1. a) How does Jayanta Mahapatra describe Indian Summer through evocative images.

OR

b) Analyse the theme of the poem 'Home coming'.

2. a) What picture of social exploitation do you find in 'Six Acres and a Third'?

OR

b) Sketch the character of Ramachandra Managaraj in 'Six Acres and a Third'.

3. a) How does Whitman emphasize the necessity of going into the open nature?

OR

b) Write a critical analysis of the poem 'The Gift outright'.

4. a) Discuss the theme of belonging in 'The Hairy Ape'.

OR

b) Analyse the character of Mildred Douglas in 'The Hairy Ape'.

5. a) Discuss waiting for Godot as an absurdist play.

OR

b) Comment on Beckett's use of symbols in 'Waiting for Godot'.
2017
Full Marks - 80
Time - 3 Hours
The questions are of equal value
Answer all questions

1. a) Analyse the features and significance of the Treaty of Shimonoseki (1895).
   OR
   b) Write a detailed note on Boxer Movement.

2. a) Review the causes and results of the Russo-Japanese War of 1904-05.
   OR
   b) Trace the causes of Chinese Revolution of 1911.

3. a) Highlight the role of Japan in the First World War and Paris Peace Conference.
   OR
   b) Ascertain the extent of success of the Washington Conference (1921-22) in solving the problems of East Asia.

4. a) Discuss the contributions of Sun-Yat-Sen to the Nationalist Movement of China.
   OR
   b) Narrate the factors leading to rise of militarism in Japan.

5. a) Discuss the role of Mao-Tse-Tung in Communist China
   OR
   b) Explain the role of Japan in the Second World War.
1. a) Briefly discuss the concept, principles and \textbf{subject matter} of Educational Psychology.

OR

b) Enumerate different goals of teaching and styles of learning explained by Educational Psychologists.

2. a) What is cognition? Discuss the nature of cognitive abilities.

OR

b) Evaluate Piaget's theory of Cognitive development with examples.

3. a) How a positive learning environment can be created?

OR

b) Discuss different strategies for encouraging motivation and thoughtful learning.

4. a) Who are gifted children? Discuss the educational programmes for gifted children.

OR

b) Discuss different educational programmes for mentally retarded children.

5. a) What is test standardization? How can a test be standardized?

OR

b) Discuss the advantages and limitations of Essay and objective type of tests with examples.
1. a) What do you mean by Educational Management. Describe its scope. 5 + 5

OR

b) What is democratic management? Discuss its main features. 5 + 5

2. a) What is Managerial behaviour? Explain the social and cultural factors that affect managerial behaviour. 2 + 4 + 4

OR

b) Discuss the important elements and functions of school plant. 5 + 5

3. a) Define educational planning. Discuss the types of educational planning. 3 + 7

OR

b) Discuss the strategies in educational planning. 10

4. a) Explain communication as a process. Discuss the types of classroom communication. 5 + 10

OR

b) Discuss the importance of mass media in classroom learning with examples. 15

5. a) What is Micro-Teaching? Discuss its uses and limitations in classroom situation. 5 + 5 + 5

OR

b) Write short notes on the following: 7½ + 7½
   (i) Computer assisted instruction
   (ii) Simulated teaching.
b) Write notes on any three of the following:

(i) Simplex method
(ii) Basic and feasible solution points
(iii) Prisoner's dilemma
(iv) Pure and mixed strategies of a game
(v) Concept of 'Degeneracy' in Linear programming problem.
(vi) Primal and Dual.
3. a) Discuss the economic significance of 'Incentives'. Examine the role of profit under socialism. 16

OR

b) Evaluate the role of communes in Chinese economic development.

4. a) What is 'mixed economy' and discuss its salient features? Briefly discuss the working of mixed economy in India. 16

OR

b) Examine the arguments for and against privatisation in India.

5. a) State and explain 'Jayaprakash Narayan's concept of 'total revolution'. 16

OR

b) Discuss the causes of the breakdown of socialism in USSR and East European countries.

GROUP - B

1. a) Evaluate: 4 × 2

(i) \( \int (5x + 7)^8 \, dx \)

(ii) \( \int \frac{x \, dx}{2x^2 + 3} \)

b) \( \int \sqrt{a^2 - x^2} \, dx \) 8

OR

a) Solve the differential equation: 6

\[ y(1-x) - x \frac{dy}{dx} = 0 \]

b) Solve the differential equation:

(i) \( (x^2 - yx^2) \frac{dy}{dx} + (y^2 + xy^2) \, dx = 0 \) 4

(ii) \( y - x \frac{dy}{dx} = x + y \frac{dy}{dx} \) 6
2. a) Derive Slutsky equation and show 'Income effect' and 'substitution effect' with a two commodity fixed income budget. 8

b) Find the optimum commodity purchases for a consumer whose utility function and budget constraints are : \( U = q_1^2 \cdot q_1 + 4q_2 = 10 \) respectively. 8

OR

a) \( U = x^2 y \) is a utility function. Find the equilibrium bundle if \( x + 2y = 4 \). 8

b) (i) The demand law is \( x = \frac{20}{p + 1} \), find elasticity of demand \( (e_d) \) with respect to price at the point where \( P = 3 \). 4

(ii) The demand function is \( P = 35 - 2x - x^2 \) and the demand \( x_0 = 3 \). Find the Consumer's Surplus. 4

3. a) Discuss the properties of Cobb-Douglas (C–D) function. Find the value of elasticity of factory substitution \( (\sigma) \) for C–D functions. 8

b) Define C.E.S. function. Obtain the value of \( \sigma \) for

\[
Q = A \left[ \alpha k^{-\beta} + (1-\alpha) L^{-\beta} \right]^{\frac{1}{\beta}}
\]

OR

Write notes on any two of the following : 4 × 2

a) i) Properties of 'Linear Homogeneous Function'

(ii) 'Adding-up' theorem

(iii) Properties of isoquants

(iv) Average Revenue (AR) and Marginal Revenue (MR) relationship.

b) Examine least cost combination of factors an entrepreneur desires to minimise the total cost for a given output level of \( q^0 = f(x_1, x_2) \) where the prices of inputs \( x_1 \) and \( x_2 \) in the market are \( r_1 \) and \( r_2 \). 8
4. a) State and explain 'Cobweb' model showing the stability of equilibrium.  

b) Determine equilibrium price and quantity for a market with demand and supply functions as \( D=20–2P \) and \( S= 40–6P \), If a specific tax of \( 1 \) one rupee per unit is imposed compute the changes in equilibrium price and quantity.  

OR  

a) Write down the assumptions of perfect competition. Examine the short run and long run commodity market equilibrium under perfect competition.  

b) A monopolist has a demand function \( P=100–4q \) and total cost \( C= 50+20q \). If the monopolist produces at a constant \( MC= 20 \), find the maximum profit and the profit maximising output of the monopolist.  

(\( P= price, C= Total\ cost, q = \text{output produced} \), \( MC= \text{Marginal Cost} \) )  

5. a) Discuss 'input-output' analysis of inter-industry relations distinguishing 'open' and 'close' system.  

b) Maximise : \( Z = 6x + 4y \)  
subject to : \( 2x + 4y \leq 48 \)  
\( 4x + 2y \leq 60 \)  
\( 3y \leq 36 \) and  
\( x \geq 0, y \geq 0 \)  

Solve the 'Linear programming problem' using graphic method.  

OR  

a) Solve the game :  

\[
\begin{bmatrix}
-2 & 0 & 0 & 5 & 3 \\
4 & 2 & 1 & 2 & 5 \\
-4 & -3 & 0 & -3 & 6 \\
5 & 1 & -5 & -2 & -6 \\
\end{bmatrix}
\]  

V-29
1. a) Give a brief account of the factors affecting distribution of population in India.

OR

b) Discuss the growth and importance of railways in the economic development of India.

2. a) Discuss the production and distribution of rice in India.

OR

b) Elaborate the problems and prospects of Indian agriculture.

3. a) Discuss the production and distribution of iron ore in India.

OR

b) Write short notes on:
   i) Age-sex structure
   ii) Urban population.

4. a) Describe the distribution and problems of cotton textile industries in India.

OR

b) Discuss the distribution and problems of iron ore in India.

5. a) Discuss the major irrigation and power projects in Odisha.

OR

b) Give an account of the growth and distribution of population in Odisha.
1. a) Explain the scope of Research Method and describe the importance of Hypothesis.

   OR

b) Write notes on the following:
   i) Exploratory Research
   ii) Explanatory Research.

2. a) Describe the techniques of field work.

   OR

b) Write notes on:
   i) Case study method
   ii) Geneealogy method
   iii) Focused Group Discussion.

3. a) What is sampling? Describe the requirement of sampling.

   OR

b) Find out the mean value of the following data:
The average mark.
(Marks secured by ten students: 75, 55, 60, 55, 65, 70, 45, 50, 65, 55)

4. a) Define statistical method and describe the use of statistic in social research.

   OR

b) Find out the mean value of the following data:
The average mark.

5. a) Write notes on:
   i) Standard deviation
   ii) Correlation
   iii) Chi square test.

   OR

b) Find out the value of correlation of the following data.

\[
\begin{array}{cccccccccc}
\text{Sl No.} & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\
\text{Students Height in cm} & 155 & 150 & 165 & 170 & 180 & 175 & 172 & 165 & 175 & 160 \\
\text{Students Weight in Kg} & 55 & 50 & 65 & 70 & 80 & 75 & 72 & 65 & 75 & 60 \\
\end{array}
\]
1. a) Examine Plato's concept of Ideal state.

OR

b) Make a critical assessment of Aristotle's views on citizenship.

2. a) Examine Machiavelli as the first modern political philosopher.

OR

b) "Hobbes started with individualism, but ended with absolutism." Comment.

3. a) "Locke laid down the essential thesis of Liberalism". (C.L. Wayper)– Elucidate.

OR

4. a) Examine the contemporary relevance of Jeremy Bentham.

b) "J. S. Mill was a reluctant democrat"– Evaluate.

5. a) Explain Hegel's views on State, Society and War.

OR

b) "The history of all hitherto existing societies is the history of class struggles"– (Karl Marx)– Comment.
b) Explain the status of world according to upanisads.

4. a) What is vidyā? Distinguish between parāvidyā and aparāvidyā
   OR
   b) Give a note on upanisadic ethics.

5. Bring out the significance of the following as described in the Bhagavadgītā.
   (a) Asaktohi ācāran karma paramāṇatoti purusa
       (Ch. III: Verse - 19)
       OR
   b) Svadharme nidhanam śreyah paradharma
       bhayābahah (Ch. III: Verse - 35)

1. Expand the meaning of any one of the following expressions of the Isōpanisad:
   a) "Iśāvasyam idam sarvam" (Mantra - I)
       OR
   b) Na karma lipyate nare" (Mantra-II)

2. a) Explain the meaning of "vidyaya amṛtam aṣṇute " (Mantra- XI)
       OR
   b) Explain the difference between sambhuti and asambhuti in the light of Isōpanisad.

3. a) Describe the upanisadic concept of Ātman.
       OR

V-32-0.5 [Turn Over
4. मनुना प्रतिपादित धर्मस्य स्वरूपं निरुपयत ।
   अथवा
   मनुस्मृत्यानुसारं उपनयनविधिमालोचयत ।

5. दृशः: टिपणी प्रदेयशः
   स्मृति:, मध्येशा:, स्वाध्याय:, चूडाकर्म

6. का नाम विद्या अथयः स्वरूपं निरुपयत
   अथवा
   अर्थशास्त्रमूल्यं त्र्योविद्यांनिरुपयत ?

7. एकस्य उत्तरम्
   क) को नाम इन्द्रजयं?
   ख) का नाम दण्डनीति?

8. एकस्य उत्कलभाष्यं अनुवादं कुर्लतः
   क) ऋद्ध पितान्य सुकुलस्तयादि के
   गुहां प्रविष्टीय परमे परार्थः
1. a) Explain crude and standardised death rates? In what way is standardised death rate superior to crude death rate? Give briefly the direct and indirect method of finding standardised death rates.

OR

b) State the meaning of various columns of a life table and explain how a life table can be constructed from data usually available. Mention the uses of a life table explain the relationship between different columns.

2. a) Define and compare various measures of fertility.

OR

b) Solve the following minimal assignment problem.

<table>
<thead>
<tr>
<th>Man</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>12</td>
<td>30</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td>II</td>
<td>18</td>
<td>33</td>
<td>9</td>
<td>31</td>
</tr>
<tr>
<td>III</td>
<td>44</td>
<td>25</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>IV</td>
<td>23</td>
<td>30</td>
<td>28</td>
<td>14</td>
</tr>
</tbody>
</table>
b) Define "Reproduction Rates" and explain how far they may be looked upon as indices of population growth.

3. a) What is control chart? Explain the basic principles underlying the control charts. Discuss the role of control charts in manufacturing processes.

OR

b) Explain in detail \( \bar{X} \) and \( R \) charts with the basis and assumptions on which \( \bar{X} \) and \( R \) charts are developed. What purpose do they serve? What are their advantages over the \( p \) chart.

4. a) Solve the following linear programming problem graphically.

Maximise \( z = 6x_1 + 11x_2 \)

Subject to \( 2x_1 + x_2 \leq 104 \)
\( x_1 + 2x_2 \leq 76 \)
\( x_1 \geq 0, \ x_2 \geq 0 \)

OR

b) Using simplex algorithm solve the following L.P.P. problem.

Maximize \( z = 2x_1 + 5x_2 + 7x_3 \)

Subject to \( 3x_1 + 2x_2 + 4x_3 \leq 100 \)
\( x_1 + 4x_2 + 2x_3 \leq 100 \)
\( x_1 + x_2 + 3x_3 \leq 100 \)
\( x_1, x_2, x_3 \geq 0 \)

5. (a) Solve the following Transportation problem by North-West Corner rule.

<table>
<thead>
<tr>
<th>From</th>
<th>( W_1 )</th>
<th>( W_2 )</th>
<th>( W_3 )</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>( F_1 )</td>
<td>(2)</td>
<td>(7)</td>
<td>(4)</td>
<td>5</td>
</tr>
<tr>
<td>( F_2 )</td>
<td>(3)</td>
<td>(3)</td>
<td>(1)</td>
<td>8</td>
</tr>
<tr>
<td>( F_3 )</td>
<td>(5)</td>
<td>(4)</td>
<td>(7)</td>
<td>7</td>
</tr>
<tr>
<td>( F_4 )</td>
<td>(1)</td>
<td>(6)</td>
<td>(2)</td>
<td>14</td>
</tr>
</tbody>
</table>

Demand | 7 | 9 | 18 | 34 |

OR
1. शब्दशास्त्र से क्या समझते हैं ? कर्क लखणा शब्दशास्त्र पर प्रकाश द्वारा ।

अवधि

रस निष्पत्ति सम्बन्धी विभिन्न आचार्योंके मत पर एक समीक्षात्मक लेख प्रस्तुत कीजिए ।

2. किन्हीं चार अलंकारोंके लखण और उदाहरण दीजिए : $5 \times 4$

अनुग्रास, यमक, श्लेष, उपमा, रूपक, उल्चेश्य, व्यतिरेक, विरोच्याभाष,

3. प्लेटो के ‘आदर्शवाद’ की समीक्षा कीजिए ।

अवधि

अरस्तू के ‘अनुकरण सिद्धांत’ को समझाकर लिखिए ।
4. बिंदू और प्रतीक का अन्तर स्पष्ट कीजिए ।
अवधि
स्वच्छन्दतावाद की प्रमुख प्रवृत्तियों पर प्रकाश डालिए ।

5. एक आलोचक के रूप में हजारी प्रसाद द्विवेदी के महत्व का आकलन कीजिए ।
अवधि
डॉ नगेन्द्र की समीक्षा की विशेषताएँ लिखिए ।

6. निम्नलिखित प्रश्नों के अंत पूरी तरह उत्तर दीजिए ।
1×10
क) नामवर सिंह के किसी एक आलोचना प्रमथ का नाम लिखिए ।
ख) महाबीर प्रसाद द्विवेदी ने किस पत्रिका का संपादन किया ।
ग) महाबीर प्रसाद द्विवेदी ने किस भाषा के प्रचार - प्रसार के लिए प्रबल आंदोलन किया था ।
घ) महाबीर प्रसाद द्विवेदी जी के द्वारा एक अनुदित गद्य कृति का नाम लिखिए ।

ड) नन्द दुलारे बाजपेयी किस युग के समीक्षक थे ।
च) ‘हिन्दी साहित्य-बीवरी शराबदी’ किसकी पुस्तक रही ।
छ) नामवर सिंह किस विश्वविद्यालय के प्रोफेसर थे ।
ज) नामवर सिंह के द्वारा संपादित हिन्दी की एक पत्रिका का नाम लिखिए ।
झ) बाजपेयी जी हिन्दी समीक्षा के क्षेत्र में किस काव्य के समीक्षक के रूप में आये ।
झ) नामवरजी किस प्रकार के आलोचक हैं ।

V-34-0.3
1. a) Briefly outline the inadequacies of classical physics.  
 b) Using Heisenberg's uncertainty relation find the ground state energy of H-atom.  
 OR  
 a) Explain how Davisson-Germer experiment conclusively established the wave nature of electrons.  
 b) Distinguish between phase velocity and wave velocity. Find a relation among the two.  

2. a) Deduce Schrodinger's equation in momentum space.  
 b) Give the mathematical theory of Kroning-Penny model. Explain how it successfully explained band structure in solids.
b) If a wavefunction is initially normalised, show that it remains normalised at a later time. 4

OR

a) State and prove Ehrenfest's theorem. 8

b) Prove that the Hamiltonian operator is Hermitian. 4

3. a) A particle encounters a potential well described by

\[ V(x) = \begin{cases} -V_0, & -a < x < a \\ 0, & |x| > a \end{cases} \]

Solve Schrödinger equation for the above potential to obtain the bound states.

OR

b) A particle is confined to a 3D-Box solve Schrödinger equation to obtain the energy eigen values and eigen functions. 12

4. a) What are Miller indices? Determine the Miller indices for planes with each of the following sets of intercepts a, b, -c. 2+4

b) Prove that c/a ratio of an ideal HCP structure is 1.633. 6

OR

c) What do you mean by symmetry operations? Describe the principal symmetry operations applicable to a 3-D lattice. 3+3

d) What are the properties of a reciprocal lattice? How is it constructed from a direct lattice? 4+2

5. a) What is Vander Waals-London interaction? Is it present in all solids? 5+3

b) Explain Cohesive energy. 4

OR
1. a) State and explain Beer Lambert law. 2+4
   b) A compound having molar extinction coefficient 1000 dm$^3$ mol$^{-1}$ Cm$^{-1}$ shows an optical density of 0.01 in a cell of path length of 1cm. Calculate the concentration. 2
   c) What type of electronic transition do you expect in a keto compound in U.V. spectra? 2

2. OR
   d) Explain why light radiation is termed as electromagnetic radiation? Explain the features of electromagnetic spectrum. 4+4
   e) What will be the wave number of a radiation having wave length 310 nm? 2
2. a) What is Hooke's law? Derive the stretching vibrational frequency of a bond

\[ r = \frac{1}{2\pi} \sqrt{\frac{k}{\mu}} \]

where the symbols have their usual meaning.

b) Calculate the approximate frequency of C–H stretching vibration from the following data.

\[ K = 5 \times 10^5 \text{ gm. Sec}^{-2} \]

mass of C atom = 20 \times 10^{-24} \text{ gm}

mass of H atom = 16 \times 10^{-24} \text{ gm.}

b) Discuss the pmr spectra of ethylbromide

c) What are the factors which influence the chemical shift?

OR

d) Write notes on:

(i) Coupling constant

(ii) Shielding and deshielding of protons

4. a) Give important features of the mass spectra of hydrocarbon.

b) The mass spectrum of 2-Butanol shows some peaks at m/e value 45, 59 and 74. What should be their corresponding ions? Explain its fragmentation pattern.

OR

c) Write notes on:

(i) Nitrogen rule

(ii) Metastable peak

3. a) How many MNR signals you expect for the following compounds?

i) neo-pentane

ii) propan-2-ol

iii) cyclohexane

iv) 2-Chloropropene.
1. a) Define Fuzzy logic. 
   b) How Fuzzy logic differs from CRISP set. 
   c) Discuss different inference rules in Propositional Logic. 
   
OR
   d) Define De-Fuzzyfication. 
   e) Discuss different Membership Functions. 
   f) How the Fuzzy rules are generated?

2. a) Define Artificial Intelligence. 
   b) Discuss the history of Artificial Intelligence. 
   c) Classify the Artificial Intelligence. 
   
OR
d) Write and explain A* search procedure with a suitable example.

4.

b) Write a program in LISP to find out the sum up to a given number.

OR

c) Discuss Natural Languages and their processing's.

d) Write a program in LISP to check out a given number is PRIME or not.

5.

b) How Brain works.

c) Write a note on Applications of Expert System.

OR

d) Define Expert System.

e) Discuss Expert System Architecture.

f) Discuss different Learning Techniques.

V-46-0.5
2017

Full Marks - 80
Time - 3 Hours

The questions are of equal value
Answer \textit{all} questions from any one group

GROUP -A

\textit{(FSA)}

1. a) What do you mean by Financial Statement Analysis and its interpretation? State the different types of financial analysis and discuss the limitations of analysis and interpretation of financial statement.

OR


2. a) What is common size Balance Sheet and common size Income Statement? Explain the techniques of preparing common size Balance Sheet.

OR
b) Explain the following terms and write their importances.
   i) Trading on Equity
   ii) Operating Leverage
   iii) Financial Leverage
   iv) Creditor Turnover ratio.

3. a) What do you mean by Revenue? How is it recognised and measured while reporting.

   OR

   b) i) Discuss various methods of valuation of inventory.

   ii) What are the different types of liabilities and state how they are valued for reporting purposes.

4. a) Discuss the concept of Human Resources Accounting and explain its importance in the present context also state two methods for valuing human resources Assets.

   OR

   b) What do you understand by Accounting Standards? What are the reasons for slow progress of standard setting in India?

5. a) Which company are the non banking financial company. Discuss various guidelines prescribed by RBI for them.

   OR

   b) What do you mean by Social Accounting? Write its scope, need and benefits, also discuss about the social cost benefit analysis.

GROUP - B

1. a) What is communication? Describe the various stages involved in the process of communication.

   OR

   b) Write notes on:

   (i) Downward and upward communication
   (ii) Grapevine patterns of communication
   (iii) Barriers to Communication.
2. a) What do you understand by advertising budget? Discuss various methods setting advertising budget.

OR

b) Discuss the various types of advertising with example.

3. a) What is copywriting? What approach do you suggest for best copywriting?

OR

b) What is an illustration as used in an advertising? Outline the essentials of a good illustration.

4. a) What are some of the functions of an advertising agency? Why do most companies use advertising agency?

OR

b) Is advertising wasteful, unethical and misleading? Discuss.

5. a) What is sales promotion? What measures would you suggest for sales promotion of a consumer product?

OR

b) Write notes on the following:
   i) Trade fairs and exhibitions
   ii) Consumer contests
   iii) Coupon sampling
   iv) POP analysis.

GROUP - C

1. a) What do you mean by Merchant Banking? State the functions of Merchant Banking with special reference to Indian market.

OR

b) Discuss the role of Merchant Banking in fund raising by:
   (i) Alternative to public issue
   (ii) Public deposits.
2. a) Discuss in detail about the different types of credit rating and state clearly rating methodology cautions.

OR

b) Explain in detail:

i) Project life cycle.

ii) Analysis of capital cost and analysis of financial projections.

3. a) What do you mean by working capital and its analysis. Write in detail the concept of working capital. Discuss various sources of working capital.

OR

b) Explain:

i) Terms Loans

ii) Working capital loans

iii) Maximum possible limits of bank finance.

4. a) Write the concepts of Lease Financing. Discuss the factors you consider while taking Leasing decisions.

OR

b) Discuss in detail the concepts of mutual fund and give their classification and their operation in India.

5. a) Define Portfolio management? Write the concepts, principles and various steps of portfolio management.

OR

b) Define venture capital. Write the scopes, importances and necessary steps involved to provide venture capital.
1. a) Give an account of the meristematic tissue system.

OR

b) Write notes on the following:
   (i) Organization of shoot apex
   (ii) Complex tissues.

2. a) Describe briefly the organization of vascular bundles.

OR

b) Write notes on the following:
   (i) Mechanical tissues.
   (ii) Sclereids and fibres.

3. a) Discuss on anomalous secondary growth in dicot stems with two examples.

OR

b) Write notes on the following:
   (i) Lenticels
   (ii) Ventilating tissue system.

4. a) Give a detailed account of microsporogenesis.

OR

b) Write notes on the following:
   (i) Structure of ovule
   (ii) Tetrasporicembryosac.

5. a) Give an account of the different types of endosperm formation.

OR

b) Write notes on the following:
   (i) Totipotency
   (ii) Xenia.
3. Describe the basic steps of genetic engineering
   OR
   Write notes on any two of the following:
   a) Southern blotting
   b) DNA polymerase
   c) Gene cloning.

4. What is monoclonal antibody? Discuss hybridoma technology for the production of monoclonal antibody. Add a note on the application of MAB.
   OR
   Write notes on any two of the following:
   a) DNA probes.
   b) Transgenic animals
   c) Mechanism of tissue culture.

5. Discuss causes and control measures of climate change.
   OR
   Write notes on any two of the following:
   a) Bioindicator
   b) Vermiculture
   c) Garbage management.

1. Give an account of different types of Lipids.
   OR
   Write notes on any two of the following:
   a) Denaturation of protein
   b) Disaccharides
   c) $\alpha$-helix structure of polypeptide.

2. Describe the reactions and energetics of $\beta$-oxidation of fatty acid.
   OR
   Write notes on any two of the following:
   a) Enzyme classification.
   b) Energetics of Krebs cycle
   c) Glycogenolysis.
b) "The suitability of data processing methods depends on the volume of data to be processed". Comment. 16

3. a) What is a conjoint analysis? Explain the steps involved in its use. 16

OR

b) What is discriminant analysis? What is it used for? Explain. 16

4. a) What is factor analysis? What is it used for? 8

OR

b) What is cluster analysis? What is it used for? Elaborate. 8

5. a) Discuss the role of a computer in research work in the present days. 16

OR

b) What are the different bases of classifying reports? Are these mutually exclusive? Elaborate. 16

1. a) What is money market? Why there is a critical need for money market instruments, explain. 4+12

OR

b) "The suitability of data processing methods depends on the volume of data to be processed". Comment. 16

2. a) What do you understand by listing of securities? Discuss the advantages and disadvantages of listing. 4+8+4

OR

b) Write short notes on the following 8+8
i) Foreign Exchange Market
ii) Functions of DFHI.
b) How do operations on a stock exchange affect the economic life of a nation? Is it necessary to control the stock exchange? 12+4

3. a) Briefly explain the methodology adopted by credit rating agencies in India. 16

OR

b) Write short notes on the following. 8 + 8

(i) Credit syndication service

(ii) Due Diligence.

4. a) Briefly discuss the various types of mutual funds. 16

OR

b) What are factors that are analysed by venture capitalists while deciding on investments. 16

5. a) Discuss the advantages and limitations of lease financing. 16

OR

GROUP - B

1. a) Explain briefly the basic steps in conducting marketing research. 16

OR

b) What is a questionnaire? Explain its importance in marketing research? Explain the general rules that must be taken into consideration while preparing a questionnaire. 16

2. a) Define tabulation. How is it useful in condensing the data? Explain the various parts of an ideal table. 16

OR
2017
Full Marks - 40
Time - 3 Hours
The figures in the right-hand margin indicate marks.
Answer all questions

1. 1) একজন যুবক চায়ের টাকা দিয়ে পানি মার্গ তীর্থে নিয়ে যায়।

    চলা

    2) যুবক এখনও চিন্তাভার ভরপূর থাকেন।

2. 1) তদানীন্তন মজুরিতে মেয়েরা তাদের মুখের জিঙ্গলে দিয়ে যায়।

    চলা

    2) মজুরিতে জীবন লাগাতে চেষ্টা করেন।

3. যদি স্ত্রীর দুঃখানুভূতি করিয়ে দিচ্ছেন।

4 × 9

1) পুত্র-ফুল যুগল

2) স্ত্রীর চিরদিন ধার

3) যুদ্ধ জয়লাল

4) দুঃখের শিখ পালন

5) যুদ্ধের জয়
3. Write notes on any two of the following. 16
   a) Modes of political participation
   b) Theories of political communication
   c) Power as a factor of social stratification.
   d) Role of political culture.

1. a) What is political socialisation? Discuss various agencies of political socialisation. 12

   OR

   b) What is political recruitment? Discuss methods of political recruitment.

2. a) What is social mobility? Discuss various factors responsible for social mobility. 12

   OR

   b) Discuss the role of caste in Indian society for social stratification. 12
[2]

b) What information does Bloch equation contain? Write down the same equation clearly stating the meaning of the symbols contained in it. 1+2

c) How are colour centres produced in a solid. 3

2. a) Calculate the local electric field at an atom inside a dielectric solid by calculating the depolarising field, the Lorentz field and the field of dipoles of cubic symmetry. 4+4+4

OR

b) What are ferro-electric crystals and how do you classify those materials? Discuss the condition for polarization catastrophe. Distinguish between first order and second order transitions with one example each. 1½+1½+5+4

3. a) Give an elementary treatment of BCS theory of superconductivity. Obtain the gap equation at T=0°K. 8+4

OR

b) Write notes on the following: 4 ×3
   i) Cooper pairs
   ii) SQUIDS
   iii) Meissner effect.
3. Describe the various methods of groundwater exploration. 12

   OR

   Write notes on the following:
   a) Sea water Intrusion 6
   b) Tubewell failures causes. 6

4. Give a detail account of the geological considerations in the selection of Dam and Reservoir sites. 12

   OR

   Write notes on the following:
   a) Engineering properties of soils. 6
   b) Building stones with examples. 6

5. What are the various types of soil erosion? Describe the various methods of soil conservation. 12

   OR

   Write notes on the following:
   a) Earthquake resistant structures 6
   b) Geology of Bridge site. 6

1. Outline the basic principle of Remote sensing. 12

   OR

   a) Application of Photogeology in Geological Mmapping. 6
   b) Application of photogeology in ground water studies. 6

2. Give a detail account of ground water provinces of India. 12

   OR

   Write notes on the following:
   a) Hydrological cycle 6
   b) Types of Aquifers. 6

3. Describe the various methods of groundwater exploration. 12

4. Give a detail account of the geological considerations in the selection of Dam and Reservoir sites. 12

5. What are the various types of soil erosion? Describe the various methods of soil conservation. 12
VI-PG-Odia-XVIII

2017

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks.

Answer all questions

1. ଯୁତିକ ବାଣିଜ୍ଞ ଦିଶା କୌତ ତୁଁଇ ? ବାଣିଜ୍ଞ କିକୁରୁ ରାଣାର ଛାଡ଼ି ତୁଁଇ ଗାଢ଼ି ତୁରିଛ ନିଛ।

2. କେଉଁ ବିଶ୍ୱବିଶ୍ୱ ସରକାର କୌତ ତୁଁଇ ମାନାକୁର କରିବ ?

3. କେଉଁ ବିଶ୍ୱବିଶ୍ୱ ସରକାର କୌତ ତୁଁଇ ପରିମାଣର ପୂରାନ୍ତ୍ର କରିବ ?

4. ପ୍ରତିକ୍ଷା କୁ ବରନ୍ତି ଗାଢ଼ି ତୁରିଛ ନିଛ।

5. ଯାହାନ୍ତି ବ୍ୟବସ୍ୟ ଗାଢ଼ି ତୁରିଛ ନିଛ।

6. ଯୁତିକ ବାଣିଜ୍ଞ ଦିଶା କୌତ ତୁଁଇ ? ବାଣିଜ୍ଞ କିକୁରୁ ଗାଢ଼ି ତୁରିଛ ନିଛ।

7. ଏହା କେଉଁତିବାସ ସରକାରର ପରିମାଣ କରିବ ଲାଗି କାଲିଗନ୍ତକ ଦେଖିବ ନିଛ?

8. କେକ୍ଷତ୍ରର କାର୍ଯ୍ୟର ସରକାର କରିବ ଲାଗି କାଲିଗନ୍ତକ ଦେଖିବ ନିଛ?

9. ଏହା କେକ୍ଷତ୍ରର କାର୍ଯ୍ୟର ସରକାର କରିବ ଲାଗି କାଲିଗନ୍ତକ ଦେଖିବ ନିଛ?

10. ଏହା କେକ୍ଷତ୍ରର କାର୍ଯ୍ୟର ସରକାର କରିବ ଲାଗି କାଲିଗନ୍ତକ ଦେଖିବ ନିଛ?

V-61-0.5
3. Briefly answer any two of the following: 8 × 2

a) Do you think peasant movements have protected the interests of peasants in India? Justify your answer.

b) Explain the nature of Youth and Student Movements in India.

c) "India's political culture maintains a dialogue between tradition and modernity" – Evaluate.

d) Explain the positive impact of globalization on Indian society.

2017
Full Marks - 40
Time - 3 Hours
The figures in the right-hand margin indicate marks.
Answer all questions

1. a) Examine the nature and operational dynamics of trade unions in the Indian political system.

   OR

   b) Briefly point out the growth of women's Movement in India and discuss the major issues highlighted by these movements in recent times.

2. a) Make a critical analysis of the changing rural power structure in the aftermath of the 73rd Constitution Amendment.

   OR

   b) What do you mean by sustainable development? Evaluate the approach or initiatives of the Government to promote and achieve the goals of sustainable development.
1. a) Use graphical method to minimize the time needed to process the following jobs on the machines shown below, i.e. for each machine find the job that should be done first. Also calculate the total time needed to complete both the jobs. 8

<table>
<thead>
<tr>
<th>Job 1</th>
<th>Sequence of machine time</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job 2</th>
<th>sequence of machine time</th>
<th>C</th>
<th>A</th>
<th>D</th>
<th>E</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

b) Determine \( x_1, x_2 \) and \( x_3 \) so as to
Maximize \( z = -x_1^2 - x_2^2 - x_3^2 + 4x_1 + 6x_2 \)
Subject to \( x_1 + x_2 \leq 2 \)
\( 2x_1 + 3x_2 \leq 12 \)
\( x_1, x_2, x_3 \geq 0 \)
8

5. a) Use Wolfe's method to solve the QPP.
Maximize \( Z = 8x_1 + 10x_2 - x_1^2 - x_2^2 \)
Subject to \( 3x_1 + 2x_2 \leq 6 \)
\( x_1, x_2 \geq 2 \)
\( x_1, x_2 \geq 0 \)
8

b) Use Beale's method to solve the following NLPP:
Minimize \( z = 6 - 6x_1 + 2x_1^2 - 2x_1x_2 + 2x_2^2 \)
Subject to \( x_1 + x_2 \leq 2 \)
\( x_1, x_2 \geq 0 \)
8

b) Using the principle of dominance, solve the following game. 8

Player B
\[
\begin{bmatrix}
3 & -2 & 4 \\
-1 & 4 & 2 \\
2 & 2 & 6
\end{bmatrix}
\]

Player A

[Turn Over]
2. a) Use dynamic programming to solve the following problem.

Minimize \( Z = y_1^2 + y_2^2 + y_3^2 \)
Subject to \( y_1 + y_2 + y_3 \geq 15 \)
\( y_1, y_2, y_3 \geq 0 \)

OR

b) Use dynamic programming to solve the LPP

Maximize \( Z = x_1 + 9x_2 \)
Subject to \( 2x_1 + x_2 \leq 25 \)
\( x_2 \leq 11 \)
\( x_2, x_2, \geq 0 \)

3. a) Tasks A, B, ..., H, I constitute a project. The notation \( X < Y \) means that the task \( X \) must be completed before \( Y \) is started. With the notation \( A < D, A < E, B < F, D < F, C < G, C < H, F < I, G < I \)
Draw a graph to represent the sequence of tasks and find the minimum time of completion of the project, when the time (in days) of completion of each task is as follows:

<table>
<thead>
<tr>
<th>Task</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (days)</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>14</td>
<td>9</td>
</tr>
</tbody>
</table>

b) Consider the following project.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Optimistic</th>
<th>Most likely</th>
<th>Pessimistic</th>
<th>Predecessor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>None</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>B</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>3</td>
<td>11</td>
<td>B</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>C,D</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>5</td>
<td>15</td>
<td>E</td>
</tr>
</tbody>
</table>

Find the path and standard deviation. Also find the probability of completing the project by 18 weeks.

4. a) Obtain the set of necessary and sufficient conditions for the given NLPP and solve:

Minimize \( z = 2x_1^2 - 24x_1 + 2x_2^2 - 8x_2 + 2x_3^2 - 12x_3 + 200 \)
Subject to \( x_1 + x_2 + x_3 = 11 \)
\( x_1, x_2, x_3 \geq 0 \)

OR
Write notes on the followings: 7 + 7
a) Sales Forecast
b) Sales organisation.

2. It is not only sufficient to employ qualified personnel in the Organisation. You have to motivate them to get the desired result”. Justify the statement. 13

OR

Write notes on the following: 6½ + 6½
a) Sales meeting and Sales contest.
b) Compensation policies.

3. What do you mean by 'control'? How control process helps managing expenses of sales personnel? 13

OR

Write notes on the following. 6½ + 6½
a) Evaluation of Sales force management as a tool of control
b) Effect of Sales volume and its cost on profitability.

IV-PG-Com-XVII (FM/AS M)

2017
Full Marks - 40
Time - 3 Hours
The figures in the right-hand margin indicate marks. Answer all questions from any one section.

SECTION - A
(FM)

1. a) X Ltd. has a share capital of Rs. 10,00,000 divided into 1,00,000 shares (equity) of Rs.10/- each, fully paid. It has a major expansion programme requiring an investment of another Rs. 5,00,00. The management is considering the following alternatives for raising this amount.
   (a) Issue of 50,000 equity share of Rs.10/- each
   (b) Issue of 50,000 12% preference shares of Rs 10/- each.
   (c) Issue of 10% debenture of Rs, 5,00,000/-
   The company’s earning before interest and tax (EBIT) are Rs. 40,00,000 p.a. You are required to calculate the effect of each of the above modes of financing on EPS
(earnings per share) assuming that EBIT will increase by Rs. 1,00,000 and tax ratio is @50%.

OR

b) Explain the factors which influence the dividend decision of the company.

2. a) Prepare an estimate of working capital requirement of DCM Ltd. adding 10% for contingencies from the following information:

Estimated cost per unit of production is Rs. 170 (includes raw material Rs. 80, direct labour Rs. 30 and overheads excluding depreciation Rs. 60). Selling price is Rs. 200 per unit. Level of activity per annum Rs. 1,04,000 units. Raw material in stock: average 4 weeks. Credit allowed by the suppliers: average 4 weeks. Finished stock: average 4 weeks. Work-in-progress: average 2 weeks (assume 50% completion stage). Credit allowed to Debtors: average 8 weeks. Lag in payment of wages and overheads: 1.5 weeks and cash at Bank is expected to be Rs. 25,000.

You may assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit only.

OR

b) What is working capital? Discuss its significance in a concern.

3. a) "Cash Budget is an appropriate technique of Cash management". Explain with different methods of preparing it.

OR

b) Write notes on:
   (i) ABC analysis of inventory control.
   (ii) Economic Ordering Quantity.

SECTION - B

1. What is Sales Budget? How it is prepared? Give suitable illustration.

OR
2. Discuss in detail about the organising and controlling system of international marketing.  
   OR
   Explain in detail how marketing information system plays a vital role in International Marketing.

3. Discuss the emerging issues and developments in international marketing in the context of Ethical and social phenomenon.
   OR
   Critically examine the followings:
   a) Impact of globalization on International Marketing.
   b) W.T.O. its operation and achievements.

1. a) Of what use is the industry life cycle approach to an industry analyst.
   OR
   b) What do you mean by technical analysis? Which single indicator is the best and why you think so?

2. a) What does the coefficient of determination tell us that its sister statistic, the correlation coefficient, does not tells us?
   b) In what ways does the Sharpe system for generating efficient portfolios differ from the Markowitz system.
   OR
c) Stock R and S display the following return over the past two years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Stock R Return (%)</th>
<th>Stock S Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>2014</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

i) What is the expected return on a portfolio made up of 40 percent R and 60 percent S?

ii) What is the \( \delta \) (S.D) of each stock?

iii) What is the covariance of stocks R and S?

iv) Determine the coefficient correlation of stock R and S.

v) What is the portfolio risk of a portfolio made up of 40 percent R and 60 percent S?

3. a) What is the essential difference between the Sharpe and Treynor Indexes of portfolio performance? Which do you think is preferable? Why?

GROUP B

1. a) Explain in detail about the promotion decisions through international advertising.

b) Study the relation between sales promotion and public relations in the context of Internationals Marketing.

OR

Write notes on the following:

a) International logistic decisions

b) Selection of foreign distribution in the light of international marketing.
4. a) Find the type of \( y^2 = x^3 - x \) over \( \mathbb{F}_7 \)  
OR
b) i) Let \( n \) a positive integer. Suppose that there is a prime \( q \) dividing \( n-1 \) which is greater than \( \sqrt{n} - 1 \). If there exists an integer \( a \) such that \( a^{n-1} \equiv 1 \pmod{n} \) and \( \gcd(a^{(n-1)/q} - 1, n) \) then show that \( n \) is prime.  
ii) Let \( q = 2^r \), and let the elliptic curve \( E \) over \( \mathbb{F}_q \) have equation \( y^2 + y = x^3 \). Express the co-ordinates of \(-p\) and \(2p\) in terms of the co-ordinates of \( p \).

5. a) If \( n \equiv 3 \pmod{4} \), then prove that \( n \) is a strong pseudoprime to the base \( b \) if and only if it is an Euler pseudoprime to the base \( b \).

b) Prove that if \( k=4 \), and if generalized fermat factorization works for a certain \( t \), then simple fermat factorization (with \( k=1 \)) would have worked equally well.

OR

c) Prove that a carmichael number must be the product of at least three distinct primes.

d) Factor 8051 using \( f(x) = x^2 + 1 \) and \( x_0 = 1 \) by rho method.
can be written as
\[ \sum_{\lambda_n \leq x} a_n \varphi(\lambda_n) = A(x) \varphi(x) - \int_1^x A(t) \varphi'(t) \, dt. \]

OR

c) Let \( f \) be a multiplicative arithmetical function, and let the series \( \sum_{n=1}^{\infty} f(n) \) be absolutely convergent. The \( \sum_{n=1}^{\infty} f(n) = \prod_{p} (1 + f(p) + f(p^2) + \ldots) \) proves the identity

where the product on the R.H.S. is absolutely convergent. If \( f \) is completely multiplicative then show that

\[ \sum_{n=1}^{\infty} f(n) = \prod_{p} [1 - f(p)]^{-1} \]

d) If \( x \) is sufficiently large, then show that

\[ \lim_{x \to \infty} \frac{\pi(x)}{x / \log x} \leq 4 \log 2 \]

2. a) If \( S \) is a bounded, convex symmetric set of measure \( V(S) \geq 2^n \), then prove that there exists a lattice point, other than the origin, in the closure of \( S \).

OR

b) If \( \wedge \) is a lattice with determinant \( \Delta \neq 0 \), and \( p \) is a closed bounded, convex, symmetric set of measure \( \nu \geq 2^n |\Delta| \), then \( p \) contains a point of \( \wedge \) different from origin. Prove this.

3. a) Let \( A = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \in M_2(z/Nz) \) and set \( D = ab - bc \). Then prove that the following statements are equivalent.

i) g.c.d. \((D,N) = 1\)

ii) \( A \) has an inverse matrix.

iii) If \( x \) and \( y \) are not both 0 in \( z/Nz \) then

\[ A \begin{pmatrix} x \\ y \end{pmatrix} \neq \begin{pmatrix} 0 \\ 0 \end{pmatrix} \]

iv) \( A \) gives a 1 to 1 correspondence of \((z/Nz)^2\) with itself.

OR

b) Suppose we know that our adversary is using an enciphering matrix \( A \) in the 26-letter alphabet. We intercept the ciphertext "WKNCCHSSJH", and we know that the first work is "GIVE". Find the deciphering matrix \( A^{-1} \) and read the message.
1. a) Explain the stages of production and significance of the stages analysis.  
   13
   OR
   b) Explain the laws of production with one variable factors.  
   13

2. a) Define the meaning of return to scale. Explain increasing return, constant return, and diminishing return to scale.  
   13
   OR
   b) State why is the short run Average Cost curve is U-shaped.  
   13

3. a) What is inflation? Explain the effects of Inflation.  
   14
   OR
   b) What is meant by "Businesses Cycle"? Explain any two theories of Business cycle.  
   14
G) Draw a brief character sketch of Vasantasena.

H) Discuss Kovalan-Madhavi relationship. How does Madhavi's mother exploit Kannagi?

**Group - B**

2. Discuss the distinctive features of Indian Epic poetry. 12½

3. Comment on the stock characters and the role played by them in classical Indian Drama 12½

4. Describe the parting scene at Kanva's ashram when Shakuntala leaves the hermitage to enter Dushyanta's palace. 12½

5. Discuss Dushyanta-Shakuntala love affair in Kanva's ashram. 12½

6. Explain the game of Dice in the Mahabharata and its subsequent consequences. 12½

7. Discuss Charudutta-Vasantasena relationship in 'Mrcchakatikam'. 12½

8. Narrate the circumstances leading to Kovalan's punishment by the King. How did Kannagi prove Kovalan's innocence. 12½

**Group - A**

1. Give short answers to any four of the following. 7½ × 4

   a) Write a brief note on the concept of Rasa.

   b) What conflict does a Hero face while performing his Dharma.

   c) Discuss how Shakuntala's two companions boost the love affair between Dushyanta and Shakuntala.

   d) How does Dushyanta visit Kanva's ashram and fall in love with Shakuntala?

   e) How does Draupadi react to her staking in the game of Dice? Who is the person who supports her and why?

   f) Under what circumstances was the little clay cart of Chandatta's son turned into a cart of gold.
h) Write a brief essay on the economic issues of the American Revolution.

**Group - B**

2. Describe the Economic Crisis of Europe in the 17th Century.  
   12½

3. Examine the Political Dimensions of 17th Century European Crisis.  
   12½

   12½

5. Form an estimate on the patterns of absolutism in Europe.  
   12½

6. Discuss the impact of Modern Science on European society.  
   12½

7. Evaluate the impact of Mercantilism on European Economy.  
   12½

8. Assess the social significance of the American Revolution.  
   12½
Group - B

2. Discuss how short run price of a commodity is determined in a competitive market. Do you think increase in demand for a commodity always leads to rise in its price in the short run? 12½

3. Derive the long run supply curve of constant cost industry working under perfect competition. 12½

4. Explain the allocation of resources in an economy using general equilibrium model. 12½

5. Illustrate a mathematical model of production and exchange under General Equilibrium analysis. 12½

6. Discuss the conditions under which price discrimination is both possible and profitable. 12½

7. Analyse Cournot's duopoly model. What are its limitations? 12½

8. Examine the difference between income effect and substitution effect of rise in wage rate. Discuss their impact on labour supply. 12½

Group - A

1. Write notes on any four of the following. 7½ × 4
   a) Producer surplus in the long run.
   b) Price controls and shortages.
   c) Factor price determination under general equilibrium analysis.
   d) Monopoly and resource allocation.
   e) Regulation of monopoly.
   f) Product differentiation.
   g) Strategic entry deterrence.
   h) Wage variation.

The figures in the right-hand margin indicate marks

Answer five questions including Q. No. 1. which is compulsory.
Group - B

2. Define political culture and examine Almond's classification. 12½

3. Discuss the significance of electoral system and briefly examine the first past the post system of representation. 12½

4. Discuss the Sartori's view on classification of political party. 12½

5. Discuss the development of Nation state in Post colonial countries. 12½

6. Discuss the historical evolution of Nation-State in European country. 12½

7. Analyse the process Democratisation in developing country. 12½

8. What is Federation? Examine its merits and demerits. 12½

Group - A

1. Write notes on any four of the following. 7½ × 4
   a) Significance of New Institutionalism.
   b) Relation between political culture and political system.
   c) Proportional Representation
   d) Functions of political party.
   e) Process of democratisation in post communist countries.
   f) Distinguish between federation and confederation.
   g) Basic elements of party organisation.
   h) Recent trends in party system of developing countries.
Group - A

1. সমস্ত নিবন্ধ সম্পূর্ণ রূপে লিখতে হবে।
   
2. নিবন্ধটিতে কাল্পনিক পদ্ধতি ব্যবহার করা হবে।

Group - B

1. ছাত্র সমূহের নিবন্ধ সম্পূর্ণ রূপে লিখতে হবে।

2. ছাত্র সমূহের নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।

3. নিবন্ধের কল্পনায়ক সমস্ত প্রশ্ন প্রকাশের সময় প্রশ্ন নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।

4. নিবন্ধের কল্পনায়ক সমস্ত প্রশ্ন প্রকাশের সময় প্রশ্ন নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।

5. নিবন্ধের কল্পনায়ক সমস্ত প্রশ্ন প্রকাশের সময় প্রশ্ন নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।

6. নিবন্ধের কল্পনায়ক সমস্ত প্রশ্ন প্রকাশের সময় প্রশ্ন নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।

7. নিবন্ধের কল্পনায়ক সমস্ত প্রশ্ন প্রকাশের সময় প্রশ্ন নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।

8. নিবন্ধের কল্পনায়ক সমস্ত প্রশ্ন প্রকাশের সময় প্রশ্ন নিবন্ধের বিষয় ও কল্পনার সম্পূর্ণ রূপে লিখতে হবে।
Answer five questions including Q. No. 1, which is compulsary.

Group - A

1. अधोलिखितेऽथूपेऽकाव्यस्य चतुर्गामाः उत्तरं प्रदेयम् 7½ × 4

क) सुदर्शन हनुमनदेवशः प्रकाष्टीयाः;

ख) समुद्रभूतस्य राजविद्वितां अभिलेखास्वरूप लिखित;

ग) मानसोपि-प्रस्तराभिलेखस्य मध्यलाचरणविवेचनीयाः;

घ) समस्तेऽव्यः नवपुरस्य जीवविश्वास्यां चविवेचनीयाः तथा वरस्तू मेवरणीयाः स एव;

ड) अनुसाद्ध करणीयः प्रेयन्त भगवतं श्रीयून्यमेत्यस्य भव्यतात्विक विवेचक धीरः;

रुपयो हि धीरोधित भ्रातीयस्य वृणीविधी प्रेयोध नंदो योग्वेस्वरूपात्वीयाः

Group - B

2. रुद्रामः गिरि-ग्रस्तप्रथमभिकृतम साहित्यकृतिकृतां निरुपयत 12½

3. समुद्रभूतस्य अभिलेखस्य ऐतिहासिक मूल्यं विचारयत 12½

4. द्विपुष्पे तिलखत ‐
   जयदाम्मु, आदिनिर्माणम्, शिशुपालम् 12½

5. यशोधरम् राजविद्वूति प्रक्रिया च वर्णयत 12½

6. निर्वकस्य: आतमज्ञानवत्तु सप्तांतररामचलम् वर्णयत 12½

7. रथस्पकस्य दार्मिकमहत्वम् तृतीयवल्ली आधारण दीयत 12½

8. आलम् स्वरूपं भववत्‌पीता आधारणलिखित 12½
g) Highlight briefly the impact of Globalisation on Education.

h) What is privatisation? What are its features.

**Group - B**

2. Define globalisation and discuss its features. 12½

3. Examine the cultural dimension of Globalisation. 12½

4. Discuss the technological dimension of contemporary globalisation. 12½

5. Highlight briefly on anti globalisation movements. 12½

6. Describe the impact of Globalisation on Tribal people.

7. Discuss the meaning and nature of consumerism. 12½

8. Analyse briefly the political dimension of Globalisation. 12½
Group - A

1. Write short notes on any four of the following: 6\times4
   a) Evolutionism.
   b) Diffusionism.
   c) Culture Area.
   d) Colonialism.
   e) British Social anthropology.
   f) American cultural tradition.
   g) Religious theory of Durkheim
   h) Functionalism.

Group - B

2. Discuss about classical evolutionism. 9
3. Describe neo-evolutionism 9
4. Explain about diffusionism. 9
5. Write in detail about Fieldwork tradition of Anthropology. 9
6. Write an essay on Functionalism. 9
7. Delineate on structurealims of Levi Strauss. 9
8. Explain symbolism and interpretative approach. 9
2017

Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q. No. 1.
which is compulsory.

Group - A

1. Answer any four of the following. 6 × 4

a) Explain Type-I and Type-II errors. What do you mean by size of errors.

b) Define Most Powerful test and uniformly Most Powerful test.

c) Explain clearly the concept of a "Critical Region" and "power of a test" in statistical inference.

d) Explain the use of Neyman-Pearson Lemma in obtaining the best critical region by an illustration.
e) Define "Likelihood Ratio Test". Under what circumstances would you recommend this test?

f) Derive the Sign Test stating clearly the assumptions made.

g) Derive the run test stating clearly the assumptions made.

h) Set up a non parametric procedure for finding the confidence interval for the median of a distribution.

**Group - B**

2. What are simple and composite statistical hypothesis? Give examples. Define null and alternate hypothesis. How is a statistical hypothesis tested?

3. State and prove Neyman Pearson Lemma for testing a simple hypothesis against a simple alternative.

4. What are level of significance and power of a test? Find the most powerful test for testing given value of the parameter against another given value in a Poission distribution.

5. Show that the "likelihood Ratio Test" for testing the equality of variances of two normal distributions is the usual F-test

6. Let $x_1, x_2, x_3, ..., x_n$ be a random sample from a normal population with unknown mean $\mu$ and known variance $\sigma^2$. Develop the likelihood Ratio test for testing $H_0 : \mu = \mu_0$ (specified) against (i) $H_1 : \mu > \mu_0$ and (ii) $H_1 : \mu < \mu_0$.

7. Explain the main difference between the parametric and non parametric approaches to the theory of statistical inference.

8. Develop the Mann-Whitney-Wilcoxon test and obtain the mean and variance of the test statistic $T$. How is the test carried out for large samples.
Group - A

1. Answer any four of the following.  
   a) Explain the concept of curriculum.
   b) Explain the term 'philosophical bases' of curriculum.
   c) Point out the guiding principles of NCF -2005
   d) What is educational guidance.
   e) What is Placement service.
   f) Explain activity centredness as a principle of curriculum construction.
   g) What is directive counselling?
   h) Follow-up service.

Group - B

2. Describe briefly different types of curriculum.  

3. Discuss any three principles of curriculum construction.  

4. Explain NCF-2005 with respect to curricular area.  

5. Describe the meaning and nature of Guidance.  

6. Describe occupational information service as a guidance service in schools.  

7. 'Objectives' is an important component of curriculum. Discuss.  

8. Discuss the role of teacher in organising guidance services in school.
Group - B

2. What is meant by abnormal behaviour? Discuss the behavioural and cognitive perspectives of abnormal behaviour.  
3. Discuss the various assessment techniques of maladaptive behaviour.  
4. What are the symptoms of anxiety disorder? Discuss its causes and treatment.  
5. What is bipolar affective disorder? Discuss its causes and symptoms.  
6. What do you mean by paranoid disorder? Discuss the causes of the disorder.  
7. Discuss the causes of anxious and avoidance personality disorder.  
8. Describe the causes and treatment of schizophrenia.
Group - B

2. Discuss the nature and scope of population geography. 9

3. Give a brief account of factors affecting the world distribution of population. 9

4. Describe the growth of population in India since Independence. 9

5. What is fertility? Discuss different measures of fertility. 9

6. Give a comparative account of age-sex structure between developed and developing countries of the world. 9

7. Discuss Malthu's population theory. 9

8. Bring out the salient features of population policy in India. 9

Group - A

1. Answer any four of the following. 6 × 4
   a) Vital Statistics.
   b) National Sample Survey.
   c) Population density
   d) Mortality
   e) Factors of migration
   f) Urban population
   g) Literacy
   h) Demographic transition.
Group - B

2. Give a detail account of the deformation mechanism. 9

3. Classify folds on the basis of dip isogon and plunge. 9

4. Give a suitable scheme of classification of faults. 9

5. Describe the different types of unconformity with neat sketches. 9

6. Describe various types of foliation. Add a note on their relation with major structures. 9

7. Give an account of the Top and Bottom criteria. 9

8. Describe various types of lineation. Add a note on their relation with major structures. 9

Group - A

1. Write notes on any four of the following. 6 × 4
   a) Concept of Stress and strain
   b) Salt dome
   c) Difference between Fault and Joint
   d) Recognition of Unconformity in the field.
   e) Types of searzone.
   f) Rules of 'V'
   g) Determination of strain in rocks.
   h) Recognition of Faults in the field.
2017
Full Marks - 80
Time - 3 Hours
The figures in the right-hand margin indicate marks
Answer five questions including Q. No. 1.
which is compulsory.

Group - A

1. किन्हें चार प्रश्नों के उत्तर दीजिए ज

2) भाषापरिवर्तन के बाह्य कारणों पर प्रकाश डालिए ज

3) भाषा विज्ञान की परिभाषा देते हुए उसके बिंदुभंज अंशों की जानकारी प्रदान कीजिए ज

4) ध्वनि यन्त्र का चित्र बनाकर उसके भिन्न-भिन्न अंगों का संक्षिप्त परिचय दीजिए ज

5) स्तविम की परिभाषा देते हुए उसकी विशेषताएं लिखिए ज

6) संस्कृत के साथ उसका सम्बन्ध स्पष्ट कीजिए ज

7) वाक्य की परिभाषा देते उसके अनिवार्य तत्त्व पर विचार कीजिए ज

V-73 [Turn Over
च) देवनागरी लिपि की विशेषताएँ लिखिए ।

छ) अर्थ परिवर्तन की दिशाएँ क्या क्या हैं ? स्पष्ट कीजिए ।

ज) स्थान और प्रयत्न के आधार पर हिंदी व्यंजनों का वर्गीकरण कीजिए ।

Group - B

२. टिप्पणी लिखिए : (किन्हीं तीन) 6 × 3

क) संयुक्त वाक्य किसे कहते हैं ? सोदाहरण स्पष्ट कीजिए ।

ख) अर्थ विस्तार क्या है ?

ग) हिंदी मानस्यों का स्थान सचिव उल्लेख कीजिए ।

घ) वाक्य परिवर्तन के कोई एक कारण लिखिए ।

ङ) अज्ञान के कारण किस तरह ध्वनि परिवर्तन होता है ।

च) स्वर और व्यंजन में अन्तर क्या है ?


<table>
<thead>
<tr>
<th>3</th>
<th>अति संक्षिप्त उत्तर दीजिए (किन्हीं बारह)</th>
<th>1 × 12</th>
</tr>
</thead>
</table>
| क) हिंदी के अर्धस्वर क्या क्या है ?
| ख) संयुक्त स्वर का उदाहरण कीजिए ?
| ग) जब बायु विवाह कम या अल्प होता है उस व्यंजन को क्या कहते हैं ?
| घ) प-फ कैसा व्यंजन है ?
| ड) ध , ढ किस तरह की ध्वनि है ?
| च) मित्र वाक्य का एक उदाहरण कीजिए ?
| छ) क्रिया हीन वाक्य का प्रयोग कहाँ होता है ?
| ज) ग्यारह शब्द की उपत्ति संस्कृत के किस शब्द से हुई है ?
| झ) देवनागरी लिपि का आरंभ कब से माना जाता है ?
| ञ) पेफ़फ़ेड़े क्या काम करते हैं ?
| ट) किस लिपि से देवनागरी लिपि का उद्भव हुआ है ?
|ठ) भाषा में यादविस्धिक का क्या अर्थ होता है ?
|ड) शब्द और पद में क्या अन्तर है ?
|ढ) संस्कृत के किस धातु से ‘भाषा’ शब्द बना है ?
6. a) Graphically plot \( f(x) = e^{-kx^2} \), \( k > 0 \). Hence evaluate its Fourier transform and plot.  

5  
b) Find the Laplace transform of \( e^{-t} \sin 2t \).  

4  

7. a) Show that the Laplace transform of the second order differential equation for SHM is an algebraic equation.  

5  
b) Find the inverse Laplace transform of \( \frac{1}{(s-k)^2} \), \( s > k \).  

4  

8. a) What does the following equation represent  
\[
\frac{dQ}{dt} + \frac{Q}{RC} = \frac{E_0}{R} \sin wt \]  
\text{How do you solve this equation by Laplace's transform?}  

5  
b) State and prove convolution theorem for Laplace's transform.  

4  

IV-UG-Phy(CC)-VIII  

2017  

Full Marks - 60  

Time - 3 Hours  

The figures in the right-hand margin indicate marks  

Answer \textit{five} questions including Q. No. 1. which is compulsory.  

\textbf{Group - A}  

1. Answer any \textbf{four} of the following.  

6 \times 4  

a) Evaluate \( (i^4)^i \)  

b) Is the function \( f(z) = z^* \) analytic? Justify.  

c) Prove that \( \int \frac{1}{2\pi i} \oint z^{m-n-1} \, dz = \delta_{mn} \)  

d) Determine the nature of the singularities of the following function and evaluate the residues there at for \( a > 0 \).  

\[
f(z) = \frac{1}{(z^2 - a^2)^2}\]
e) Evaluate the Fourier transform of a Dirac delta function.

f) If \( F(k) \) is the Fourier transform of \( f(x) \), then show that
\[
\int_{-\infty}^{+\infty} dx \, f^*(x) f(x) = \int_{-\infty}^{+\infty} dk \, F^*(k) F(k)
\]

- Group - B

2. a) Develop the Taylor expansion of \( \ln(1+z) \) and show that
\[
\ln(1+z) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{z^n}{n}
\]

b) Prove that \(|z_1| - |z_2| \leq |z_1 + z_2| \leq |z_1| + |z_2| \)

3. a) Show that
\[
\int_{C} (z - z_0)^n \, dz = \begin{cases} 0, & n \neq -1 \\ 2\pi i, & n = -1 \end{cases}
\]

where the contour \( C \) encircles the point \( z = z_0 \).

b) Expanding \( f(z) = \frac{e^{-z}}{z^3} \) about origin in a Laurent expansion, identify the principal part and the residue at \( z = 0 \).

4. a) Find the poles of \( f(z) = \frac{1}{1 + z^4} \)

b) Evaluate \( \int_{0}^{2\pi} \frac{d\theta}{a + b \cos \theta} \) for \( a > |b| \)

5. a) If the Fourier transform of \( f(x) \) is \( F(k) \) and the Fourier transform of \( \frac{df(x)}{dx} = F_1(k) \), show that \( F_1(k) = -ik \cdot F(k) \)

b) Evaluate the Fourier sine transform of \( e^{-ax} \).
7. Explain
   i) The properties of Zn and Hf are very similar. 2
   ii) \( \text{Sm}^{2+} \) is a good reducing agent while \( \text{Ce}^{4+} \) is a good oxidising agent. 2
   iii) The earlier actinide elements show higher oxidation states than most of the lanthanides. 2
   iv) Magnetic moment of lanthanides are calculated by taking into account of spin and orbital contribution. 2

8. a) What do you mean by essential trace elements? 3
   b) Discuss the relationship between relative abundance of the elements and their biological importance. 6

9. a) Narrate the role played by myoglobin and haemoglobin in biological systems. 6
   b) What are main sources of mercury pollution? What are effects of mercury on human life? 3

1. Answer any four of the following. 6 × 4
   a) Determine the number of unpaired electrons on the basis of CFT of the following.
   b) Write the experimental evidences in favour of Weiner's co-ordination theory. 6
   c) Predict which of the following will be coloured in aqueous solution.
      \( \text{Fe}^{3+}, \text{Mn}^{2+}, \text{Sc}^{3+}, \text{Ti}^{3+}, \text{V}^{3+}, \text{Cu}^+ \)
      Give reasons for each. 3
d) The Latimer diagram for iron is shown as

\[
\begin{align*}
\text{FeO}_4^{2-} & \rightarrow -2.2 \text{ V} & \text{Fe}^3^{+} & \rightarrow 0.77 \text{ V} & \text{Fe}^{2+} & \rightarrow -0.47 \text{ V} \\
\text{Fe} & \rightarrow -0.057 \text{ V}
\end{align*}
\]

Discuss its usefulness in deciding the stabilities of different oxidation states.

e) Explain Lanthanide contraction. Discuss its cause and effect.

f) What are actinides? Describe their chemistry of oxidation states.

g) Discuss the important features of Na\(^+\)-K\(^+\) pump.

h) Discuss the role of carbonic anhydrase in living systems.

**Group - B**

2. a) Describe the factor which affect the magnitude of crystal field splitting in coordination compounds.
b) The ratios relating to Posco India Ltd. are given as follows. 4×4

Gross profit Ratio : 15 per cent
Stock velocity : 6 months
Debtors velocity : 3 months
Creditors velocity : 3 months

Gross profit for the year ending Dec. 31, 2016 amounts to ₹ 60,000. Closing stock are equal to opening stock.

Find out:

a) Sales
b) Closing stock
c) Sundry Debtors
d) Sundry Creditors.

OR

b) The following data are related to the manufacture of a standard product during the month of January 2017. 16

<table>
<thead>
<tr>
<th>Item</th>
<th>₹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw material consumed</td>
<td>30,000</td>
</tr>
<tr>
<td>Direct labour</td>
<td>22,000</td>
</tr>
<tr>
<td>Factory overheads</td>
<td>16,000</td>
</tr>
<tr>
<td>Administrative overheads</td>
<td>8,000</td>
</tr>
<tr>
<td>Selling overhead</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Administrative overheads :20% on factory cost

Units produced — 17,000
Units sold — 16,000
Selling price per unit ₹ 7

1. a) What do you mean by Cost Accounting ?
 Discuss the advantages and four important limitations of cost accounting. 4+8+4

OR

b) The following data are related to the manufacture of a standard product during the month of January 2017.

<table>
<thead>
<tr>
<th>Item</th>
<th>₹</th>
</tr>
</thead>
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<td>Direct labour</td>
<td>22,000</td>
</tr>
<tr>
<td>Factory overheads</td>
<td>16,000</td>
</tr>
<tr>
<td>Administrative overheads</td>
<td>8,000</td>
</tr>
<tr>
<td>Selling overhead</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Administrative overheads :20% on factory cost

Units produced — 17,000
Units sold — 16,000
Selling price per unit ₹ 7
You are required to prepare a cost sheet from the above information, showing the profit per unit as well as total profit.

2. a) Explain different methods of pricing issue of materials with their merits and demerits. 16

OR

b) i) What do you understand by ABC analysis? What are its advantages. 8

ii) For a certain work order, the standard time is 20 hours, wages ₹5 per hour, the actual time taken is 13 hours. Find the wages payable to one worker under Halsey and Rawan Premium plan. 8

3. a) What do you understand by absorption of overhead? Briefly explain the different methods of absorption of factory overhead. 4+12

OR

b) Work out the Machine hour rate for the following machine whose scrap value is nil. 16

4. a) i) Explain the importance of reconciliation of cost and the financial accounts. 8

ii) Prepare a proforma Reconciliation Statement starting with profit as per Cost Accounts. 8

OR

b) Define Management Accounting. Discuss the limitations of Management Accounting. 4+12

5. a) What is working capital? What factors would you take into consideration in estimating the working capital needs of concern? 16

OR

V-80 [Turn Over
2017
Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q. No. 1.
which is compulsory.

SECTION - A

1. Answer any four of the following : \(7\frac{1}{2} \times 4\)

a) Calculate service tax payable by Fair Tours and Travels :

\[\text{\textcurrency{}}\]

i) Package tours to Australia 30,00,000
ii) Package tours to Vaishno Devi 15,00,000
iii) One day package tour to Shimla 4,00,000
iv) Non package tour to Kerala 4,50,000
v) Hotel Booking charges 1,00,000
vi) Touring to American Embassy New Delhi 50,000
vii) One day nonpackage tour to Naina Devi 70,000
b) List the general exemption form service tax

c) Composition scheme

d) Small dealers

e) What are the provisions of CENVAT under Central Excise.

f) Differentiate between excisable goods and goods.

g) Discuss the basic custom duties.

h) Explain the exemptions from baggage under Custom Act.

SECTION - B

2. Explain in brief the provision regarding payment and filling of returns in case of service tax. 12½

3. What is VAT? Discuss its features. 12½

4. Discuss CENVAT credit in relation to capital goods. 12½

5. Discuss the general procedure of central excise valuation of goods. 12½

6. Explain in detail the various custom duties levied under the Custom Act, 1962. 12½

7. Discuss the restriction on imports under the Custom Act. 12½

8. Discuss the restriction on exports under the Custom Act. 12½
Fita straight line trend by method of least square to the following data

<table>
<thead>
<tr>
<th>Year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>100</td>
<td>120</td>
<td>118</td>
<td>136</td>
<td>124</td>
<td>140</td>
</tr>
</tbody>
</table>

5. Write note on :

a) Features of Normal Distribution

b) Baye's theorem

OR

a) 8 coins are tossed simultaneously find the chance of obtaining
   i) at least 6 heads
   ii) No heads.

b) A bag contains 5 white and 3 black balls. 4 balls are drawn at random. Find the probability that 2 are white and 2 are black.

1. Write notes on the following :

a) Secondary Data

b) Limitations of Statistics

c) Characteristics of an Ideal Average.

d) Limitations of Geometric Mean.

OR

a) Mean and standard deviation of 200 items are found to be 60 and 20. If two items are wrongly taken as 3 and 67 instead of 13 and 17, find the correct mean and standard deviation.
b) The following results were obtained in two organisations relating to payment of wages to workers.

Organisations:

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of workers</td>
<td>550</td>
<td>600</td>
</tr>
<tr>
<td>Average monthly wages</td>
<td>60</td>
<td>48.50</td>
</tr>
<tr>
<td>Variance in distribution of wages</td>
<td>100</td>
<td>144</td>
</tr>
</tbody>
</table>

Find the average monthly wages and the variability in wages of all workers in two organisations taken together.

2. Find Karl Pearson's coefficient of correlation from the following data.

<table>
<thead>
<tr>
<th>X</th>
<th>45</th>
<th>44</th>
<th>50</th>
<th>53</th>
<th>66</th>
<th>30</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>42</td>
<td>40</td>
<td>41</td>
<td>42</td>
<td>56</td>
<td>30</td>
<td>43</td>
</tr>
</tbody>
</table>

OR

Define regression. Why are there two regression lines.

3. Calculate cost of living index number from the following data.

<table>
<thead>
<tr>
<th>Items</th>
<th>Price</th>
<th>Base Year</th>
<th>Current Year</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>30</td>
<td>47</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>12</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>14</td>
<td>18</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>22</td>
<td>15</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>25</td>
<td>30</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

OR

Write notes on:

a) Uses of Index number
b) Fisher's ideal index
c) Cost of living index
d) Splicing index.

4. What is Secular trend? How does it differ from seasonal variation?

OR
Group - A

1. Write notes on any four of the following. 6 × 4
   a) Historical perspective of DNA
   b) Watson-Crick's base pairing rule
   c) Cell Organelle DNA
   d) Semiconservative DNA replication
   e) Genetic Code
   f) Ribozymes
   g) m-RNA
   h) Steroids.

Group - B

2. Discuss DNA as the carrier of genetic information. 9
3. Discuss the Nucleosome. 9
4. Describe the chemistry of DNA synthesis. 9
5. Discuss the Central Dogma. 9
6. Describe RNA editing and m-RNA transport. 9
7. Discuss various steps of Protein synthesis. 9
8. Describe the regulation of transcription in Prokaryotes. 9
Group - B

2. Briefly describe the 4 basic structural levels of organization of proteins.  


4. Discuss citric acid cycle with energy balance of the cycle.  

5. Illustrate β-oxidation of saturated fatty acids with even numbers of carbon atoms.  

6. Define urea cycle in detail.  

7. Give a detailed account of shuttle systems you have studied for transport of electrons from extramitochondrial NADH to enter into electron-transport system.  

8. Describe different steps involved in palmitic acid biosynthesis.  

Group - A

1. Answer any four of the following.  
   a) General structure of monosaccharides  
   b) Glycogenolysis  
   c) General structure of amino acids  
   d) Glycolysis  
   e) Ketogenesis  
   f) Write only the extra steps required for β-oxidation of structured fatty acids with odd number of carbon atoms.  
   g) Deamination  
   h) Transamination.

2017
Full Marks - 60  
Time - 3 Hours  

The figures in the right-hand margin indicate marks  
Answer five questions including Q. No. 1. which is compulsory.  

Draw labelled diagrams wherever necessary.
7. Using Euler's method find out $y(0.02)$, given that
\[
\frac{dy}{dx} = x^2 + y, \quad y(0) = 1
\]
Taking $h = 0.01$.

8. Solve numerically:
\[
\frac{dy}{dx} = y - x, \quad x = 0, \quad y = z
\]
by using Runge-Kutta method of order 2 choosing $h = 0.1$ for $y(0.1)$ and $y(0.2)$.

1. Answer any four of the following. 6 × 4
   a) Write down the approximate representation of $\frac{3}{5}$ correct to four significant figures and then find:
      i) Absolute error,
      ii) Relative error
      iii) Relative percentage error.
   
   b) Obtain an interval which contains a root of the equation $f(x) = \cos x - xe^x = 0$.
   
   c) Solve the following system of equations by Gauss-Jordan method
      \[
      \begin{align*}
      2x + y + z &= 10 \\
      3x + 2y + 2z &= 18 \\
      x + 4y + 9z &= 16
      \end{align*}
      \]
d) Show that $E^+ = \mu + \frac{1}{2} \delta$, and $E^- = 1 - \nu$.

e) Find the value of $\int_0^1 \frac{1}{1+x^2} \, dx$, taking 5 subintervals by Trapezoidal Rule, correct to 5 significant figures.

f) Evaluate numerically $\Gamma = \int_0^1 \frac{dx}{1+x}$ using Gauss-Legendre three point formula.

g) Solve $\frac{dy}{dx} = x + y^2$, $y(0) = 1$, by Picard's method upto 3rd approximation.

h) Write the general form of fourth order Runge-Kutta formula and the value of the parameters as per Kutta's formula and classical formula.

2. Describe Newton-Raphson method for computing a simple real root of the equation $f(x) = 0$. Give its geometrical interpretation. Prove that the Newton-Raphson method has second order convergence.

3. Using Lagrange's formula, find the polynomial of maximum degree determined by the set of points:
   
   $(-5, 87), (-1, 7), (0, -3), (2, -1)$.

4. Derive Newton's fundamental interpolation formula. Construct the divided difference table for the data:
   
   $f(10) = 335, f(0) = -5, f(8) = 21, f(1) = -14$ and $f(4) = -15$.

5. Solve the system of linear equations
   
   $5x_1 - x_2 + 0x_3 = 9$
   $-x_1 + 5x_2 - x_3 = 4$
   $-x_2 + 5x_3 = -6$
   
   by Gauss-Jacobi iteration method.

6. Evaluate $I(f) = \int_0^1 e^{-x^2} \, dx$ numerically by
   
   i) mid point rule
   ii) trapezoidal rule
   iii) Simpson's rule.
3. a) Analyse the results of the Crimean War.
   OR
   b) Discuss the Domestic policy of Napoleon III.

4. a) Review the Domestic Policy of Bismarck as the Chancellor of the German Empire.
   OR
   b) How the diplomatic background of European powers led to the outbreak of the First World War.

5. a) Give an account of the First World War.
   OR
   b) Narrate the causes and consequences of the Russian Revolution of 1917.

1. a) What do you mean by Metternich system?
Discuss its working in the European politics from 1815 AD-1848 AD.
   OR
   b) How far was the orientalist rule responsible for the outbreak of the French Revolution of 1848.

2. a) Assess the role Mazzini and Garibaldi in the Unification of Italy.
   OR
   b) Narrate briefly the main events leading to the Unification of Germany.
Answer all questions

1. a) What is International Politics? Discuss its nature and importance.

   OR

   b) Define National Power. Discuss various elements of National Power.

2. a) Non-aligned Movement is irrelevant today. Examine.

   OR

   b) Write a critical note on Post-Cold war international system.

3. a) Explain the composition and functions of General Assembly of the UN.

   OR

4. a) Briefly examine the Indo-US relations since 2000.

   OR

   b) Examine Indo-China relationship since UPA government.

5. a) Examine the steps taken at the International level to protect environment.

   OR

   b) "Politics of Gender inequality has given birth to Feminist Movement". Examine.
1. a) Explain Anekantavada of Jainism.
   OR
   b) Explain Jaina theory of Ethics.

2. a) Discuss the theory of Pratitya samutpada of Buddhism.
   OR
   b) Discuss the doctrine of Anatmavada of Buddhism.

3. a) Give a classification of Nyaya inference and explain each form with examples.
   OR
   b) Give an account of Vaisesika conception of abhava.

4. a) Examine Sankhya conception of Purusa.
   OR
   b) Examine Sankhya theory of evolution.

5. a) How does Kumarila explain error? Discuss.
   OR
   b) How does Ramanuja explain God? Discuss.
IV-UG-Soc(H)-IV

(Back)
2017
Full Marks - 80
Time - 3 Hours
The questions are of equal value
Answer all questions

1. a) Define urban sociology and discuss its scope and subject matter.
   OR
   b) Discuss the nature, scope and subject matter of Rural sociology.

2. a) Write a short essay on rural urban contrast and continuum.
   OR
   b) Bring out the difference between rural and urban society.

3. a) Define poverty and discuss the measures taken for the abolition of poverty
   OR

4. a) Discuss the factors affecting urbanisation
   OR
   b) Analyse the meaning and characteristics of urbanisation.

5. a) Analyse the success and failure of community development programme.
   OR
   b) Discuss the various rural development programme in brief.

V-170-0.2

[Turn Over
1) ଜୁଗରୁ ରାତ୍ରିରେ ବଳାଣ: ନେଇ ପରିମିତି ନାମ୍ତି ବଳାଣ ଚିତର ରହିଥାଯାନ୍ତା। ପାଇଁ ମନାବାରେ ମନ୍ତରିତ, ପ୍ରତି ମନାବାରେ ମନ୍ତରିତ।

2) କର୍ତ୍ତାର ନାମରେ ବଳାଣ: ନେଇ ପରିମିତି ନାମ୍ତି ବଳାଣ ଚିତର ରହିଥାଯାନ୍ତା। ପାଇଁ ମନାବାରେ ମନ୍ତରିତ, ପ୍ରତି ମନାବାରେ ମନ୍ତରିତ।

3) ବରାବରି ନାମରେ ବଳାଣ: ନେଇ ପରିମିତି ନାମ୍ତି ବଳାଣ ଚିତର ରହିଥାଯାନ୍ତା। ପାଇଁ ମନାବାରେ ମନ୍ତରିତ, ପ୍ରତି ମନାବାରେ ମନ୍ତରିତ।

4) ଜୁଗରୁ ରାତ୍ରିରେ ବଳାଣ: ନେଇ ପରିମିତି ନାମ୍ତି ବଳାଣ ଚିତର ରହିଥାଯାନ୍ତା। ପାଇଁ ମନାବାରେ ମନ୍ତରିତ, ପ୍ରତି ମନାବାରେ ମନ୍ତରିତ।

5) ବରାବରିରେ ବଳାଣ: ନେଇ ପରିମିତି ନାମ୍ତି ବଳାଣ ଚିତର ରହିଥାଯାନ୍ତା। ପାଇଁ ମନାବାରେ ମନ୍ତରିତ, ପ୍ରତି ମନାବାରେ ମନ୍ତରିତ।

6) ଜୁଗରୁ ରାତ୍ରିରେ ବଳାଣ: ନେଇ ପରିମିତି ନାମ୍ତି ବଳାଣ ଚିତର ରହିଥାଯାନ୍ତା। ପାଇଁ ମନାବାରେ ମନ୍ତରିତ, ପ୍ରତି ମନାବାରେ ମନ୍ତରିତ।
1. Write short notes on any five of the following: 5×5
   
i) Impact of American war of Independence on literature.

   ii) Romantic Movement in British on literature.

   iii) Importance of the year 1789.

   iv) Impact of Industrial Revolution literature.

   v) Rise of Novel in British literature.

   vi) First generation Romantic Poets.

   vii) Victorian Morality

   viii) Bronte Sisters.
2. a) Sketch the character of Pip.  

OR 

b) Write an essay on the setting of the novel 'Great Expectations.' 

3. a) 'The Mayor of Casterbridge' reveals a structural pattern that relies heavily on coincidence. Discuss.  

OR 

b) Is Michael Henchard responsible for his own fate? Discuss with reference to the text. 

4. a) De Quincey's essay "On the Knocking at the gate in Macbeth" foreshadows the psychological approaches of much later criticism. Discuss.  

OR 

b) Bring out the central idea of "A piece of Chalk." 

5. a) Attempt a critical appreciation of 'Dover Beach'.  

OR 

b) Make an assessment of Byron as a poet with reference to the part of 'child Harold's pilgrimage' that you have read. 

6. Annotate the following  

a) The Gods of the earth and sea 
   Sought thro' Nature to find this tree; 
   But their search was all in vain 
   There grows one in the Human Brain.  

OR 

b) Thou wilt renew thy beauty mom by mom; 
   I earth in earth forget these empty courts, 
   And thee returning on thy silver wheels.
b) Discuss the similarities and difference between religion and magic.

4. a) What is economic organisation? Write the states of economy.

        OR

    b) What is subsistence economy? Give details about the mode of exchange of primitive mode.

5. a) Write the concept, meaning and definition of political organisation. Discuss the political power and functionaries.

        OR

    b) Briefly discuss on the crime and punishment in primitive society.

        a) Discuss the meaning and definition of social anthropology and write other branches of anthropology.

        OR

    b) Discuss the relationship of social anthropology with other social sciences.

1. a) Elaborately discuss on the meaning, concept and type of family with suitable example.

        OR

    b) Write the definition of kinship. Discuss the usages and behaviour of the kinship.

2. a) What is religion? Briefly discuss on the types of primitive religions.

        OR

        b) Discuss the similarities and difference between religion and magic.

3. a) Discuss the meaning and definition of social anthropology and write other branches of anthropology.

        OR

    b) Discuss the relationship of social anthropology with other social sciences.

V-173-0.1
4. a) Write the factors of localisation of Industries.
   OR

   b) Elaborate Weber's industrial location theory.

5. a) Discuss the problems and prospects of railways in India.
   OR

   b) Give an account of India's export trade.
3. a) Discuss on the morphological nature of sporocarp of *Marsilea*.

OR

b) Write notes on the following:
   (i) Protostele
   (ii) T.S. of stem of *Equisetum*.

4. a) Describe the life history of *Ginkgo*.

OR

b) Write notes on the following:
   (i) T.S. of coralloid root of *Cycas*
   (ii) Ovule of *cycas*.

5. a) Give an account of the life history of *Gnetum*.

OR

b) Write notes on the following:
   (i) Polyembryony in *pinus*
   (ii) Male cone of *pinus*.

1. a) Give an account of the life history and affinities of *Lepidodendron*.

OR

b) Write notes on the following:
   (i) *Rhynia major*
   (ii) Geological time scale.

2. a) Discuss on the origin and evolution of pteridophytes.

OR

b) Write notes on the following:
   (i) T.S. of stem of *Lycopodium*
   (ii) Strobilus of *Selaginella*.
1. a) Give an illustrated account of the ultra structure of a typical sperm.

OR

b) Write notes on any two of the following:
   i) Mechanism of action of peptide hormones.
   ii) Pineal gland
   iii) Neurohypophysis.

4. a) Discuss the endocrine control of menstrual cycle.

   OR

b) Write notes on any two of the following:
   i) Endocrine functions of Pancreas.
   ii) Diabetes mellitus.
   iii) Simple goiter.

5. a) What is immunity? Write an essay on innate immunity.

   OR

b) Write notes on any two of the following:
   i) Structure of Immunoglobulin
   ii) MHC complex
   iii) Hypersensitivity.
1. a) Find a real root of the equation \( x^3 - x = 1 \) by Bisection method which lies in \([1, 2]\), correct to two significant figures.

OR

b) The polynomial \( p(x) = x^3 - 2x - 1 \) has a zero between 1 and 2. Find this zero correct to three significant figures by using secant method.

2. a) Using Lagrange's formula, find the polynomial of maximum degree determined by the set of points: \((-5, 87), (-1, 7), (0, -3), (2, -1)\)

OR
b) Given \( x_i = x_0 + ih, \) \( i = 0, 1, 2, \ldots, n \) are equally spaced nodes with constant spacing \( h \). Then prove that \( f [x_0, x_1, x_2 \ldots x_n] = \frac{\Delta^nf(x_0)}{n!h^n} \).

3. a) Evaluate \( \int_0^1 \frac{dx}{1+x} \) by compound Simpson's \( \frac{1}{3} \)rd rule with 8 equal subintervals.

OR

b) Evaluate \( \int_0^1 e^{-x^2} \) dx by Gauss - Legendre 3-point rule.

4. a) Solve the differential equation \( \frac{dy}{dx} = -xy^2 \); \( y(2) = 1 \) by Euler's method. Determine \( y(2.1) \) by choosing \( h = 0.05 \). Compare your result with exact solution.

OR

b) Solve: \( \frac{dy}{dx} = x + y \), \( y(0) = 0 \) by Euler's method taking \( h = 0.2 \) and find \( y(0.4) \).

5. a) Solve the following system of equations by Jacobi's method.

\[
\begin{align*}
8x + 2y - 2z &= 8 \\
x - 8y + 3z &= -4 \\
2x + y + 9z &= 12
\end{align*}
\]

OR

b) Solve the following system of equations by Gauss-Seidel method.

\[
\begin{align*}
10x_1 - 2x_2 + 6x_3 &= 16 \\
3x_1 + 10x_2 - 5x_3 &= 29 \\
4x_1 - 5x_2 + 10x_3 &= -13
\end{align*}
\]

Starting with initial guess \( x^{(0)} = (1,1,1)^T \) do two iterations.
6. a) A company has three operational departments (weaving, processing and packing) with capacity to produce three different types of clothes namely suitings, shirtings and woollens yielding a profit of Rs. 2, Rs 4 and Rs 3 per metre respectively. One metre of suitings requires 3 minutes in weaving, 2 minutes in processing and 1 minute in packing. Similarly one meter of shirtings requires 4 minutes in weaving, 1 minutes in processing and 3 minutes in packing. One meter of woollen requires 3 minutes in each department. In a week total run time of each department is 60, 40 and 80 hours for weaving, processing and packing respectively. Formulate the L.P.P. to find the product mix to maximize the profit.

OR

b) Solve the following L.P.P. graphically
Maximize \( z = 7x_1 + 3x_2 \)
Subject to constraints:
\( x_1 + 2x_2 \geq 3 \)
\( x_1 + x_2 \leq 4 \)
\( 0 \leq x_1 \leq 5/2 \)
\( 0 \leq x_2 \leq 3/2 \)

7. a) If A is any finite subset of vectors in \( \mathbb{R}^n \), then prove that the convex hull of A is the set of all convex combinations of vectors in A.

OR

b) Obtain all the basic solutions to the following system of linear equations:
\( x_1 + 2x_2 + x_3 = 4 \)
\( 2x_1 + x_2 + 5x_3 = 5 \)

8. a) Use simplex method to maximize
\( z = 5x_1 + 3x_2 \)
subject to the constraints:
\( x_1 + x_2 \leq 2 \)
\( 5x_1 + 2x_2 \leq 10 \)
\( 3x_1 + 8x_2 \leq 12 \)
\( x_1, x_2 \geq 0 \)

OR
b) Use two-phase simplex method to

maximize \[ z = 5x_1 - 4x_2 + 3x_3 \]

subject to the constraints:
\[ 2x_1 + x_2 - 6x_3 = 20 \]
\[ 6x_1 + 5x_2 + 10x_3 \leq 76 \]
\[ 8x_1 - 3x_2 + 6x_3 \leq 50 \]
\[ x_1, x_2, x_3 \geq 0 \]

9. a) Use duality to solve the following L.P.P

Minimize \[ z = 15x_1 + 10x_2 \]

subject to constraints:
\[ 3x_1 + 5x_2 \geq 5 \]
\[ 5x_1 + 2x_2 \geq 3 \]
\[ x_1, x_2 \geq 0 \]

OR

b) Obtain the dual problem of the following primal problem.

Minimize \[ z = x_1 - 3x_2 - 2x_3 \]

subject to constraints:
\[ 3x_1 - x_2 + 2x_3 \leq 7 \]
\[ 2x_1 - 4x_2 \geq 12 \]
\[ -4x_1 + 3x_2 + 8x_3 = 10 \]
\[ x_1, x_2 \geq 0 \text{ and } x_3 \text{ is unrestricted.} \]

10. a) Use Vögel's Approximation method to obtain an initial basic feasible solution of the transportation problem.

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>11</td>
<td>13</td>
<td>17</td>
<td>14</td>
<td>250</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>18</td>
<td>14</td>
<td>10</td>
<td>300</td>
</tr>
<tr>
<td>C</td>
<td>21</td>
<td>24</td>
<td>13</td>
<td>10</td>
<td>400</td>
</tr>
</tbody>
</table>

Demand 200 225 275 250

OR

b) Solve the following assignment problem.

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>12</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>14</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>D</td>
<td>8</td>
<td>15</td>
<td>11</td>
<td>9</td>
</tr>
</tbody>
</table>
5. a) What is time series? Explain the different components of a time series.

b) For the following values of production in Birla Tyres during 2009-2016. Fit a straight line trend and from the data estimate production for 2017.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Production (in thousand)</td>
<td>80</td>
<td>90</td>
<td>92</td>
<td>83</td>
<td>94</td>
<td>99</td>
<td>92</td>
<td>100</td>
</tr>
</tbody>
</table>

OR

c) Discuss the theorems of probability.

d) Calculate price index for 2016 with 2011 as the base using both Laspeyres and Paasche’s method.

<table>
<thead>
<tr>
<th>Commodities</th>
<th>2011</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price</td>
<td>Quantity</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
<td>80</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>70</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>D</td>
<td>12</td>
<td>20</td>
</tr>
</tbody>
</table>

1. a) Find the partial derivatives of 
    \[ z = 4x^2 + 4xy + y^2 \]

b) Given the function \( z = \frac{x^3 - 2x^2y}{x + y} \) determine the degree of homogeneity.

c) Find \( \frac{dy}{dx} \) of \( x^2 - y^2 + 3x = 5y \)

d) State Euler’s theorem.

OR

e) Define function. Find the limit of the function
    \[ \lim_{x \to 1} \frac{3x^3 - 2x^2 + x + 4}{x^2} \]

f) If \( U = x_1^2x_2 \) is a utility function and the budget constraint is \( x_1 + 2x_2 = 4 \), find the equilibrium bundle of two goods which would maximize utility.
2. a) If the demand function is \( P = 35 - 2x = x^2 \) and \( X_0 = 3 \) find the consumer's surplus.

b) If the supply curve is \( P = \sqrt{9-x} \) and \( x_0 = 7 \), find the producer's surplus.

c) Write a note on Cramer's rule.

d) Evaluate \( \int \frac{4x + 5}{2x^2 + 5x + 2} \) dx

OR

e) Find the ranks of the following matrix.
\[
A = \begin{pmatrix}
-1 & 2 & 1 \\
0 & 1 & 1 \\
2 & 1 & 3
\end{pmatrix}
\]

f) What do you mean by definite integral? Write down the properties of definite integral.

3. a) If the average mark secured by 25 boy students in an examination is 64 and the average mark secured by 15 girls students is 70, then workout the average marks of all the students.

b) Prove that for any two positive real numbers:
\[
\text{A.M.} \geq \text{G.M.} \geq \text{H.M.}
\]

OR

c) Discuss the relative merits and demerits of various measures of dispersion.

d) Calculate mode from the following data.

<table>
<thead>
<tr>
<th>Marks below</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Students.</td>
<td>4</td>
<td>6</td>
<td>24</td>
<td>46</td>
<td>67</td>
<td>86</td>
<td>96</td>
<td>99</td>
<td>100</td>
</tr>
</tbody>
</table>

4. a) Calculate the coefficient of correlation of the following data.

\begin{array}{c|cccccccc}
\hline
x & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\
\hline
y & 2 & 5 & 6 & 4 & 3 & 2 & 4 \\
\hline
\end{array}

b) Prove that correlation coefficient is independent of change in origin and scale.

OR

c) What is regression analysis? Why are there two regression lines in case of a bivariate series? When do the two regression lines coincide?

d) The following informations are given:
\begin{align*}
\text{Mean value of } X &= 53.2 \\
\text{Mean value of } Y &= 27.9 \\
\text{Regression coefficient of } Y \text{ on } X &= -1.5 \\
\text{Regression coefficient of } X \text{ on } Y &= -0.2 \\
\end{align*}

What is the most likely value of \( Y \) when \( X = 60 \)?
1. a) Explain the concept of educational evaluation.
   Describe different techniques of educational evaluation. 5+10

   b) Explain norm referenced and criterion referenced tests. 7½ + 7½

2. a) Define reliability of a test. How does it differ from the validity of a test? Describe the split-half method for determining the reliability of a test. 2½ + 2½ + 10

   b) What is an achievement test? Describe the tools for measuring achievement of pupils. 3+12

3. a) Describe the general principles of test construction and standardization. 10 + 5

   b) Describe the methods of interpreting test scores and reporting the test result. 10 + 5

4. a) Define median and state its uses. Calculate median from the following distribution 2+ 3+10

<table>
<thead>
<tr>
<th>Class interval (CI)</th>
<th>frequency (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-19</td>
<td>2</td>
</tr>
<tr>
<td>20-29</td>
<td>3</td>
</tr>
<tr>
<td>30-39</td>
<td>6</td>
</tr>
<tr>
<td>40-49</td>
<td>8</td>
</tr>
<tr>
<td>50-59</td>
<td>10</td>
</tr>
<tr>
<td>60-69</td>
<td>7</td>
</tr>
<tr>
<td>70-79</td>
<td>3</td>
</tr>
<tr>
<td>80-89</td>
<td>1</td>
</tr>
</tbody>
</table>

   N = 40

   OR

   b) Write notes on: 7½ + 7½

      i) Scope of educational statistics.

      ii) Ogive and its uses.
Answer two questions from each group.

**Group - A**

1. Discuss basic principles of Banking.  
   7½

2. Analyse the recent trends in Indian Banking.  
   7½

3. Write a note on Net Banking.  
   7½

4. Analyse the importance of Micro Finance.  
   7½

**Group - B**

5. Analyse the structure of Indian Banking system.  
   12½

6. Discuss the recent changes in the functions of Commercial Banks.  
   12½
1. What do you understand by auditing? Discuss briefly its objectives. 6 + 4

OR

Write short notes on the following: 10 + 10
a) Audit note book
b) Audit working papers.

2. What do you understand by the term 'Internal Check'? Discuss the system of internal check as to cash receipts and cash payment. 6 + 7 + 7

OR

How would vouch the following? 5 × 4
a) Patents
b) Wages
c) Plant and machinery
d) Credit sales

3. What do you understand by 'divisible profits'? Discuss the duties of a company auditor in this connection. 20

OR

State in brief the powers and duties of a company auditor. 20

4. Explain the special points while auditing the accounts of a non-government aided college. 20

OR

Outline the procedure and strategies of auditing the accounts of a Nationalised Commercial Bank. 10 + 10

5. What is Investigation? Discuss with examples the mode of investigation when fraud is suspected in a non-profit company. 6 + 14

OR

Write short notes on the following: 10 + 10
a) Tax audit
b) Management audit.
3. Throw some light on the legal aspects of heritage sites in India with regards to its conservation and preservation. 12½

4. Point out the issues and challenges faced in preserving India's intangible heritage. 12½

5. Discuss in detail the relationship between cultural heritage, landscape travel and recent trends. 12½

1. Write short notes on any two of the following: 7½×2
   a) Difference between tangible and intangible heritage.
   b) Antiquity Smuggling
   c) ASI
   d) Red Fort

2. Describe briefly about two archeological sites of India of International importance. 12½
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   b) Antiquity Smuggling
   c) ASI
   d) Red Fort

2. Describe briefly about two archeological sites of India of International importance.  12½
b) Analyse the composition and function of Public Accounts Committee.

4. a) Give a detailed analysis of Budget preparation in a Parliamentary form of government. 12½

   OR

b) Discuss the role of Judiciary in law making.

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4. a) Give a detailed analysis of Budget preparation in a Parliamentary form of government. 12½

   OR

b) Discuss the role of Judiciary in law making.

Group - A

1. a) Discuss functions of Chairman of Panchayat Samiti in Odisha. 7½

   OR

b) Discuss functions of Estimate Committee. 7½

2. a) CAG of India. Discuss its functions. 7½

   OR

b) Role of media and Law making in India.

Group - B

3. a) Give a sketch of preparation of a Bill in the legislature. 12½

   OR
3. a) Give an account of role of information technology in environment and human health.
   OR
   b) Write notes on any two of the following:
      i) Waterborne diseases
      ii) Airborne diseases
      iii) Pollution growth.

4. a) What is Biodiversity? Discuss the methods of conservation of biodiversity.
   OR
   b) Write notes on any two of the following:
      i) Mineral as natural resource
      ii) Forest as natural resource
      iii) Biodiversity at local level.

5. a) Discuss on Water Act and Air Act.
   OR
   b) Write notes on any two of the following:
      i) Environment Protection Act
      ii) Public awareness for environment protection
IV-UG-ODI(SEC)-II

2017
Full Marks - 40
Time - 2 Hours
The figures in the right-hand margin indicate marks
Answer all questions.

1. এই কৌশল সৃষ্টিতে কদম দিতেনি : 7½×2
   ١) ইস্কারেল স্বীকার করতে না পেয়ে নাকি দিতেনি।
   ٢) ইস্কারেল করেন না।
   ৩) কাজির এই কৌশল সৃষ্টিতে কদম দিতেনি।
   ৪) জেলের হয়েছে (Michel Porter) ছিলেন?

2. এই কৌশল সৃষ্টিতে কদম দিতেনি : 12½×2
   ١) ইস্কারেল ভ্রাতা দিতে না পেয়ে নাকি দিতেনি।
   ٢) ইস্কারেল করেন না।
   ৩) বাজারের প্রতিষ্ঠা কৌশল সৃষ্টিতে কদম দিতেনি।
   ৪) ইস্কারেল হয়েছে।
   ৫) ইস্কারেল করেন।

V-92-1
2017
Full Marks - 40
Time - 2 Hours
The figures in the right-hand margin indicate marks
Answer all questions.

1. द्वयोर्तारं दीयतामः : 7½×2
   क) चतुर्वेदीं विषयभाष्य समयनिरस्त्र स्त्रीत तात्त्वर्थम् ।
   ख) का गृहिणीपद यान्ति ।
   ग) शकुन्तला: विदयकाले कण्वमुने: पीडा कीतुशी आसीत् ।
   घ) वृक्षान्त्र प्रति शकुन्तलान्: वास्तवं कृदकु: आसीत् ।

2. द्वयोर्तारं दीयतामः : 12½×2
   क) वेदशब्दस्य कोर्णे: ? वेदस्य किं महत्वं विवृणुत् ।
   ख) दुवाशापस्य का भूमिका ।
   ग) शकुन्तला: विदयकाले आश्रमस्य अवस्था कीदृशी आसीत् ।
   घ) शकुन्तलां प्रति कण्वमुने: क: उपदेशाः आसीत् ।
1. a) What are File Management System? Discuss different types of file organizations with their advantages and disadvantages.  

OR

b) Write short notes on the following:  
   i) Multiple Indexing  
   ii) Hashing  
   iii) File Management System  
   iv) Problems of sharing files.

2. a) Write short notes on the following:  
   i) Data Dictionary  
   ii) Schema  
   iii) View  
   iv) DDL.  

OR
b) Describe the term view with example. What is the criteria for which a table can be manipulated through views?  

6

c) Write short notes on the following:  
i) DDL Vs. DML  
ii) Database Administrator.  

6

3. a) Explain in details about Hierarchical Model in Database structure.  

12

OR

b) Write short notes on the following:  
i) DBTG Set  
ii) Integrity Rules.  

6

c) How Insertion, Deletion, Update operations are done in a hierarchical model? How are they anomalies?  

6

4. a) Define functional dependencies and multi valued dependency. Discuss the normalization based on functional and multi valued dependencies. What is de-normalization? Where it is used. Explain the concept with suitable examples.  

12

OR

b) Discuss the various security measures taken at several levels to protect the database.  

6

c) What is concurrency control? What are the update problems in concurrent processing? Discuss one method for preventing deadly embrace.  

6

5. a) Let 'G' be a connected planar graph with 20 vertices and the degree of each vertex is 3. Find the number of regions in the graph.  

6

b) How many simple non-isomorphic graphs are possible with 3-vertices?  

6

OR

c) Write short notes on the following:  
i) Spanning Tree  
ii) Cut sets  
iii) Eulerian path  
iv) Weighted Graph.  

8

d) What is the chromatic number of complete graph K_n?  

4
8. Define Marginal Cost. State characteristics and assumptions of marginal costing. 12½

1. Answer any four of the following: 7½×4
   a) Distinguish between Cost Accounting and Management Accounting.
   b) Distinguish between allocation and apportionment of overhead expenses.
   c) What is ABC analysis? What are its merits?
   d) What are the essentials of a good wage system?
   e) What is 'Margin of Safety'? How can it be improved?
   f) What is Job Costing? What are the main features of job order costing?
   g) Distinguish between Fixed budget and Flexible budget.
h) Give a list of possible causes of material price variance and Labour efficiency variance.

**Group - B**

2. What is Cost Accounting? What are its objectives? 12½

3. "There is generally divergence between financial profits and cost profits" Explain this statement and give reasons for such divergence. 12½

4. Discuss briefly the objectives and limitations of Budgetary Control. 12½

5. A product passes through two distinct processes A and B. It is estimated that in each process 10% of the total input is lost and 5% comes out as scrap. Prepare necessary ledger accounts from the following: 12½

<table>
<thead>
<tr>
<th>Process A</th>
<th>Process B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material used</td>
<td>4,000 units</td>
</tr>
<tr>
<td>Cost per unit (Rs)</td>
<td>80</td>
</tr>
<tr>
<td>Wages in (Rs)</td>
<td>1,20,000</td>
</tr>
<tr>
<td>Manufacturing overheads</td>
<td>25% of wages</td>
</tr>
<tr>
<td>Sale of Scarp @ Rs/unit</td>
<td>80</td>
</tr>
<tr>
<td>Output units</td>
<td>3,500</td>
</tr>
</tbody>
</table>

6. A company furnishes you the following information: 12½

<table>
<thead>
<tr>
<th>Year 2014 (Rs)</th>
<th>Year 2015 (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>8,10,000</td>
</tr>
<tr>
<td>Profit</td>
<td>21,600</td>
</tr>
</tbody>
</table>

*You are to Compute:*

a) P/V ratio
b) Fixed cost
c) Profit or loss when sales are Rs. 6,48,000
d) Sales to earn a profit of Rs 1,08,000.

7. In a brass factory standard mixture of a component consists of 60% copper and 40% of zinc. The standard loss is 10% of input. From the following information calculate Material Cost Variance, Material Mix Variance and Material Yield Variance.

**Actual**

Copper 25kg @ Rs 15/per kg.
Zinc-25 kg @ Rs 10/per kg

**Standard**

30 kg
20 kg

Actual price and standard price remains unchanged.

Actual output 43 kg 12½

<table>
<thead>
<tr>
<th>Copper 25kg</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>30 kg</td>
</tr>
<tr>
<td>Standard</td>
<td>30 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zinc-25 kg</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
<td>20 kg</td>
</tr>
<tr>
<td>Standard</td>
<td>20 kg</td>
</tr>
</tbody>
</table>
1. Answer any four of the following:

a) Define Photo electric effect and outline the laws of photo electric emission.  
   2 + 4

b) Define work function and calculate the energy of a photon of wavelength 6000 Å in terms of electron volt.  
   2 + 4

c) Write down the expression for the wave number and explain the spectral series of hydrogen atom.  
   1 + 5

d) Write down the limitations of Rutherford's atom model and the postulates of Bohr's atom model.  
   2 + 4
e) Obtain the expression for the de-Broglie wavelength associated with an electron at a potential difference of V-volts and obtain its numerical value in terms of amstrong unit. 3+4

f) Establish the relation UpUg = c^2 where the symbols have their usual meanings. 6

g) Explain the non-existance of an electron in the nucleus in the light of uncertainty principle. 6

h) Estimate the energy released in the process of interaction of a neutron with uranium-235. 6

**Group - B**

2. Define Compton shift. Deduce an expression for it in terms of sine of the angle of scattered Photon. 2+7

3. Deduce Rutherford's scattering formula for alpha particles. 9

4. Define Critical Potential. Describe Franck-Hertz experiment to demonstrate the existence of discrete energy status of an atom. 2+7

5. Employing Uncertainty Principle estimate the ground state energy of a harmonic oscillator. 9

6. Outline the properties of nuclear force and describe the stability of nucleus explaining N-Z graph. 4+5

7. Establish the semi-emperical mass formula explaining the significance of various factors involved in it. 9

8. With a neat schematic diagram describe the construction and working of a nuclear reactor. 2+5+3
6. a) Give two methods of preparation of Furan. 4
   b) Explain why electrophilic substitution reactions in furan preferentially occurs at 2 or 5 position. Write halogenation and nitration reactions in furan. 3 + 2

7. Explain the following reactions with mechanism. 3 × 3
   a) Knorr-pyrole synthesis.
   b) Friedlander's synthesis
   c) Bischler-Napieralski reaction.

8. a) Elucidate the structure of Nicotine and confirm it by one method of synthesis. 5 + 2
   b) Give medical importance of Quinine. 2

1. Answer any four of the following:
   a) What happens when 2 × 3
      i) Nitroalkane is heated with Sn and Conc. HCl.
      ii) Methylecyanide is treated with Na and alcohol.
      iii) Methylamine is heated with CHCl₃ and ale.KOH.
   b) Write notes on the following: 3 × 2
      i) Gabriel Phthalimide synthesis.
      ii) Hofmann's elimination reaction.
c) How will you synthesize?
   i) P-Naphthol from Naphthalene
   ii) Anthraquinone from Anthracene.

d) i) What are heterocyclic compounds? Give their classification.
   ii) How will you prepare furoic acid from furan?

e) Explain the following reactions.
   i) Hantzseh synthesis of pyridine
   ii) Madelung synthesis of indole.

f) Write a note on electrophilic substitution reactions of isoquinoline.

g) i) What are alkaloids? Discuss their biological action.
   ii) Write a note on Emde's modification.

h) i) What are terpenes? Give their classification.
   ii) Write one method of synthesis of Neral.

Group - B

2. a) How will you distinguish \( 1^0, 2^0 \) and \( 3^0 \) amenes by Hinsberg reagent?
   b) Write a note on Hoffmann's exhaustive methylation.

3. a) Discuss two methods of preparation of benzene-diazonium chloride.
   b) How will you synthesize the following compounds using benzenediazonium chloride?
      i) Phenol
      ii) Benzonitrile.

4. a) Write a note on Mannich reaction.
   b) Give two methods of preparation of Naphthalene.

5. Elucidate the structure of Anthracene and confirm it by one method of synthesis.
Group - B

2. Explain the interrelationship between biotic world and its environment. 9

3. Discuss soil as one important ecological factor. 9

4. Explain hydrological cycle and say why it is important for the ecosystem. 9

5. Describe light as an ecological factor 9

6. Mention how succession is necessary for establishment climax community. 9

7. Write an essay on ecological pyramid. 9

8. Briefly discuss the phytogeographical division of India. 9

9. Discuss energy flow in ecosystem through a model of your choice. 9

Group - A

1. Answer any four of the following: 6 × 4

   a) Synecology.
   b) Homoeostasis.
   c) Precipitation.
   d) Community dynamics.
   e) Ecological Niche
   f) Food chain
   g) Energy flow
   h) Biome.

V-98-0.5  [Turn Over
Group - A

1. Answer any four of the following: 6 × 4
   a) Prions
   b) Phagolysosomes
   c) Oxysome particle
   d) Lysosome
   e) Histone proteins
   f) S-phase
   g) cdk cyclin
   h) Types of tumors.

2. Give a detailed account on various methods of transport across cell membrane.
   9

3. Describe the structure and function of mitochondria.
   9

4. Discuss the ultrastructure of nucleus and add anote on function of nucleolus.
   9

5. Describe the different stages of cell cycle during somatic cell division.
   9

6. Briefly explain the extrinsic and intrinsic pathway of apoptosis.
   9

7. Describe the structural components and function of tight junctions and desmosomes.
   9

8. Discuss the mechanism of vesicular transport.
   9

V-99 0.5
2017
Full Marks - 60
Time - 3 Hours
The figures in the right-hand margin indicate marks.
Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Answer any four of the following:
   a) Define Network. Discuss the goals of the Network in briefly. 2 + 4
   b) What are the basic components of data communication? Explain different data flow. 6
   c) How many types of transmission media exist? What are they? 6
   d) Discuss the different types of guided media in briefly. 6
   e) Discuss the different SONET layers in briefly.
f) What do you mean by Frame relay? Explain frame relay operation.

6

g) How are congestion control and quality of service related.

h) What is Ethernet? Describe the traditional, Fast and Gigabit Ethernet?

Group - B

2. State and explain the different layers of OSI reference model.

9

3. a) Distinguish between data rate and signal rate.

4½

b) Define block coding and give its purpose. 4½

4. Which of the three multiplexing technique is common for fibre optic links? Explain the reason. 9

5. Explain the reason for moving from stop-and-wait ARQ protocol to the go-back-NARQ protocol. 9

6. What are the common fast ethernet implementation and common gigabit ethernet implementations? Explain.

9


9

8. Write short notes on the following:

9

a) DSL

b) ATM

c) Virtual Circuit Network.
5. If \( \{f_n\} \) is a sequence of functions defined on \( E \) and 
\( |f_n(x)| \leq M_n \) for all \( x \in E, \ n \in \mathbb{N} \) where \( \{M_n\} \) is a sequence of positive constants. Prove that
\[
\sum_{n=0}^{\infty} f_n(x) \text{ converges absolutely and uniformly on } E \text{ if } \sum M_n \text{ converges.}
\]

6. State and prove Merten's theorem. 12½

7. If \( \{f_n\} \) be a sequence of continuous functions on \( E \subseteq \mathbb{C} \) converging uniformly to \( f \) on \( E \). Then prove that \( f \) is continuous on \( E \). 12½

8. Show that the function \( f(x) = \begin{cases} \frac{-1}{e^{\frac{1}{x}}}, & x \neq 0 \\ 0, & x = 0 \end{cases} \) has derivatives of all orders at \( x \neq 0 \) but it does not have a Taylor expansion. 12½

1. Answer any four of the following: 7½ \( \times \) 4
   a) Examine the conditional and absolute convergence of the following series.
   \[
   \sum_{n=1}^{\infty} (-1)^n \frac{n!}{10^n + 1}
   \]
   b) If \( \sum a_n \) is absolutely convergent, any rearrangement of \( \sum a_n \) has the same sum prove it.
   c) Examine the convergence of the integral
   \[
   \int_{0}^{\infty} \frac{\sin x}{x^\alpha} \, dx, \quad 0 < \alpha \leq 1
   \]
d) Show that the gamma function
\[ I(p) = \int_0^\infty e^{-t} t^{p-1} dt \] converges for \( p > 0 \).

e) Show that the sequence \( \{f_n\} \) defined by
\[ f_n(x) = x \frac{(0 \leq x \leq 1)}{1 + nx^2} \] converges uniformly to a limit function \( f \) but:
\[ \lim_{n \to \infty} f_n'(x) = f'(x) \text{ is true if } x \neq 0 \]

f) Let \( \{f_n\} \) be a sequence of function in \( [a, b] \) converging uniformly to \( f \). There \( f \in \mathbb{R}[a, b] \) and prove that
\[ \lim_{n \to \infty} \int_a^b f_n(x) \, dx = \int_a^b f(x) \, dx \]

g) Show that for \( -1 < x \leq 1 \)
\[ \log(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \frac{x^5}{5} - \ldots \]
Also prove that \( 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \ldots = \log 2 \)

h) If \( f(x) = \begin{cases} x, & x \in \mathbb{Q} \\ 0, & x \in \mathbb{R} - \mathbb{Q} \end{cases} \)
Then prove that
\[ \int_a^b f(x) \, dx = \frac{b^2 - a^2}{2} \]

Group - B

2. If \( f \in B[a, b] \) be continuous over \( [a, b] \) except over a finite set. Then prove that \( f \) is integrable.

3. Let \( f(x) = \begin{cases} 1, & 0 \leq x \leq 1 \\ x, & 1 < x \leq 2 \end{cases} \)
using fundamental theorem of calculus, verify that the function \( F \), defined by
\[ F(x) = \int_0^x f(t) \, dt, \quad x \in [0, 2] \]
is differentiable on \( [0, 2] \) and \( F' = f \) on \( [0, 2] \)

4. Find the pointwise limit of \( f_n(x) \) if it exists and examine for uniform convergence of
\[ f_n(x) = nx e^{-nx^2}, \quad x \in [0, 1] \]
The figures in the right-hand margin indicate marks. Answer all questions.

1. 1) 20

2. 1) 10

3. 1) 15

4. 1) 10

5. 1) 10

6. 1) 10
I. អំពីការអនុម័តការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
II. បញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
III. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
IV. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
V. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
VI. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
VII. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
VIII. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
IX. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។ 
X. ការដោះស្រាយបញ្ហារបស់ការអនុវត្តនការអាជីវកម្មអង្គការ ខេត្តកំពង់សោះ ។
2017
Full Marks - 75
Time - 3 Hours
The figures in the right-hand margin indicate marks.
Answer all questions

1. a) Explain the origin of various spectral lines of hydrogen atom on the basis of Bohr's atomic model.  
   
   7½

   b) How does the motion of the nucleus affect the wavelength of spectral lines and account for the discovery of deuterium.  
   
   7½

   OR

   c) Explain the origin of continuous x-ray and discuss briefly the significance of short wavelength limit. Point out the important difference between continuous x-ray and characteristic x-ray.  
   
   7+3

   d) Write notes on Mosely Law.  
   
   5
2. a) What is Compton effect. Derive an expression for the change of Wavelength of the incident photon. 2+10

b) The Wavelength of an x-ray photon is doubled on being scattered by 90°. Find out the wavelength of incident photon. 3

OR

c) State and explain Heisenberg's uncertainty principle. 7½

d) Estimate the ground state energy of the dimensional harmonic oscillator using Heisenberg's uncertainty principle. 7½

3. a) Define eigen functions and eigen values. Show that eigen values corresponding to Hermitian operator is real. 2+2+4

b) Explain orthonormality of eigen functions and establish the communication relation between the position and corresponding momentum. 4+3

OR

c) What is one dimensional potential step. 3

d) A particle of energy E encounters a potential step of height V₀. Find the reflection and transmission co-efficient for E>V₀. 6+6

4. a) Give an account of nuclear force. Briefly explain the charge, size, spin of the nucleus. 6+3+3+3

OR

b) With a neat schematic diagram explain the construction and working of GM. counter. 15

5. a) State postulates of special theory of relativity and derive Lorentz transformations. 2+8

b) Derive length contraction formula. 5

OR

c) Derive time dilation formula and discuss its results. 7

d) Establish the variation of mass with velocity. 8
1. a) State and explain Kohlrausch's law of independent migration of ions.  

b) Discuss the titration curves obtained in the conductometric titration of (i) strong acid with strong base (ii) AgNO₃ with KCl.  

OR  
c) Explain the variation of equivalent conductance with concentration for strong electrolytes.  
d) Give a brief account of buffer solution  

2. a) What are reversible electrodes? Describe the construction of a standard hydrogen electrode. How is the electrode potential of Zn/Zn²⁺ electrode determined.  

b) Electrophilic substitution occurs at C–2 position in case of pyrrole. Explain.  

c) Explain why pyrrole is more basic than furan.  

OR  
d) Explain the following with examples.  

(i) Antipyretics  
(ii) Antimalarials  
(iii) Antacids  
(iv) Antihistamines.  

e) What is mustard gas? Write one of its uses.  

3. a) What happens when furan reacts with  

(i) SO₂ in presence of pyridine  
(ii) H₂ in presence of nickel.  

b) Explain why pyrrole is more basic than furan.  

OR  
c) Explain the variation of equivalent conductance with concentration for strong electrolytes.  
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b) Electrophilic substitution occurs at C–2 position in case of pyrrole. Explain.  

c) Explain why pyrrole is more basic than furan.  

OR  
d) Explain the following with examples.  

(i) Antipyretics  
(ii) Antimalarials  
(iii) Antacids  
(iv) Antihistamines.  

e) What is mustard gas? Write one of its uses.  

5. a) How will you prepare  

(i) Glycine from chloroacetic acid.  
(ii) Adipic acid from diethyl malonate?  

d) Write notes on:  

(i) Isoelectric point  
(ii) Gabriel phthalimide synthesis of alanine.  

6. a) What happens when furan reacts with  

(i) SO₂ in presence of pyridine  
(ii) H₂ in presence of nickel.  

b) Electrophilic substitution occurs at C–2 position in case of pyrrole. Explain.  

c) Explain why pyrrole is more basic than furan.  

OR  
d) Explain the following with examples. 

(ii) Antipyrine  
(ii) Antimalarials  
(iii) Antacids  
(iv) Antihistamines.  

e) What is mustard gas? Write one of its uses.
b) What is quinhydrone electrode? How is the pH of a solution determined by using this electrode. 1+6

OR

c) Explain phase and component with suitable examples. Derive phase rule. 4+3

d) How is the solubility product of the sparingly soluble salt determined by EMF method? 5½

3. a) How is diborane obtained from boron trichloride? Discuss the bridge structure of diborane. 2+4

b) Give an account of hydrides of nitrogen. 6½

OR

c) Write notes on:
   i) Interhalogen compounds.
   ii) Silicones.

4. a) Name two ores of nickel. How is the metal extracted from its important ore? Write the composition of German Silver. 1+6½+1

b) How is sodium nitroprusside prepared? How is it used to detect sulphide ion in qualitative analysis. 3+1

OR

c) Explain the role of myoglobin during oxygen transport. 4

d) How is potassium cobaltinitrate prepared? Explain its structure. 3+1½

e) How does KMnO₄ act as an oxidising agent in alkaline medium. 2

f) Give an oxidising property of K₂Cr₂O₇ in acidic solution. 2

5. a) How is methyl magnesium iodide prepared? Starting from it how will you prepare (i) ethyl alcohol and (ii) acetaldehyde? 2½ × 3

b) How will you synthesize (i) ethyl methyl ketone and (ii) 4-methyl uracil from acetoacetic ester. 2+3

OR

V-184 [Turn Over
The questions are of equal values
Answer all questions

1. a) Describe the structure and functions of Thyroid gland.
   OR
   b) Write notes on any two of the following:
      i) Chemical nature of hormones
      ii) Mechanism of action of protein hormones.

2. a) What is fertilization? Describe the mechanism of fertilization.
   OR
   b) Write notes on any two of the following:
      i) Oogenesis.
      ii) Types of cleavage
      iii) Structure of sperm.

3. a) Discuss the causes, effects and control measures of Air Pollution.
   OR
   b) Write notes on any two of the following:
      i) Food Chain
      ii) Biotic components of ecosystem
      iii) Types of biodiversity.

4. a) Give an account of the various renewable resources and add a note on its conservation.
   OR
   b) Write notes on any two of the following:
      i) Conservation of Wildlife.
      ii) Cell mediated immunity.
      iii) Vermitechnology.

5. a) Write an essay on agriculture and add a note on its economic importance.
   OR
   b) Write notes on any two of the following:
      i) Sustainable agriculture
      ii) Histogram
      iii) Arithmetic mean.

IV-UG-Zool(P/EL)-VII
(Back)
2017
Full Marks - 75
Time - 3 Hours
The questions are of equal values
Answer all questions
II-PG-ODI-VI

2017
Full Marks - 40
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer all questions.

1. (a) Full marks - 40
Time - 3 Hours

2. (a) Full marks - 40
Time - 3 Hours

3. (a) Full marks - 40
Time - 3 Hours

V-190-0.5
1. **a)** Elite theory developed in part as a reaction to Marxism. Do you agree? Give reasons. Discuss the limits of Elite theory.

**b)** "History is the graveyard of aristocracy."—Pareto. In the light of the preceding statement critically discuss the concept of 'Circulation of Elites'.

2. **a)** Explain the nature of public policy.

**b)** Examine the ways by which the legislature and judiciary exercise their influence on policy implementation.

3. Write notes on any two of the following:

   **a)** Elites and Non-Elites
   **b)** Elites and Political Stability
   **c)** Role of the PMO in the policy process
   **d)** Importance of public policy
   **e)** 'Fact/value' constraints to policy-making.
3. a) Discuss Born approximation in scattering theory and derive an expression for the scattering amplitude $6(\theta, \phi)$. Discuss the condition for validity of Born approximation. 

OR

b) Discuss partial wave analysis of elastic and inelastic scattering and show that optical theorem is valid in both cases. What is the physical significance of optical theorem.

10+2

6+3+3

1. a) What is anomalous Zeeman effect? Explain it applying perturbation theory. 

OR

b) Find the energy levels of a particle in one dimensional oscillator potential using WBK method.

c) Write a note on cold emission.

9

7

2. a) What do you mean by transition probability? Deduce expressions for a constant perturbation and harmonic perturbation.

OR

b) Define and interpret Einstein's A, B coefficient of spontaneous and induced emission. Deduce expressions for these coefficients.

4+4+4

2+2+8
The figures in the right-hand margin indicate marks.

Answer five questions including Q. No. 1 which is compulsory.

Group - A
1. Write notes on four of the following:
   a) Uses of Fossils
   b) Index Fossils with examples.
   c) Geological History of Brachiopoda
   d) Dentition in Pelecypoda
   e) Corals
   f) Siwalik Fauna
   g) Forms of Gastropoda shells
   h) Suture lines of Cephalopoda

Group - B
2. Give a detailed account of the theory of organic evolution.
3. Describe the morphology of a Trilobita with examples.
4. Describe the morphology of a Pelecypoda shell with examples.
5. Discuss the evolution of Horse.
7. Describe the morphology of Echinoids with neat sketches.
8. Give a detailed account of Evolution of Trilobite.
5. a) For all integer \( k \),

\[
\sum_{j=0}^{2n} e^{ikt} = \begin{cases} 
2n+1, & e^{ik} = 1 \\
0, & e^{ik} \neq 1
\end{cases}
\]

The condition \( e^{ik} = 1 \) is equivalent to \( k \) being an integer multiple of \( 2n+1 \). Prove this.

OR

b) Given the following values of \( f(x) \) and \( f'(x) \)

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
<th>( f'(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>1</td>
<td>-5</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

estimate the values of \( f(-0.5) \) and \( f(0.5) \) using the hermite interpolation.

1. a) For even, assume \( f(x) \) is \( n+2 \) times continuously differentiable on \([a, b]\). Then prove that

\[
I(f) - I_n(f) = C_n n^{n+3} f^{(n+2)}(\eta) \text{ some } \eta \in [a, b]
\]

with \( C_n = \frac{1}{(n+2)!} \int_0^n \mu^2 (\mu - 1) \cdots (\mu - n) \, d\mu \)

OR

b) Use Simpson's rule to evaluate the integral

\[
\int_0^\pi e^x \cos x \, dx
\]

For 8 sub intervals and calculate the error \( E_n(f) \).
2. a) Consider the equation \( y' = -y^2, y(0) = 1 \). Calculate \( y(2) \) by Euler's method for \( h = 0.4, 0.2 \) and compare the error.

OR

b) Let \( m \geq 1 \) be a given integer. In order that
\[
\tau(h) = \max_{x_p \leq x_n \leq b} |\tau_n(Y)| \to 0 \quad h \to 0
\]
holds for all continuously differentiable function \( Y(x) \), i.e. the method
\[
y_{n+1} = \sum_{j=0}^{P} a_j y_{n-1} + h \sum_{j=-1}^{P} b_j f(x_{n-j}, y_{n-j}), \quad n \geq p \]
be consistent, it is necessary and sufficient that\( P \)
\[
\sum_{j=0}^{P} a_j = 1, \quad -\sum_{j=0}^{P} a_j + \sum_{j=-1}^{P} b_j = 1 \quad \text{.........(A)}
\]
And for \( \tau(h) = O(h^m) \) to be valid for all functions \( Y(x) \) that are \( m+1 \) times continuously differentiable, it is necessary and sufficient that (A) holds and that
\[
\sum_{j=0}^{P} (-j)^i a_j + i \sum_{j=-1}^{P} (-j)^{i-1} b_j = 1, i = 1, 2, \ldots, m.
\]
Prove that.

3. a) Consider the differential equation \( y' = 1 + y^2 \), \( y(0) = 0 \). Using Adams-Bashforth fourth order method, find \( y(0.8) \) with step length \( h = 0.2 \).

OR

b) Consider the backward Euler method:
\[
y_{n+1} = y_n + h f(x_{n+1}, y_{n+1}), \quad n \geq 0
\]
Find the region of stability.

4. a) Solve the system \( A x = b \) by Gauss-Jacobi method with
\[
a = \begin{bmatrix} 10 & 3 & 1 \\ 2 & -10 & 3 \\ 1 & 3 & 10 \end{bmatrix}, \quad b = \begin{bmatrix} 14 \\ -5 \\ 14 \end{bmatrix}, \quad x^0 = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}
\]
and check the convergence.

OR

b) Solve the following system by Gauss elimination with pivoting:
\[
0.729x + 0.81y + 0.9z = 0.6867 \\
x + y + z = 0.8338 \\
1.331x + 1.21y + 1.1z = 1.000
\]
3. a) Discuss the importance of effective communication for accelerating the productivity of an industrial unit. 13

OR

b) Explain the term grapevine as a channel of communication. State its benefits to management. 5 + 8

II-PG-Com-VI (MCOB)

2017
Full Marks - 40
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer all questions.

1. a) Define Leadership. Explain various styles of leadership. 2 + 12

OR

b) Write notes on the following: 7 × 2
i) Informal group
ii) Group Dynamics.

2. a) What do you mean by conflict. Explain various sources of conflict in an organisation. 3+10

OR

b) Write notes on the following: 6½ + 6½
i) Interpersonal conflict.
ii) Interorganisational conflict.
3. a) What is performance appraisal? State its objectives and importance.

   OR

b) Explain the meaning and advantages of job enrichment. In what ways a job be enriched?

4. a) What do you mean by employees compensation? What are the objectives of paying compensation.

   OR

b) Explain the important features of labour welfare programmes.

5. a) What is meant by collective bargaining? State its merits and weaknesses.

   OR

b) Make constructive suggestions for the minimisation and settlement of industrial disputes.

1. Write notes on any two of the following:
   a) Manpower planning
   b) Personnel management environment in India
   c) Human Resource Development System
   d) Operation of a personnel office.

2. a) What do you mean by development? State the need for development. How is it different from training.

   OR

b) What do you mean by career planning? What are its merits?
IV-UG-ODI(CC)-X

2017
Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No.1.
which is compulsory.

Group - A

1. The figures in the right-hand margin indicate marks

Group - B

1. The figures in the right-hand margin indicate marks

5. Group - B

1. The figures in the right-hand margin indicate marks

6. Group - B

1. The figures in the right-hand margin indicate marks

7. Group - B

1. The figures in the right-hand margin indicate marks

8. Group - B

1. The figures in the right-hand margin indicate marks

V-109-0.7

V-109
The figures in the right-hand margin indicate marks.

Answer five questions including Q.No.1. which is compulsory.

Group - A

1. अध्योतिकेतुपु: चदुर्णाँ प्रश्नानां, उत्तरं देयम्: 7½ × 4
   क) राजहंसस्य शैरि प्रकटतयत ।
   ख) वसुमते: गर्भधारण प्रकारं वर्ण्यत ।
   ग) क: मानसार: ? राजहंसमानसारयो: युद्धवर्णां कुरु ।
   घ) वसुमते: अरण्यवासस्य कारणं लिखित ।
   ड) कादम्बरी आधारेण यौवनस्य दोषानं वर्णित ।
   च) अनुवादं कुरुः
      गर्भधारणमभिनवाविवलस्पष्टं मनोत्सेषमनुशासितस्वानि
      महतीं खलवननीयसर्परमस्ते ।

Group - B

2. दशकुपार्वाणां परिचयं दीयत । 12½

3. वसुमते: सौन्दर्यं वर्णित ।

4. पराजयात्मकाः: कि कृतवान्।

5. आत्महत्यात्मरूपी वसुमती निशाने के दृश्या किमकरोत्।

6. लक्ष्याक्षरं वाणभूतिरुपं वर्णित ।

7. वाणोच्छज्जगतंस्वरं - अस्त्रं उक्ते: मार्गस्य प्रमाणाणि।

8. संस्कृतवें निबंधं लिखत कस्थाचित् एकस्य।
   क) राष्ट्रभाषा संस्कृतम्
   ख) गणतन्त्रम्

2017
Full Marks - 80
Time - 3 Hours

V-110-0.5 [Turn Over
1. निम्नलिखित गद्यांशों में से किन्हीं दो की सप्तम व्याख्या कीजिए।  
6 × 2

क) जब तुम जाने कैसे एक बहनी हुई तारीख के समान मेरे शून्य में उदित हो गयी हो, अशोक की एक कोमल रेखा इस निविड़ तम में मुस्कान लगी।

ख) अब कोई क्या खिलायेगा? वह जमाना दूसरा था। अब तो सबको किफायत सूझती है। सादी-व्याह में मत खर्चकरो, क्रिया-कर्म में मत खर्च करो, पूछो, गरीबों का माल बटोर बटोर कर कहाँ रखोगे? बटोरने में तो कभी नहीं है। हाँ, खर्च में किफायत सूझती है?

ग) सिद्धेश्वरी की समझ में नहीं आ रहा था कि क्या कहे। वह चाहती थी कि सभी चीजें ठीक से चुके ले। सभी चीजें ठीक से
2. निम्नलिखित प्रश्नों में से किन्हीं चार के उत्तर दीजिए : $12\frac{1}{2} \times 4$

क) ‘उसने कहा था’ कहानी की कथा उद्देश्य और शैली पर आलोचना कीजिए।

ख) ‘आकाश दीप’ कहानी के आधार पर चंपा के चरित्र की विश्लेषणाएं को रेखांकित कीजिए।

ग) ‘हार की जीत’ कहानी के नामकरण की सार्थकता पर विचार कीजिए।

3. टिपणी लिखिए : (किन्हीं दो) 4 × 2

क) आंचलिकता और लाल पान की बेगम

ख) सितनका बदल गया की नायिका

ग) नयी कहानी और कफन

घ) मलबे का मालिका कौन है?

4. अति संक्षिप्त उत्तर दीजिए (किन्हीं दस) 1 × 10

क) शाहाजी कौन था?
The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

**Group -A**

1. Give short answers to any **four** of the following:
   
   4 × 7½
   
   a) Discuss the significance of race studies.
   
   b) How does the feminist study distinguish between sex and gender.
   
   c) 'Dying is an art' – Elaborate the statement in 'Lady Lazarus'.
   
   d) Discuss the theme of sexism in 'The Color Purple'.
   
   e) Throw light on the sisterhood between Celie and Nettie in 'The Color Purple'.
   
   f) What does the pear tree in the story 'Bliss' symbolise?
   
   g) How is Dopdi portrayed as a symbol of women empowerment in Mahasweta Devi's 'Draupadi'?

2. What pathetic picture of the upper caste women is presented in 'Amar Jiban'.

**Group -B**

2. What issues of Black Women are addressed in 'The Color Purple'.12½

3. What is confessional writing? Write a note on the confessional mode in the writings of two women writers. 12½

4. How does Kate Millet's sexual politics analyse the role of patriarchy in society, culture and literature. 12½

5. Discuss major concerns in Emily Dickinson's poetry on the basis of the poems you have read. 12½

6. Discuss the conflict in 'Bliss' by Katherine Mansfield. 12½

7. How does the story 'Draupadi' portray the oppressed women of the deprived section of society. 12½

8. Write a critical summary of Ramabai Ranade's 'A testimony of our inexhaustible Treasures'. 12½
Group-B

2. Give an account of the Persian and Vernacular literary sources of information for the study of Medieval India.  
   12½

3. Throw light on the growth of Mansab system under Jahangir and Shah Jahan.  
   12½

4. Discuss the territorial expansion and consolidation of Mughal empire in the first half of 17th Century.  
   12½

5. Trace the development of Mughal architecture under Shah Jahan.  
   12½

6. Estimate the achievements of Shivaji.  
   12½

7. Discuss the factors responsible for the decline of the Mughal empire.  
   12½

8. Write an essay on the organisation of craft production and technological development during the Mughal period.  
   12½

Group-A

1. Write short notes on any four of the following.  
   7½ × 4
   a) Travelogues on Mughal polity.  
   b) Issues in the War of Succession.  
   c) Anti Hindu policy of Aurangzeb.  
   d) Jat and Satnami Revolts.  
   e) Mughal Paintings.  
   f) Peshwa Baji Rao I  
   g) Emergence of successor states.  
   h) Markets and transportation system under the Mughals.
g) Discuss the effects of taxation on distribution.

h) Explain the objective approach to Ability to Pay theory of Taxation.

Group-B

2. Coincidence of MSS with MSB determines the optimum size of public Budget. 12½

3. Discuss the role of Government in respect of market failure due to externalities. 12½

4. Explain Wagner's law of Increasing State Activities. 12½

5. Discuss Peacock-Wiseman hypothesis of discrete growth of public expenditure. 12½

6. Explain Dalton's modern theory of Incidence of Taxation. 12½

7. Equality in taxation implies equality in sacrifice. Explain. 12½

8. Budget is an instrument of economic policy. Explain. 12½

Group-A

1. Give short answers to any four of the following: 7½ × 4

   a) Distinguish between Public Finance and Private Finance.

   b) Explain the characteristics of Private Goods and Public Goods.

   c) Discuss the Canons of public expenditure.

   d) Explain the effects of public expenditure on production.

   e) Discuss the Canons of taxation.

   f) Explain the causes of low level of taxable capacity in India.
Group - A

1. Answers any four of the following.  
   \(7\frac{1}{2} \times 4\)
   a) Explain how territoriality of a nation-state is affected by the process of globalization.
   b) What is WTO? What are its functions? Explain.
   c) Expand the concept 'State terrorism'.
   d) Explain the causes of inter-state migration.
   e) Discuss the changing dimensions of human security.
   f) Mention the main provisions of Kyoto protocol.
   g) What do you mean by TNCs? Briefly point out how they work to promote globalization.
   h) Do you think the NPT, 1968 is discriminatory? Justify your answer.

Group - B

2. "World Bank and the IMF are two engines of globalisation". Explain the statement with reference to their role and functions. \(12\frac{1}{2}\)

3. Define globalization and briefly discuss the alternative perspectives. \(12\frac{1}{2}\)

4. Give an account of the steps taken by the international community to address various environmental issues. \(12\frac{1}{2}\)

5. Explain the cultural and technological dimensions of globalization. \(12\frac{1}{2}\)

6. What do you mean by nuclear proliferation? Discuss the problems of nuclear proliferation. \(12\frac{1}{2}\)

7. "Governance without government is the contemporary trend in global politics." Examine \(12\frac{1}{2}\)

8. What do you mean by international terrorism? Discuss the causes of its growth in recent times. \(12\frac{1}{2}\)
Group A

1. Write short notes on any four of the following concepts of the Bhagavadgita. 7½ × 4
   a) Yoga
   b) Karmaphala
   c) Vikarma
   d) Brahman as parama Aksara
   e) Purusottama
   f) Parā Prakṛti
   g) Sannyāsa
   h) Sattvika Sukha.
g) Discuss the causes of Domestic violence.

h) Give your suggestions to control the problem of Terrorism in India.

**Group-B**

2. Briefly discuss the nature of social disorganisation. 
   12½

3. Give a sociological analysis of the problem of dowry in India. 
   12½

4. Discuss the causes of family disorganisation. 
   12½

5. Examine Merton’s sociological analysis on the theory of deviant behaviour. 
   12½

   12½

7. Analyse the reformative theory of punishment. 
   12½

8. Describe the causes of poverty in Indian society. 
   12½
2. What is the contribution of Malinowski about the ethnographic approaches of fieldwork tradition in anthropology? 9

3. Briefly discuss on the comparative and historical methods of fieldwork tradition in Anthropology. 9

4. What is Research Design? Briefly discuss the types of research design? 9

5. Elaborately discuss on the types of sampling with suitable examples. 9

6. Define the concept of survey and give the details of relation of survey method with ethnographic methods of data collection. 9

7. What is ethics? Define and analyze ethical issues in the context of human subject research. 9

8. Write details about ethical importance of consent, Privacy and confidentiality in research. 9

Group-B

2017

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer **five** questions including Q.No.1 which is compulsory

**Group -A**

1. Write short notes on any **four** of the following 6 × 4

   a) Field work tradition.
   b) Etic and emic perspectives.
   c) Rapport establishment.
   d) Participant observation.
   e) Report writing.
   f) Interview.
   g) Life history.
   h) Authorship and publication.
2. Elaborate the concept of Possibilism. 9

3. Give an account of major races of India. 9

4. Describe the life and economy of Semangs. 9

5. Discuss the major languages of India. 9

6. Critically examine the impact of caste system on Indian society. 9

7. Give an account of the scheduled caste population in India. 9

8. Highlight on the social and economic life of Santals. 9

9. Answer any four of the following $\frac{7}{2} \times 4$
   a) Scope of human geography
   b) Cephalic Index
   c) Origin of man
   d) Social life of Bushmen
   e) Culture
   f) Sikhism
   g) Scheduled tribes.
   h) Economy of Todas.
IV-UG-Stat(CC)-X

2017
Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No.1 which is compulsory

Group - A

1. Answer any four of the following 6 × 4

a) Describe Semi average method of measuring trend.

b) Distinguish between "Additive model" and multiplicative model in a time series analysis of data.

c) Describe how a straight line trend can be fitted by principle of least square.

d) What is a "Business cycle" describe the cyclic variations occurring in business cycle.
e) Describe "Simple Average Method" of obtaining seasonal variation.

f) Define Index number. What are the limitations of Index number? Why Index number is called an economic barometer.

g) What is Circular Test? Show that fisher's Index number does not satisfy circular test.

h) Explain "Base Shifting" Splicing and deflating of Index number.

**Group-B**

2. Define Time Series. Mention its important components with illustrations and describe a method of smoothing of time series

3. Fit a straight line Trend to the given data and obtain the trend values

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>production in tonnes</td>
<td>77</td>
<td>88</td>
<td>94</td>
<td>85</td>
<td>91</td>
<td>98</td>
<td>90</td>
</tr>
</tbody>
</table>

4. Describe the "Ratio-to-trend" method of measuring the seasonal variation.

5. Describe the variate difference method for determining the irregular variations.

6. What do you mean by weighted index number? Discuss the various types of weighted Index number.

7. What are the criteria of a good index number? Why Fisher's Index number is called an ideal index number.

8. What is the cost of living Index number? What are the steps of its construction? Mention its uses.
**Group - B**

2. What is action research? Describe the various steps in conducting action research.  

3. Explain in detail the nature and characteristics of qualitative research.  

4. What is hypothesis? Describe the main characteristics of a good hypothesis.  

5. Define rating scale and give an account of different types of rating scale with their specific use.  

6. What is Content Analysis? Explain the various steps of content analysis.  

7. Explain in detail the general format of a research report.  

8. Describe with example how quantitative data i.e. inferential statistics based on parametric tests are analysed.  

**Group - A**

1. Answer any four of the following:  

   a) Differentiate between basic and applied research.  
   b) Explain the characteristics of a good research problem.  
   c) Describe the value of interview in data collection.  
   d) Discuss the nature of experimental research.  
   e) Briefly describe the uses of mean and median.  
   f) Mention six properties of normal probability curve.  
   g) Write down the value of correlation in data interpretation.  
   h) Explain what is synopsis?
Group - B

2. Discuss different parameters of assessment with examples. 9

3. What do you mean by psychological scaling? Discuss various methods of scaling. 9

4. What is meant by Standardization? How can a test be standardized? 9

5. Define reliability. Discuss different types of reliability. 9

6. How projective tests are used to assess personality? 9

7. Discuss the advantages and limitations of different traditional tests. 9

8. Write short notes on any two of the following: 9
   a) Development of test norms
   b) Interpersonal interaction
   c) Computer assessment
   d) Alternative Assessment.

Group - A

1. Answer any four of the following: 6 × 4
   a) What do you mean by assessment? Briefly discuss the nature and scope of human assessment.
   b) Discuss different principles of test construction.
   c) What is validity? Discuss different types of validity.
   d) Point out the differences between verbal and nonverbal tests with examples.
   e) How intelligence can be measured?
   f) Discuss the advantages and limitations of self-report inventories.
   g) Evaluate different techniques of grading and reporting of performances.
   h) Discuss the drawbacks of various interest inventories.
4. Discuss briefly the objectives and limitations of budgetary control. 8 + 8

OR

Write notes on the following: 8 + 8
a) Master Budget
b) Flexible Budget.

5. The standard cost of a chemical mixture is as under:
8 tons of material A at Rs 40 per ton.
12 tons of material B at Rs 60 per ton.
Standard Yield is 90% of input.
Actual cost for a period is as under:
10 tons of material A at Rs 30 per ton.
20 tons of material B at Rs 68 per ton.
Actual Yield is 26.5 tons.
Compute all material variances. 16

OR

What are the possible causes of following variances?
a) Material Price Variance 4 × 4
b) Material Quantity Variance
c) Labour Rate of Pay Variance
d) Labour Efficiency Variance.

1. a) How does Management Accounting differ from Financial Accounting? 8

b) What are the limitations of Management Accounting? 8

OR

From the following particulars prepare statement of proprietary fund with as many details as possible:
a) Stock Velocity 6
b) Capital Turn Over ratio 2
c) Fixed Asset Turn Over ratio 4
d) Gross profit Turn Over ratio 20%
e) Debtors velocity 2 months
f) Creditors velocity 73 days

The gross profit was Rs 60,000. Reserves and Surplus amounted to Rs 20,000. Closing stock was Rs 5,000 in excess of opening stock. 16
2. What is Fundflow Statement? Explain its importance and objectives.

OR

The following schedule shows the Balance sheet in condensed form of Phulera Ltd. in the beginning and at the end of the year 2015.

<table>
<thead>
<tr>
<th>Assets</th>
<th>1.1.2015</th>
<th>31.12.2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and Bank Balance</td>
<td>45,000</td>
<td>45,000</td>
</tr>
<tr>
<td>Sundry Debtors</td>
<td>33,500</td>
<td>21,500</td>
</tr>
<tr>
<td>Temporary Investment</td>
<td>55,000</td>
<td>37,000</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>500</td>
<td>1,000</td>
</tr>
<tr>
<td>Stock in trade</td>
<td>41,000</td>
<td>53,000</td>
</tr>
<tr>
<td>Land and building</td>
<td>75,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Machinery</td>
<td>26,000</td>
<td>35,000</td>
</tr>
<tr>
<td></td>
<td>2,76,000</td>
<td>2,67,500</td>
</tr>
<tr>
<td>Liabilities and Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sundry Creditors</td>
<td>51,500</td>
<td>48,000</td>
</tr>
<tr>
<td>Outstanding Expenses</td>
<td>6,500</td>
<td>6,000</td>
</tr>
<tr>
<td>8% Debentures</td>
<td>45,000</td>
<td>35,000</td>
</tr>
<tr>
<td>Depreciation Fund</td>
<td>20,000</td>
<td>22,000</td>
</tr>
<tr>
<td>Reserve for Contingencies</td>
<td>30,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Profit and Loss A/c</td>
<td>8,000</td>
<td>11,500</td>
</tr>
<tr>
<td>Capital</td>
<td>1,15,000</td>
<td>1,15,000</td>
</tr>
<tr>
<td></td>
<td>2,76,000</td>
<td>2,67,500</td>
</tr>
</tbody>
</table>

Additional information:

a) 10% Dividend was paid in cash.

b) New machinery for Rs 15,000 was purchased but old machinery costing Rs 6,000 was sold for Rs 2,000 and accumulated depreciation thereon was Rs 3,000.

c) Rs 10,000 8% debentures were redeemed by purchase from open market Rs 96 for a debenture of Rs 100.

d) Rs 18,000 investments were sold at book value.

You are required to prepare the Cash Flow Statement.


OR

A company has fixed expenses of Rs 90,000 with sales Rs 3,00,000 and a profit of Rs 60,000 during the first half year. In the second half it suffered a loss of Rs 30,000.

Calculate:

a) The profit volume ratio break-even point and margin of safety for the first half year.

b) Sales volume for the second half year assuming that selling price and fixed expenses remained unchanged.

c) The break-even point and margin of safety for the whole year.
The figures in the right-hand margin indicate marks. Answer five questions including Q.No.1.
which is compulsory.

Group - A

1. अध्यालिखितेशु केशाबशित चलुणां पुत्रं दीयति :  \[7\frac{1}{2} \times 4\]

   क) भीत्रधीमं भयेजुः खृष्ठथाः – सूत्रं व्याख्यात ।

   ख) अन्तरं येनादर्शनमविश्वति- सूत्रं व्याख्यात ।

   ग) कृत्यानं कृतां वा-सूत्रं व्याख्यात ।

   घ) ज्ञानसं हेतुपुरयां – सूत्रं व्याख्यात ।

   ङ) यस्य च भावने भावलक्षणम–सूत्रं व्याख्यात ।

   च) नात्रै लुष्यि च–सूत्रं व्याख्यात ।

   छ) संस्कृतेन अनुवदत : 

   थः बुधसः ठानसमानसः सः ठानसमानसः – बुध
   बुधसः ठानसमानसः सः ठानसमानसः - बुध
   ठानसमानसः सः – बुध
   बुधसः ठानसमानसः सः – बुध
Sanskrit is called as the language of Gods. It is oldest of literary languages of the world. It is the mother of all Indian languages.

Group - B

2. सूत्र व्याख्यातः । 12½
   भूतः मभवः, पराजेरसीवः ।

3. सूत्र व्याख्या कार्यः । 12½
   कर्तुकर्मणोऽऽ, व्यवहरणः, समयः:

4. सूत्र व्याख्यातः । 12½
   यतः निर्यासरथः, सप्तपथिकरणः ।

5. संस्कृतेन अनुवदतः । 12½
   तुः थस्तते यहः यहैदा याम्बैः । तुः थस्तते यहः
   तुः थस्तते यहः याम्बैः ।

Trees give shelter for the wellbeing of others. They offer fruits to others enduring the tremendous heat. The nature of goodmen are like this. The wealth of goodmen are utilised for the benefit of others. Good men endure pain and offer pleasure to others.

6. विष्णू: दुर्गाया: च सप्तसप्तनामानि लिखतः । 12½

7. दिप्तूणि लिखतः । 12½
   आपातानम्, शेषः, निर्धारणम् ।

8. गणेशस्य सप्तनामानि लिखतः । 12½

V-152-0.5
1. निम्नलिखित गद्यांशों में से किन्हीं दो की समस्त व्याख्या किएं : 

2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks.

Answer all questions

1) प्रेमचन्द का नाम क्या है?
2) काली के गाँव का नाम क्या है?
3) ‘नरक कुंड का बास’ किसकी रचना रही?
4) काली की चाचा का नाम क्या था?
5) ‘आप का बण्डी’ किस तरह का उपन्यास है?
6) ‘आपका बण्डी’ के अतिरिक्त मतू भूण्डारी रचित दूसरा उपन्यास का नाम लिखिए।
7) राकुन और अजय के बीच तत्काल का मूल कारण क्या है?
8) बंदी का नाम क्या था?
9) हिंदी के किसी एक प्रसिद्ध लेखिका का नाम लिखिए।

क) मेरा दु:ख-सुख तुम्हारे साथ है। जिस तरह रखोगे, उसी तरह रखूंगी। मैं भी देखूँगी, तुम अपने सिद्धांतों के कितने पक्के हो? मैं प्रण करती हूँ कि तुमसे कुछ न माँगूँगी।

ख) मैं उन आदमियों में नहीं हूँ जो जिन्दगी की जंगियों को ही जिन्दगी समझते हैं। मैं जिन्दगी की आरजुओं को जिन्दगी समझता हूँ। मुझे जिन्दा रहने के लिए एक ऐसे दिल की जरूरत है, जिसमें आरजू हो, दर्द हो, त्याग हो, सोंठा हो।

जो मेरे साथ रोक सकता हो, मेरे साथ जल सकता हो।
2. किन्हीं के विषय पर टिपूणी लिखिए :  
क) सुखदा का स्वाभिमान  
ख) काली और ब्रानो का प्रेम  
ग) बंदी की विवशता  
घ) मुनी का व्यक्तित्व ।

3. निम्नलिखित प्रश्नों में से किन्हीं चार के उत्तर लिखिए :  
12½ × 4  
क) ‘कम्पूमूम’ में चित्रित समस्या पर आलोचना कीजिए ।  
ख) अमरकांत के चरित्र की विशेषताओं को समझ कीजिए ।

4. अंतिक संख्या उत्तर दीजिए (किन्हीं दस) : 1 × 10  
क) कर्मभूमि उपन्यास का प्रकाशन वर्ष लिखिए ।  
ख) काले खाँ कौन था ?  
ग) सोजे वतन किसकी रचना रही ?

[Turn Over]
The figures in the right-hand margin indicate marks
Answer five questions including Q.No.1.
which is compulsory.

Group -A

5. অন্যতম কথাটিতে কথিত কথিত কথিল কথিল কথিল কথিল কথিল কথিল কথিল কথিল কথিল কথিল । 12½

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7. অন্যতম কথাটিতে কথিত কথিল কথিল কথিল কথিল কথিল কথিল কথিল কথিল 

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9. অন্যতম কথাটিতে কথিত কথিল কথিল কথিল কথিল কথিল 

10. ‘অন্যতম’ কথাটিতে কথিত কথিল কথিল 

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13. ‘অন্যতম’ কথাটিতে কথিল 

Group -B

1. বুদ্ধিমত্তা কথিত কথিল কথিল কথিল কথিল 

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80. ‘বুদ্ধিমত্তা’ কথিল 

V-151-0.7
5. a) Comment on the theme of Henry Derozio's poem, 'The Orphan Girl'. 12½

   OR

   b) Critically analyse Robin S. Ngargon's poem, 'A Poem for Mother' in your own words.

6. Write short answer on any one of the following: 7½

   i) Why did the poet's blood turn cold? Explain it briefly.

   ii) Explain the significance of the title of the poem 'Night of the Scorpion'.


   OR

   b) What is the Central theme of Sashi Despande's short story, 'The Intrusion'? Discuss it in your own words.

8. Write short notes on any one of the following: 7½

   a) Literary works of Mulk Raj Anand

   b) Short stories of Rohinton Mistry.

   a) Justify the title of the novel 'Swami and Friends'. 12½

   OR

   b) Sketch the character, 'Swaminathan'.

2. Write short notes on any one of the following. 7½

   a) Major characters of 'Swami and Friends'.

   b) R. K. Narayan as a Novelist.

3. a) Discuss Anita Desai as a feminist writer with reference to her novel, 'In Custody' 12½

   OR

   b) Comment on the Plot-construction of Anita Desai's novel, 'In custody'.

4. Write short notes on any one of the following: 7½

   a) Literary works of Mulk Raj Anand

   i) Literary works of Anita Desai

   ii) A Portrayal of Deven.
Group -B

2. What is meant by financial market? Analyse its features and functions.  
   12½

3. Critically examine the purchasing power parity theory of exchange rate determination under inconvertible paper standard.  
   12½

4. Describe the Mundell-Fleming short run open economy model for a small economy. Point out its limitations.  
   12½

5. Explain the Harrod model of economic growth along with Knife-edge instability problem.  
   12½

6. Analyse various objectives of fiscal policy. Do you think effectiveness of fiscal policy on economic growth is limited by crowding-out effect? Give reasons.  
   12½

7. Explain the classical view that a general cut in money wage will cure unemployment. How did Keynes oppose such a policy?  
   12½

8. Write a brief note on the development in the field of macro economics in the post-Keynesian period.  
   12½

Group -A

1. Write short notes on any four of the following:  
   7½ × 4
   a) Capital Market
   b) Non-Banking Financial Intermediaries
   c) Balance of Payment disequilibrium
   d) Exchange control
   e) Euro-Money Market
   f) Warranted growth rate
   g) Automatic fiscal stabilisers
   h) Fiscal deficit.
h) What is MNREGA? MNREGA is a failure policy. Discuss.

**Group - B**

2. Discuss the merits and demerits of Decentralisation.  
   12½

3. Discuss the enactment of the Budget in Indian Parliament.  
   12½

4. Define Public Policy. Discuss the policy formulation in India.  
   12½

5. Analyse the working of Panchayati Raj System in India.  
   12½

6. What do you mean by local self governance? Explain the evolution of Urban Local Government in India.  
   12½

7. "Right to Food Security plays a significant role in eradication of poverty in India". Examine  
   12½

8. What is the meaning of Redressal of Public grievances? Discuss the role of Lokpal for redressal of public grievances.  
   12½

**Group - A**

1. Answer any *four* of the following:  
   7½ × 4
   a) Discuss the meaning and characteristics of Public Policy.
   b) Define Budget. Explain the Budget is a tool of administration.
   c) Discuss the importance of National Health Mission.
   d) "Control of state government over the Urban Local Bodies is very vital" Explain.
   e) Discuss the various types of Budget.
   f) Analyse the role of RTI to eradicate corruption.
   g) Explain the significance and necessity of Local Self Government in India.

2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks.
Answer *five* questions including Q.No. 1 which is compulsory.
Group -B

2. Give an account of the Persian literary works for studying Mughal history.  

3. Shed light on the political condition of India on the eve of Babur's Invasion.

4. Examine the policy adopted by Akbar towards the Rajputs.

5. Discuss in detail the Revenue administration of Sher Shah.

6. Give a picture of rural society during Mughal rule.

7. What is meant by Suffism? Discuss the main principles of Suffism.

8. Highlight the position of 'Ulema's as a pressure group in Mughal India.

Group -A

1. Write notes on any four of the following:  

   a) Vernacular literature.
   b) First Battle of Panipath
   c) Mansabdari system
   d) Revolt of Satnamis
   e) Crop patterns
   f) Overseas trade
   g) Rural tension
   h) Ulema.

2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks.
Answer five questions including Q.No. 1 which is compulsory.

V-147-0.5

[Turn Over
Group -B

2. State and explain the nature of ethics. How is it related to religion. 12½

3. Define ethics. What is its scope? How is it related to sociology. 12½

4. Distinguish between moral and non-moral actions. Ethics is concerned with which type of actions. 12½

5. Explain and examine utilitarianism of J.S. Mill. 12½

6. Give an account of organic view of society. 12½

7. Discuss briefly about retributive theory of punishment. 12½

8. Give an account of exploitation of nature. 12½

Group -A

1. Answer any four of the following: 7½ × 4

   a) Define Ethics.

   b) What do you mean by non-moral actions?

   c) Distinguish between motive and intention.

   d) Explain Hedonism.

   e) What is Egoism?

   f) Explain deterrent theory of punishment.

   g) Write short notes on individualism.

   h) Define environmental ethics.
g) Discuss briefly any three factors affecting joint family system in India.

h) Discuss briefly any three effects of divorce in the Indian context.

**Group -B**

2. Define marriage and discuss briefly its various forms. \(12\frac{1}{2}\)

3. Analyse the functions of family. \(12\frac{1}{2}\)

4. Define kinship and discuss its various types \(12\frac{1}{2}\)

5. Write a note on kinship terminology. \(12\frac{1}{2}\)

6. Write a note on genealogical methods. \(12\frac{1}{2}\)

7. Discuss the recent changes in marriage in the Indian context. \(12\frac{1}{2}\)

8. Write a note on divorce and family disintegration. \(12\frac{1}{2}\)

**Group -A**

1. Answer any **four** of the following: \(7\frac{1}{2} \times 4\)

   a) Discuss briefly any three functions of marriage.

   b) Discuss briefly endogamy and exogamy as rules of marriage.

   c) Discuss briefly any three characteristics of family.

   d) Write a brief note on clan.

   e) Discuss briefly kinship organization in Northern India.

   f) Write a brief note on kinship organization in Southern India.
Group - B

2. What is growth? Discuss the concept of human growth, development and maturation.

3. Discuss the evolutionary perspective on human growth including living primate and fossil human ancestors.

4. Give an account of the period of growth on human being.

5. Briefly discuss the ethnic and gender differences in growth curves.

6. Write the ecological factors influencing the patterns of growth and variation.

7. Briefly discuss the nutritional epidemiology and the concept of balance diet.

8. Give a detailed account of models and techniques of human physique and body composition.

Group - A

1. Write short notes on any four of the following:

   a) Human Growth.
   b) Primatics.
   c) Pre-natal.
   d) Growth Curves.
   e) Patterns of growth.
   f) Body Mass Index (BMI).
   g) Somatotyping.
   h) Parnell.
Answer five questions including Q. No. 1 which is compulsory.

Group A
1. Answer any four of the following:
   a) Discuss the relationship between Assessment and Evaluation.
   b) Differentiate between referenced measurement and criterion referenced measurement?
   c) Write the advantages and limitations of objective type Test.
   d) State the learning objectives under cognitive domain.
   e) What are the different Rating Scales and their uses?
   f) What are the steps involved in the construction of a standardized test.
   g) Write the different factors affecting the validity of test scores.
   h) Explain the important factors influencing the usability of a test.

Group B
2. Discuss the objectives and important features of Continuous Comprehensive Evaluation (CCE).
3. Discuss the general instructional objectives and corresponding specific learning outcomes in terms of student's behaviour under affective domain.
4. Describe the different types of observational techniques and its applications in assessing the learner's behaviour.
5. Explain the Tryout and Evaluation Stage of Constructing a standardized achievement test.
6. What do you mean by reliability of a good test? Describe any one method of determining the reliability of a test.
7. What is Interview? Discuss the types and purpose of Interview.
8. Discuss the various evaluation procedures used in the classroom instruction.
Answer five questions including Q.No. 1 which is compulsory.

Group -A

1. Answer any four of the following: 6 × 4
   a) Define Educational Psychology and discuss its principles in brief.
   b) Discuss different objectives for learning.
   c) Elaborate Vygotsky’s theory of cognitive development with its limitations.
   d) Point out the differences between Intrinsic and Extrinsic motivation.
   e) Discuss different techniques in classroom teaching.
   f) Enumerate different characteristics of creativity.
   g) What is an aptitude? Discuss the nature of aptitude.

2. Evaluate Piaget’s theory of cognitive development with examples.

3. Discuss different approaches to understand different classroom motivation.

4. Elaborate different characteristics of an effective teacher.

5. Briefly discuss different theories of creativity.

6. How creativity can be fostered among children?

7. Discuss various techniques for the measurement of aptitudes.


Group -B

2. Evaluate Piaget’s theory of cognitive development with examples.

3. Discuss different approaches to understand different classroom motivation.

4. Elaborate different characteristics of an effective teacher.

5. Briefly discuss different theories of creativity.

6. How creativity can be fostered among children?

7. Discuss various techniques for the measurement of aptitudes.


h) Evaluate the advantages and limitations of standardized tests.

- Turn Over -
Group -B

2. Discuss the significance of statistical methods in Geography. 9

3. Give an account of the interval and ratio scales of measurement with examples. 9

4. Explain the uses and limitations of histogram and frequency polygon. 9

5. Define and discuss the importance of ogive curves. 9

6. Define Sampling and differentiate between systematic and stratified sampling. 9

7. What is measures of central tendency? Discuss the calculation and uses of median. 9

8. What is correlation? Elaborate with examples the positive and negative correlation. 9

Group -A

1. Answer any four of the following: 6 × 4

   a) Primary data
   b) Types of data
   c) Grouping Technique
   d) Mode
   e) Coefficient of variation
   f) Random Sampling
   g) Scatter diagram
   h) Regression.
Group - B

2. What is value-added? Explain the value-added method of estimating national income. Point out the limitations of the method. 12½

3. Discuss Cash-balance approach to Quantity Theory of Money. Examine its superiority over Cash transaction approach. 12½

4. "Banks are not mere purveyors of Money, but in an important sense, manufacturer's of Money'. Examine the statement. 12½

5. Explain different approaches of inflation and bring out the differences between the Keynesian and Monetanist approaches. 12½

6. "Inflation is unjust, Deflation is inexpedient of the two deflation is worse". Examine. 12½

7. "Supply creates its own demand". Discuss. 12½

8. Explain the Keynesian theory of income determination in a simple two sector model. 12½

Group - A

1. Write short notes on any four of the following: 7½ × 4

a) Stock and flow variable.
b) Real and Nominal GDP.
c) Green Accounting
d) Velocity of circulation of Money
e) Deflation
f) Full employment
g) Investment Multiplier
h) Depreciation.
2017
Full Marks - 60
Time - 3 Hours
The figures in the right-hand margin indicate marks.
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any four of the following: 6 × 4

a) What is a sample survey? Differentate between random sampling and Non-random sampling.

b) Describe the basic principles of sample survey.

c) What do you mean by sampling errors? How these errors can be controlled?

d) Prove the probability of selecting a specified unit of the population at any given draw is equal to the probability of its being selected at the first draw.

e) Show that in simple random sampling without replacement sample mean is an unbiased estimator of population mean.
f) Describe the procedure of stratified random sampling. Under what condition is stratified random sampling preferred to simple random sampling?

g) How is a systematic sample taken from a population of size \( nk \) where \( n \) is the sample size and \( k \) is an integer. Give an expression for an estimator of the population mean.

h) Discuss product estimator and derive its mean square error up to the second degree of approximation.

**Group -B**

2. Describe the advantages of sample survey over complete enumeration.

3. What are the sources of Non-sampling errors. State the precautions to be taken for the eradication of these errors.

4. Show that in simple random sampling without replacement sample mean square is an unbiased estimator of population mean square.

5. Explain proportional allocation in stratified random sampling. Find sampling variance of sample mean under this allocation and hence compare it with that of a simple random sampling without stratification.

6. In usual notations, prove that the systematic sample mean is more precise than the mean of a simple random sample taken without replacement if \( S^2_{\text{way}} > S^2 \).


8. Define cluster sampling. State the situation where cluster sampling is useful. Find the relative efficiency of mean of a cluster sample with respect to that of a simple random sample.
7. Deduce the wave equations satisfied by the Electric and Magnetic fields from the Maxwell equations and hence prove that electromagnetic waves are transverse. \[3+3+3\]

8. Discuss propagation of energy in electromagnetic waves and hence deduce the expression for Poynting vector. Prove the Poynting theorem. \[2+4+3\]

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1. Answer any four of the following: \[6 \times 4\]

a) Prove that \(\vec{a} \times (\vec{b} \times \vec{c}) = \vec{b}(\vec{a} \cdot \vec{c}) - \vec{c}(\vec{a} \cdot \vec{b})\) \[6\]

b) Derive the expression for electric field due to a point charge using Gauss's theorem. \[6\]

c) Calculate the electric potential due to a dipole at a point with position vector making angle \(\theta\) with the dipole axis. \[6\]

d) Distinguish among diamagnetic, paramagnetic and ferromagnetic substances. \[6\]
e) State Lenz’s law and explain with the help of an appropriate example how it ensures conservation of energy.

f) Show that the magnetic energy of a pair of coupled circuits will given by

\[ U = \frac{1}{2} L_1 I_1^2 + \frac{1}{2} L_2 I_2^2 + M I_1 I_2 \]

Where \( L_1 \) and \( L_2 \) are the self inductances, \( M \) is the mutual inductance, \( I_1 \) and \( I_2 \) are the currents in the circuits.

g) A battery is connected across an inductor and resistor in series. Solve the differential equation for growth of current. Define time constant and sketch the current versus time.

h) Explain the necessity for introduction of the Displacement current in the 4th Maxwell equation.
6. Discuss the mechanism of electrophilic aromatic substitution for
   a) halogenation
   b) sulphonation.

7. Discuss the mechanism of SN₁ and SN₂ reaction in alkyl halides.

8. a) What happen's when ethylene glycol is treated with
   i) lead acetate
   ii) HNO₃.
   b) What happens when ¹, ² and ³ alcohols are oxidised with alkaline KMnO₄ ?

9. Write notes on the following:
   a) Aldol condensation
   b) Pinacole-pinacolone rearrangement.

1. Answer any four of the following:
   a) i) State different forms of first law of thermodynamics.
      ii) Explain standard enthalpy of formation.
   b) State Le-chatelier's principle. What will happen to the equilibrium,
      \( \text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g) + 96\text{KJ} \)
      if temperature and pressure are increased?
   c) What is buffer solution? Explain the buffer mechanism of an acid buffer. Deduce an expression for the PH of such buffer solution.
d) i) Define pH. Calculate pH of the following solution at 25°C. 1+2
0.001 M HCl and 0.01 M NaOH.
ii) Derive the relation between PH and POH. 3

e) Complete the following reactions and name the products 2 × 3
i) \( C_6H_6 + CH_3COCl \xrightarrow{AlCl_3} \)
ii) \( C_2H_2 \xrightarrow{\text{Red hot tube, 400°C}} \)
iii) \( C_6H_5 - CH_2 - CH_2 - CH_3 + KMnO_4 \xrightarrow{H^+} \)

f) Discuss the elimination-addition mechanism for reaction of chlorobenzine with NaNH\(_2\). 6

g) i) How will you prepare ethyl alcohol from methyl alcohol? 2
ii) Write a note on Benzoin condensation. 4

h) How will you prepare 1\(^0\), 2\(^0\) and 3\(^0\) alcohols using Grignard reagent? 2 × 3

Group -B

2. a) Bond energies of F\(_2\) and Cl\(_2\) are 36.6 and 58.0 KCal/mol respectively. Heat liberated in the reaction of F\(_2\) + Cl\(_2\) → 2FCl is 26.6 KCal. Find the bond energy of F– Cl. 5
b) Thermodynamically derive the law of mass action. 4

3. a) Derive Kirchoff’s equation. 5
b) What is meant by Kp? Derive the relation between Kp and Kc. 1 + 3

4. a) Explain the hydrolysis of weak acid and strong base. Derive expressions for K, K\(_n\) and PH of the solution. 3 + 3
b) Define and explain the term ionic product of water. 3

5. Write notes on the following: 4½ × 2
a) Common ion effect
b) Application of solubility product principle.
Answer any four of the following: 7½ × 4

a) Suppose \( R^+ \) be the set of all positive real numbers. Define the operations of addition and scalar multiplication as follows
\[
R^+ + R^+ = u \cdot v, \quad \forall u, v \in R^+
\]
\[
\alpha \cdot u = u^\alpha, \quad \forall u \in R^+ \text{ and real scalar } \alpha.
\]
Prove that \( R^+ \) is a vector space.

b) State and prove rank nullity theorem.

c) Form the matrix \( [T : B_1, B_2] \) where \( T : v_2 \rightarrow v_2 \) defined by \( T(x, y) = (x, -y) \)
\[
B_1 = \{(1,1), (1,0)\}, \quad B_2 = \{2,3, (4,5)\}\]
d) Find eigen values and eigen spaces of the matrix
\[
\begin{bmatrix}
3 & 2 & 4 \\
2 & 0 & 2 \\
4 & 2 & 3
\end{bmatrix}
\]

e) State and prove fundamental theorem of homomorphism of groups.

f) Prove that every finite integral domain is a field.

g) If \( G \) is a finite group and \( a \in G \), prove that \( 0(a) / 0(G) \).

h) Suppose \( f(x), g(x) \neq 0 \in f[x] \). Prove that there exists two polynomials \( t(x) \) and \( r(x) \) in \( F[x] \) such that \( f(x) = t(x) g(x) + r(x) \) where \( r(x) = 0 \) or \( \deg r(x) < \deg g(x) \).

Group - B

2. a) Prove that if \( S \) is a nonempty subset of a vector space \( V \) then \([S]\) is the smallest subspace of \( V \) containing \( S \).

b) In a vector space \( V \), let \( \{v_1, v_2, \ldots, v_n\} \) spans \( V \). Prove that the following conditions are equivalent.

3. a) Let \( T : V_3 \to V_3 \) be a linear map defined by
\[
T(e_1) = e_1 - e_2 + e_3, \quad T(e_2) = 3e_1 - 5e_3, \\
T(e_3) = 3e_1 - 2e_3.
\]
Find the inverse of \( T \).

b) Reduce the conic \( 7x^2 + 52xy - 32y^2 = 180 \) to its principal axis.

4. a) Find the inverse of the matrix
\[
\begin{bmatrix}
1 & -1 & 2 \\
3 & 0 & 1 \\
0 & 1 & -1
\end{bmatrix}
\]
by row reduction echelon method.

b) If \( A \) is an \( m \times n \) matrix then prove that the rows of \( A \) are L.I. If \( A \) has a non zero minor of order \( m \).

5. a) State and prove Lagrange's theorem.
Group - B

2. What do you mean by development? Discuss different criteria used for the measurement of economic development.

3. Examine the composition of national income and occupational structure of India at the time of independence.

4. Analyse the economic reform measures undertaken for structural adjustment in India since 1991.

5. Discuss the policies adopted by the government of India for restructuring the agrarian relation.

6. What are the causes of unemployment in India? Explain the programmes introduced by government to solve the problem of unemployment.

7. Examine the trends of agricultural production and productivity in India during the planning period.

8. Bring out the main changes in the composition of India’s Foreign Trade since 1991.

Group - A

1. Write short notes on any four of the following:  

   a) Human Development  
   b) The agrarian scene at the time of independence.  
   c) Import substituting industrialisation.  
   d) Policies for regulating concentration of economic power.  
   e) Poverty.  
   f) Population and economic development.  
   g) The small scale sector  
   h) Role of Foreign capital
Group - B

2. What do you mean by development? Discuss different criteria used for the measurement of economic development. 12½

3. Examine the composition of national income and occupational structure of India at the time of independence. 12½

4. Analyse the economic reform measures undertaken for structural adjustment in India since 1991. 12½

5. Discuss the policies adopted by the government of India for restructuring the agrarian relation. 12½

6. What are the causes of unemployment in India? Explain the programmes introduced by government to solve the problem of unemployment. 12½

7. Examine the trends of agricultural production and productivity in India during the planning period. 12½

8. Bring out the main changes in the composition of India's Foreign Trade since 1991. 12½

Group - A

1. Write short notes on any four of the following:
   
   a) Human Development
   b) The agrarian scene at the time of independence.
   c) Import substituting industrialisation.
   d) Policies for regulating concentration of economic power.
   e) Poverty.
   f) Population and economic development.
   g) The small scale sector
   h) Role of Foreign capital

The figures in the right-hand margin indicate marks. Answer five questions including Q.No. 1 which is compulsory.
Group - B

2. Discuss the composition and functions of the principal organs of United Nations Organisation (UNO).  
   12½

3. Define Colonialism. Explain types of Colonialism.  
   12½

4. Discuss in detail about the Non-Alignment Movement.  
   12½

5. Trace the origin and causes of the Cold War.  
   12½

   12½

7. Write a note on Feminist Movement.  
   12½

8. Explain the nature of emerging trends in Culture.  
   12½

Group - A

1. Answer any four of the following:  
   7½ × 4

   a) UNESCO.
   b) The World Health Organisation (WHO)
   c) The Bandung Conference
   d) 'Perestroika'
   e) Economic impact of Globalization
   f) Ecological Movement
   g) Classification of Human Rights.
   h) Social impact of Electronic Media.

2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks.

Answer five questions including Q.No. 1 which is compulsory.
g) Examine the role of UNO on Peace keeping.

h) Discuss the causes of Vietnam war.

**Group - B**

2. Discuss the historical background of formation of United Nations organisation.  
   12½

   12½

4. Discuss the various jurisdiction of International Court of Justice.  
   12½

5. Describe the functions of United Nations Educational, Scientific and Cultural Organisation (UNESCO)  
   12½

   12½

   12½

8. Discuss the role of UNO in Peace making and Peace enforcement.  
   12½

**Group - A**

1. Answer any four of the following:  
   7½ × 4

   a) Discuss the principles of the United Nations Organisations.

   b) Discuss the composition of General Assembly.

   c) Examine composition and functions of International Labour Organisation.

   d) Write short note on United Nations Children's Funds. (UNICEF)

   e) Bring out the role of United Nations High Commissioner for Refugees.

   f) Discuss the peace enforcement programme of UNO.
g) Examine the role of UNO on Peace keeping.

h) Discuss the causes of Vietnam war.

**Group - B**

2. Discuss the historical background of formation of United Nations organisation. 12½

3. Examine the composition and functions of Security Council. 12½

4. Discuss the various jurisdiction of International Court of Justice. 12½

5. Describe the functions of United Nations Educational, Securities and Cultural Organisation (UNESCO) 12½

6. Briefly discuss United Nations Development programme. 12½

7. Examine the role of United Nations High Commissioner for Refugees. 12½

8. Discuss the role of UNO in Peace making and Peace enforcement. 12½
2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks.

Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Write short notes on any four of the following:
   \(7\frac{1}{2} \times 4\)
   a) Logical form of an argument.
   b) Inference and Implication.
   c) The contradictory function.
   d) The equivalence function.
   e) Conjunctive Normal form.
   f) Singular proposition.
   g) Class-sum and class-product.
   h) Free variables and bound variables.
2. Explain the relation between symbolic logic and classical logic. 12½

3. Construct Truth Tables for the following:
   a) Disjunctive function 6
   b) Implicative function 6½

4. Test the following formulae by direct truth-table method and say which of them are tautologies.
   a) \((p \lor q) \land \sim q) \land \sim p\) 6
   b) \(((p \lor q) \land (q \land r)) \land (p \land r)\) 6½

5. Read the following formulae to their C.N.F.
   a) \(((p \lor q) \land \sim q) \land \sim p\) 6
   b) \(((p \lor q) \land (p \land r)\) \land (p \land r)\) 6½

6. Test the validity of the following arguments by method of equivalent substitutions.
   a) If the cost of living rises or government revenues increase, then salary increases will be granted. No salary increases will be granted. Therefore, the government revenues will not increase. 6

7. Symbolise the following expressions using appropriate quantifiers. 3+3+3+3½
   a) All living beings are mortal.
   b) Nothing is perfect.
   c) Some birds are white.
   d) Many politicians are not honest.

8. Put the following Boolean expressions into normal form. 6+6½
   a) \(A' + AC + ABC + AB'C\)
   b) \((AB + A'C)' + B\)
The figures in the right-hand margin indicate marks. Answer five questions including Q.No.1., which is compulsory.

Group -A

2. এল এলিফিতে এলিফটেলো চিহ্ন কোথা দেখেন? : 7½×4
   ১) দেখে দেখি।
   ২) দেখে দেখি।
   ৩) দেখে দেখি।
   ৪) দেখে দেখি।
Group -B

9. ‘খলো ডুডু’ সাজ শুভোপথে অদর্শন করিয়া। 12½

10. ‘পাঁচ দবারা ডুডু’ সাজের সায়াক্ষী অনুপ্রবৃত্ত করিয়া দে। 12½

11. তেন ছণিত প্রশিক্ষণ অভ্যয় অর্ধেক অলক্ষী সম্প্রদায় করিয়া জিন্দির হই। 12½

12. ‘খলো ও ডুডু’ অভিলাল করিয়া দে। 12½

13. হই ললিতি দর্শনের দল ৯০০ চাপ সেল প্রায়শাচ দে। 12½

a) ওড়া ভাবে অলক্ষী রাজিল।
b) লক্ষ্য করিলে জিন্দি করিল।

14. লক্ষ্যের সঙ্গীতের প্রশ্নের সত্যতা দল : 12½

জলবার, লক্ষ্মী, শালুকার, ধনঞ্জয়ী, লক্ষ্মীনারায়ণ, পক্ষীনার, লক্ষ্মীনারায়ণ, দর্শন ।

15. কল্যাণের প্রশ্নের লক্ষ্যের দল জিন্দি : 12½

ললাকু তেন লক্ষ্মীতি লক্ষ্মীতি করিয়া? হল লক্ষ্মী তুলাব, লক্ষ্মী বিশ্বাস প্রকাশ, লক্ষ্মী লক্ষ্মীর, লক্ষ্মী করা হয় না।

গড় অনেক নতুন নক্ষত্র, হল নতুন লক্ষ্মী নতুন কর্ম।

[Turn Over]
2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No.1.
which is compulsory.

Group -A

1. केषाखित् चतुर्भाष्य प्रसन्नानां उत्तरं दीयत । 7½ × 4

वर) समसंहृ व्याख्या विदेया : 

अन्तः श्रील हरां पवनः किंचिदित्यनुलखीभि 
दृष्टोत्साह्यकितचकिति मुग्ध सिद्धाञ्जनाभि:।
स्मानादस्मादसरसनिचुलाधुवतोदबुकं: स्वं 
दिङ्यागानं पधि परिहरन् स्मृतसहस्तावलेपान् ।।

अष्टव

तत्र संहं नियतवसाति पुष्पमेधीकृतात्मा 
पुषासारः स्मृतत्व भवान्योगमहाजलः ।।
रक्षाहेतोत्वश्चिभूता वासवीं चमूना 
मत्यादित्यं हुनवहुमुखं संभृतं तद्भि तेजः ।।
ख) उत्तरलक्षण आक्षेपलक्षण वा अनुवाद कुरुतः

भूमिज्ञाति: सत्तलमस्तान सत्तिपातः कव मेघः
संदेशार्थः कव पदुकरणः प्राणिभः प्राणीयाः
इत्योत्तमावद्यार्थिणानु गहयक रंग यथाचे
कामार्थः हि प्रकृतिकृपणः श्रृजनाचेतनेणुः

अवश्या
आपृच्छस्व प्रयत्नकममु तुज्ञात्मविश्व शीलं
वन्धः पुंसां रघुपथिनदिध्वं पैखलामुः
काले काले भवति भवतो यस्य यस्य संगममत्थ
सेनं व्यवित्तित्वित्विरहं युञ्जो बाष्पमुण्मणः

ग) मेघागमने दशाणां शोभा किंदूसी भवति

घ) मेघदूतमाधारेण हिमालयस्य वर्णं कुरु

ङ) मेघस्य महाकालेक्षरस्य सेवां वर्णयत

च) अमृककवे: परिचयं तत्स्य व्रजस्य सारं च लिखत

छ) कादम्बर्यः: कथासारं वर्णयत

ज) शुक्लपाति इति व्रजस्य रचयितुः परिचयं प्रदाय तत्स्य निर्यासिं

लिखत

[ 3 ]

Group -B

2. मेघदूते वर्णितानां देवस्थानानां निर्भ्र दीपत ।

3. मेघदूतमालमित्य कारिदास्स्य प्रकृति चित्रण कुरु ।

4. मेघदूते नदीनां वर्णनं यथाग्रथं कुरु ।

5. मेघदूते उल्लिखितानां पौराणिकी कथानां वर्णनं कुरु ।

6. भृगुहे: गीतिकाव्यानां परिचयं दीयत ।

7. दण्डनं: कालं निरुपं तत्स्य व्रजस्य कथासारं, आलोचयत ।

8. पञ्चतन्त्रस्य सारं आलोचयत ।

V-131-0.4

□□
2017

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks.

Answer all questions from both the groups

**Group - A**

1. किन्हीं बीन पर टिपणी लिखिए । 6 × 3

   ख) समाचार लेखन और छंककार ।

   ख) आर्थिक पत्रकारिता

   ग) फोटो पत्रकारिता

   घ) समाचार लेखन की उपादेयता

   ढ) फीचर लेखन की प्रशिक्ष

   च) साक्षात्कार का उद्देश्य

   छ) रिपोर्टज़ का स्वरूप ।
2. अति संक्षिप्त उत्तर दीजिए।

(क) हिंदी के एक फीचर लेखक का नाम लिखिए।
(ख) फीचर लेखन के मुख्य तत्त्व क्या है?
(ग) रिपोर्टेज की उत्पत्ति कब और कहाँ हुई थी?
(घ) साक्षात्कार का अंग्रेजी पत्रिका लिखिए।
(ङ) समाचार पत्र के, किसी एक स्तंभ का नाम लिखिए।
(च) अखबार के चौथा या पांचवां पत्र को कब कहा जाता है?
(छ) फोटो पत्रकारिता का स्वर्णयुग कब से प्रारंभ हुआ?
(ज) लोकशाही का चतुर्थस्तंभ किसे कहा जाता है?
(झ) हिंदी का पहला समाचार पत्र का नाम लिखिए।
(ञ) 'Journalism' शब्द का हिंदी पौर्णिमा लिखिए।
(ट) हिंदी के किसी एक प्रसिद्ध रिपोर्टेज लेखक का नाम लिखिए।
(ठ) हिंदी का एक समाचार पत्र का नाम लिखिए।

3. किन्हीं चार प्रश्नों के उत्तर दीजिए:

(क) रिपोर्टेज का अर्थ स्पष्ट करते हुए उसके स्वरूप पर प्रकाश दालिए।
(ख) समाचार पत्र के विविध स्तंभों का परिचय दीजिए।
(ग) साक्षात्कार के महत्व पर प्रकाश दालिए।
(घ) फीचर की प्रमुख विशेषताएं लिखिए।
(ङ) समाचार समाधान कला के आधार भूत तत्त्व पर विचार कीजिए।
(च) समाचार की परिभाषा देते हुए उसके मूल तत्त्व पर प्रकाश दालिए।
(छ) खेल सम्बन्धी समाचार पत्र के एक स्तंभ का नया न्युनत रूप कीजिए।
i) If $X$ is a Poisson variate such that 
$P(X=1) = P(X=2)$.
Find $P(X=3)$

ii) A random variable $X$ has a uniform distribution over $(-3,3)$, calculate $P(|X| \leq 2)$

h) i) A random variable $X$ has a uniform distribution over $(-3,3)$, calculate $P(|X| \leq 2)$

ii) $X$ is a normal variate with mean 30 and standard deviation 5. Find $P(X \geq 45)$.

**Group - B**

Answer any four of the following: $9 \times 4$

2. Explain the following with examples.
   i) Random experiment
   ii) Sample space
   iii) Event
   iv) Exhaustive events.

1. Answer any four of the following: $6 \times 4$
   a) i) State the classical definition of probability and mention its limitations.

   ii) Two balls are drawn from a bag containing 10 black and 5 white balls. Find the probability that both the balls drawn are white.

   b) Describe the sample spaces for the following cases.

   i) Successive tosses of a coin until a head turns up.
ii) Two successive draws without replacement from a bag containing one white, two black and one red ball.

c) i) Show that \( P(\overline{A}) = 1 - P(A) \)

ii) State the conditions when \( P(A|B) = \frac{P(A)}{P(B)} \) and \( P(A|B) = 1 \)

d) i) A and B are two events with \( P(A) = \frac{1}{4} \),

\[ P(B|A) = \frac{1}{2} \text{ and } P(A|B) = \frac{1}{4} \]

Find the value of \( P(\overline{A} | \overline{B}) \).

ii) A, B and C are three events with \( P(A) = 0.5 \)

\[ P(B) = 0.6, P(C) = 0.7, \quad P(A \cap B) = 0.3, \]

\[ P(A \cap C) = 0.2, \quad P(B \cap C) = 0.2 \quad \text{and} \]

\[ P(A \cap B \cap C) = 0.1 \]

Find the value of \( P(\overline{A} \cup B \cup C) \)

e) i) Define the distribution function of a random variable and state its properties.

ii) The probability function of random variable \( X \) is given as

\[ X : 1 \quad 2 \quad 3 \quad 4 \]

\[ p : 0.2 \quad 0.1 \quad 0.3 \quad 0.4 \]

Find the probability function of a random variable \( X + X^2 \).

f) i) A continuous random variable \( X \) has the pdf

\[ f(x) = a + bx, \quad 0 \leq x \leq 1 \]

Find \( A \) and \( B \) if the mean of the distribution is \( \frac{1}{2} \).

ii) A random variable \( X \) has the pdf

\[ f(x) = 0, \text{ if } x < 0 \quad \text{ or } \quad x > 2 \]

\[ = x, \text{ if } 0 \leq x \leq 1 \quad \text{or} \quad \frac{1}{2}, \text{ if } 1 < x \leq 2 \]

Find \( P\left(1 < X \leq \frac{3}{2}\right)\)

g) i) The random variable \( X \) follows binomial distribution with mean 5 and variance 4. Find \( P(X \leq 1) \)
6. Two random variables $X$ and $Y$ have the following joint probability density function.

$$f(x, y) = 2^{-x-y}$$

$$0 < x < 1$$

$$0 < y < 1.$$ 

$$= 0, \quad \text{otherwise}$$

Find i) Marginal probability density function of $X$ and $Y$.

ii) Mean of $X$ and $Y$.

7. Define the binomial distribution with parameters $n$ and $p$ and give a suitable example where the distribution is realized. Derive the mean and variance of the distribution.

8. Define normal distribution with mean $\mu$ and variance $\sigma^2$. Show that the distribution satisfies the relation.

$$\mu_{2n} = 1.3.5.\ldots (2n - 1) \sigma^2 n$$

Where $\mu_n$ denotes the $n$th central moment.
Group - A

1. Answer any four of the following: 6 × 4
   a) Differentiate between Measurement and Assessment in teaching learning process.
   b) Differentiate between Formative and Summative Evaluation.
   c) Discuss the restricted response and extended response form of Essay type questions with their uses.
   d) What is Anecdotal Record? Discuss its advantages and limitations.
   e) Discuss the 'Sociometric' and 'Guess who' techniques used in peer appraisal system.
   f) Differentiate between Norm referenced and Criterion referenced assessment.

Group - B

2. Discuss the function of Evaluation and Assessment in teaching. 9

3. What is Objective Type and Objective Based test? Explain different forms of objective type test with examples. 9

4. What is Rating Scale? Discuss the types and their uses. 9

5. What is Content Analysis? Describe its steps and advantages. 9

6. Discuss the present practices of Computer Based Assessment in student evaluation and its advantages. 9

7. What is Questionnaire? Discuss the types of questionnaire and their limitations. 9

8. Discuss the principles of constructing Essay Type Tests. State the limitations. 9
g) What is Grading system? Discuss its merits and limitations.

h) What is Continuous Comprehensive Evaluation. State its objectives.

**Group - B**

2. Discuss the function of Evaluation and Assessment in teaching.

3. What is Objective Type and Objective Based test? Explain different forms of objective type test with examples.

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8. Discuss the principles of constructing Essay Type Tests. State the limitations.

9. What is Grading system? Discuss its merits and limitations.

**Group - A**

1. Answer any four of the following: 6 × 4

a) Differentiate between Measurement and Assessment in teaching learning process.

b) Differentiate between Formative and Summative Evaluation.

c) Discuss the restricted response and extended response form of Essay type questions with their uses.

d) What is Anecdotal Record? Discuss its advantages and limitations.

e) Discuss the 'Sociometric' and 'Guess who' techniques used in peer appraisal system.

f) Differentiate between Norm referenced and Criterion referenced assessment.
g) Point out the differences between inductive and deductive reasoning.

h) What is a concept? Discuss different types of concepts with examples.

**Group - B**

2. What is auditory perception? Explain the structure and functions of human ear.

3. Discuss different Gestalt principles of perceptual organization.

4. What are the characteristics of observational learning.

5. Point out the differences between classical and operant conditioning.

6. Discuss different causes of forgetting.

7. Elaborate different stages of language development.

8. Discuss different steps in problem solving.

9. Discuss different speech errors with examples.

9. Point out the differences between inductive and deductive reasoning.

9. What is a concept? Discuss different types of concepts with examples.

**Group - A**

1. Answer any **four** of the following: 6 × 4

   a) With the help of a diagram, describe the structure and functions of human eye.

   b) Define perception. Discuss the nature of perceptual process.

   c) What is learning? Describe different principles of classical conditioning.

   d) Discuss different types of memory with suitable examples.

   e) Enumerate different properties of language.

   f) Discuss different speech errors with examples.
The figures in the right-hand margin indicate marks.

Answer **five** questions including Q.No. 1 which is compulsory.

**Group - A**

1. Answer any **four** of the following:  
   a) Discuss the religious composition of Indian Society.
   b) Define Regionalism and discuss how it is a threat to National Integration.
   c) Write a short note on Purushartha.
   d) Discuss the characteristics of Joint family.
   e) Analyze the features of caste system.
   f) Differentiate between caste and class.
   g) Write a short essay on marriage and family among the Muslims.
   h) Discuss briefly modernization.

**Group - B**

2. "India is a fine example of Unity in Diversity". Explain  
   12½

3. Discuss in brief the bases of Hindu social organisation.  
   12½

4. Define casteism and discuss it as a threat to National Integration.  
   12½

5. Discuss the recent changes in the institution of Hindu marriage.  
   12½

6. Write a short essay on marriage and family among the Muslims.  
   12½

7. Analyse the measures taken for the development of Scheduled Tribe.  
   12½

8. Define Secularization as a process of social change.  
   12½
Answer all questions

1. The figures in the right-hand margin indicate marks

2. 2017
   Full Marks - 40
   Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer all questions

1. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

2. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

3. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

4. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

5. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

6. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

7. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

8. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

9. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

10. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩
3. Write short notes on any two of the following. 8 × 2
   a) Scientific Management Approach of Fredrick Taylor.
   b) Types of Disasters.
   c) Elton Mayo's Human Relations Approach.
c) Prove that a subset $A$ in $\mathbb{R}^n$ is compact if and only if it is closed and is bounded in the Euclidean metric $d$ or the square metric $\rho$. 

d) Let $f : X \to Y$ be a bijective continuous function. If $X$ is compact and $Y$ is Hausdorff, then show that $f$ is a homomorphism.

5. a) Let $X$ be a space satisfying the first countability axiom. Then prove that the function $f : X \to Y$ is continuous if and only if for every convergent sequence $(x_n)$ in $X$, converging to $x$, say, the sequence $(f(x_n))$ converges to $f(x)$.

b) Prove that every metrizable space is normal.

OR

c) Prove that every regular space with a countable basis is normal.

d) Suppose that $X$ has a countable basis. Then prove that there exists a countable subset of $X$ which is dense in $X$. 

1. a) Let $X$ be a set; let $T_f$ be the collection of all subsets $U$ of $X$ such that $X - U$ either is finite or is all of $X$. Then show that $T_f$ is a topology on $X$.

b) If $A$ is a subspace of $X$ and $B$ is a subspace of $Y$, then the product topology on $A \times B$ is the same as the topology $A \times B$ inherits as a subspace of $X \times Y$. Prove this.

OR

c) Prove that a subset $A$ or $\mathbb{R}^n$ is compact if and only if it is closed and is bounded in the Euclidean metric $d$ or the square metric $\rho$.

d) Let $f : X \to Y$ be a bijective continuous function. If $X$ is compact and $Y$ is Hausdorff, then show that $f$ is a homomorphism.
2.  
   a) State and prove the pasting lemma.

   b) Suppose the topology on each space $X_\alpha$ is given
      by a basis $B_\alpha$. Then prove that the collection of
      all sets of the form $\prod_{\alpha \in J} B_\alpha$, where $B_\alpha \in B_\alpha$ for
      each $\alpha$, will serve as a basis for the box topology.

   OR

   c) Let $A_\alpha$ be a subspace of $X_\alpha$ for each $\alpha \in J$.
      Then $\pi \Lambda \alpha$ is a subspace of $\pi \Xi \alpha$ if both
      products are given the box topology, or if both
      products are given the product topology. Prove
      this.

   d) Let $X$ and $Y$ be topological spaces: let
      $f : X \to Y$. Then prove that the following are
      equivalent.

      i) $f$ is continuous

      ii) For every subset $A$ of $X$, one has
          $F(\overline{A}) \subseteq F(A)$

      iii) For every closed set $B$ in $Y$, the set $f^{-1}(B)$
          is closed in $X$.

3.  
   a) Prove that the cartesian product of connected
      spaces is connected.

   b) Prove that the unit ball $B^n = \{ x : \| x \| \leq 1 \}$ in
      $\mathbb{R}^n$ is path connected. Where $\| x \| =
      (x_1^2 + \ldots + x_n^2)^{1/2}$.

   OR

   c) If $L$ is a linear continuum in the order topology,
      then show that $L$ is connected.

   d) If the sets $C$ and $D$ form a separation of $X$, and
      if $Y$ is a connected subset of $X$, then prove that
      $Y$ lies entirely within either $C$ or $D$.

4.  
   a) Prove that every compact subset of a Hausdorff
      space is closed.

   b) Let $X$ be a (nonempty) compact Hausdorff
      space. If every point of $X$ is a limit point of $X$,
      then show that $X$ is uncountable.
1. a) Distinguish between large sample and small sample tests of significance. Are small sample tests valid for large samples?  
   
   b) Before an increase in excise duty on coffee, 400 people out of sample of 600 persons were found to be coffee drinkers. After an increase in duty 400 people were coffee drinkers in a sample of 800 people. Using standard error of proportion, state whether there is significant decrease in the consumption of coffee.  

   OR  

   c) Explain and illustrate "The Kruskal Wallis Test".  

   d) From the information given below construct an appropriate control chart.  

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of defectives</td>
<td>12</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>6</td>
<td>7</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>

   State your conclusions. Write all the steps in construction of the above chart including formula for UCL and LCL.
The following table gives the classification of 100 workers according to sex and the nature of works. Test whether nature of work is independent of the sex of the worker.

<table>
<thead>
<tr>
<th></th>
<th>Skilled</th>
<th>Un-skilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Females</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>

(For \( v = 1 \), the table of \( \chi^2 \) at 5% level of significance is 3.84).

2 a) By means of suitable scatter diagram indicate different types of correlation that may exist between the variables in bivariate data.

b) Calculate Karl Pearson's co-efficient of correlation from the data given below:

<table>
<thead>
<tr>
<th>Roll No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks in Accountancy</td>
<td>20</td>
<td>35</td>
<td>42</td>
<td>37</td>
<td>13</td>
<td>39</td>
<td>24</td>
</tr>
<tr>
<td>Mark in Statistics</td>
<td>32</td>
<td>37</td>
<td>50</td>
<td>30</td>
<td>25</td>
<td>24</td>
<td>40</td>
</tr>
</tbody>
</table>

3. a) Discuss briefly the need and utility of Statistical Quality Control in Industry.

b) During an examination of equal length of clothes the following are the number of defects observed:

2, 3, 4, 0, 5, 6, 7, 4, 3, 2.
2. a) Explain the operation of an Astable multivibrator with neat circuit diagram. Discuss the wave forms generated by it and find out expressions for its frequency. 6+2+4

b) Explain the action of SCR as a switch. 4

OR
c) Describe the construction and working of n-channel FET. Draw and explain its characteristic curves. Define various constants of this transistor and establish the relation between them. 5+2+5

d) Write brief note on frequency generator. 4

3. a) Write notes on the following. 6+6
   i) Horn Antenna
   ii) Yogi Antenna.

   OR

b) With a block diagram explain the process of transmission of TV signal. What do you mean by synchronisation. 3 + 6 +3

II-PG-Phy-VII

2017
Full Marks - 40
Time - 3 Hours
The figures in the right-hand margin indicate marks Answer all questions

1. a) Explain the operation of an Astable multivibrator with neat circuit diagram. Discuss the wave forms generated by it and find out expressions for its frequency. 6+2+4

b) Explain the action of SCR as a switch. 4

OR
c) Describe the construction and working of n-channel FET. Draw and explain its characteristic curves. Define various constants of this transistor and establish the relation between them. 5+2+5

d) Write brief note on frequency generator. 4

2 a) Discuss the important characteristics of an ideal OP amplifier as (i) subtractor (ii) logarithmic amplifier. 6+3+3

   OR
2017
Full Marks - 60
Time - 3 Hours
The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any four of the following:

   a) Derive an expression for Barrier potential and Barrier width for step junction. 3 + 3

   b) Define $\alpha$ and $\beta$. Find $\alpha$ and $\beta$ of a transistor shown in the figure.

   \[ I_B = 240 \mu A \]
   \[ I_E = 12 \text{ mA} \]
   \[ \beta = 49 \]

   Hence determine the value of $I_c$ using both $\alpha$ and $\beta$ rating of the transistor. 2 + 4
c) Give the structure of LED and photodiode. 3+3

d) What is the importance of load line analysis? Why is AC load line steeper than DC load line? What is the significance of operating point? 2+2

e) What do you understand by class A, class B and class C power amplifiers? 2+2+2

f) Write down the effects of negative feedback on gain stability, distortion, input and output impedance. 6

g) Show how an operational amplifier can be used as a differentiator and integrator. 3+3

h) Discuss the important characteristics of an ideal OP amplifier. 6

**Group - B**

2. Explain with neat circuit diagram the working of a full wave bridge rectifier and obtain expressions for its efficiency. 2+4+3

3. Describe Zener diode and give its characteristic properties. Why is Zener diode used as a voltage regulator. 3+3+3

4. Describe an n-p-n transistor in its CB connection. Give the necessary diagram. Discuss its input and output characteristics. 4+1+2+2

5. Define h-parameters. Find out expression for current gain, voltage gain, input and output resistance. 3+6

6. Describe the operation of a RC coupled amplifier with a neat circuit diagram with special reference to its frequency response, advantages and disadvantages. 5+2+1+1

7. Discuss Barkhausen’s criteria for self sustained oscillation. With a neat diagram explain the action of Hartley oscillator. Derive the expression for its frequency of oscillation. 3+3+3

8. Explain the operation of an inverting and non inverting operational amplifier with diagram. 4½+4½
5. How can you determine the following by conductance measurement. 4½ × 2
   i) Ionic product of water
   ii) Hydrolysis constant of a salt.

6. a) What is quinhydrone electrode? How is the electrode useful in determining the pH of a solution. 2+5
   b) Aqueous solution of NH$_4$Cl is acidic but that of NaCl is neutral explain. 2

7. a) State Faradays laws of electrolysis. 3
   b) How is electrolysis applied in metallurgy and industry. Explain with one example of each. 3 × 2

8. a) Explain the origin of magnetism. Describe the experimental determination of magnetic susceptibility by Gouy's method. 1½ + 5½
   b) What do you mean by dipole moment? 2

9. Write notes on the following: 3 × 3
   i) Paramagnetism
   ii) Diamagnetism
   iii) Basic ideas of electrostatics.
d) What is meany by transport number of an ion? How is it determined by moving boundary method.

e) What is electromotive force? Write the cell reactions and emf expressions for the following Galvanic cells.
   (i) \( \text{Zn}_\text{(s)} | \text{ZnSO}_4_{\text{(aq)}} \ || \text{AgNO}_3_{\text{(aq)}} | \text{Ag}_\text{(s)} \)
   (ii) \( \text{Pt}, \text{H}_2 \text{(g)} | \text{HCl}_{\text{(aq)}} \ || \text{AgCl}_\text{(s)} | \text{Ag}_\text{(s)} \)

f) How will you calculate
   (i) the standard free energy change
   (ii) equilibrium constant of a given reaction from emf measurement?

g) What are concentration cells? Derive an expression for the concentration cell without transference.

h) i) How do concentration cells differ from chemical cells?
   ii) Write a note on liquid junction potential.

2. a) Explain how equivalent conductance of strong and weak electrolytes vary with dilution.

b) The equivalent conductance of \( \text{HN}_4\text{Cl}, \text{NaOH} \) and \( \text{NaCl} \) at infinite dilution are 149.6, 243.8 and 126.5 Ohm\(^{-1}\) cm\(^2\) gm equiv\(^{-1}\) respectively. Calculate the equivalent conductance of \( \text{NH}_4\text{OH} \) at infinite dilution at the same temperature.

3. a) Discuss Debye-Huckel Onsagar conductance equation. What are its limitations?

b) Define and explain
   i) Equivalent conductance
   ii) Molar conductance.

4. Explain the use of conductance measurement for the determination of:
   i) Degree of dissociation of a weak acid.
   ii) Solubility product of \( \text{AgCl} \).

V-138
Group - B

2. Give an account of the important herbaria and botanical gardens of the world and functions of Herbarium. 9

3. Describe briefly about the taxonomic, biological and evolutionary concept of species. 9

4. Discuss Hutchinson's system of classification with its merits and demerits. 9

5. Describe Engler and Prantl's system of classification with its merits and demerits. 9

6. Discuss on Bentham and Hooker system of classification. 9

7. Give an account of the origin and evolution of angiosperms. 9

8. Discuss the methods of illustrating evolutionary relationship of Angiosperms. 9

Group - A

1. Write notes on any four of the following: 6 × 4
   a) E-Flora
   b) Cladogram
   c) Nomenclature
   d) Merits of Bentham and Hooker's system
   e) Cluster analysis
   f) Polyphyly
   g) Monographs
   h) Phenograms.
2. Explain Mendel's laws of Independent Assortment with example.  

3. Give an account of somatic cell hybridization.  

4. Describe polygenic inheritance in Man with suitable examples.  

5. Explain various types of point mutations.  

6. Describe cytoplasmic inheritance in Eukaryotes with an example.  

7. Discuss the cytological basis of crossing over.  

8. Explain Sex-linked inheritance in Man.  

1. Write notes on any four of the following: 6 x 4  
   a) Sex determination in Man  
   b) Recombination frequency  
   c) Lethal genes  
   d) Complete Linkage  
   e) Aneuploidy  
   f) Sex limited characters  
   g) Mitochondrial DNA mutation.  
   h) CLB method for detection of mutations.
2. Discuss scaling, reflection and rotation in 2D-transformation. 9

3. a) Discuss Back Face Detection Method. 3
   b) Define projections. Discuss different types of projection method. 6

4. What is Bezier curve? Find out the mathematical equation of Bezier curve passing through three control points. 9

5. Find out the scan converted co-ordinates of a line by using Bresenham Line Drawing Algorithm. 9

6. Differentiate between line clipper and a polygon clipper. Write and explain Sutherland and Hodgeman polygon clipping algorithm with an example. 9

7. a) Write down the Cohen Sutherland Line Clipping algorithm. 6
   b) Differentiate between WCS, NDCS and PDCS. 3

1. Answer any four of the following. 6 × 4
   b) Define Computer Animation. Differentiate Raster Scan System from Random Scan System.
   c) Differentiate between geometric and co-ordinate transformation.
   d) Write a note on Fractal Geometry Methods.
   e) Discuss Ray Casting Methods.
   f) What is parametric continuity conditions in curve?
   g) Discuss different Halftone Patterns and Dithering Techniques.
   h) Define translation in 2D transformation.
3. a) The element \( a \in k \) is algebraic over \( F \) if and only if \( F(a) \) is a finite extension of \( F \). Prove this.

OR

b) Prove that \( \tau^* \) defines an isomorphism of \( f[x] \) onto \( f[t] \) with the property that \( \alpha \tau^* = \alpha' \) for every \( \alpha \in F \).

4. a) Prove that if \( \alpha \) is constructible then \( \alpha \) lies in some extension of the rationals of degree a power of 2.

OR

b) If \( F \) is of characteristic 0 and if \( a, b \) are algebraic over \( F \), then prove that there exists an element \( c \in F(a, b) \) such that \( F(a, b) = F(c) \).

5. a) If \( k \) is a finite extension of \( F \), then prove that \( G(k, F) \) is a finite group and its order, \( O(G(k, F)) \) satisfies \( O(G(k, F)) \leq [K : F] \).

OR

b) Prove that \( K \) is a normal extension of \( F \) if and only if \( K \) is the splitting field of some polynomial over \( F \).

a) Suppose \( G \) is a finite abelian group and \( p | O(G) \), where \( p \) is a prime number. Then prove that there is an element \( a \neq e \in G \) such that \( a^p = e \).

OR

b) If \( G \) is a group, \( H \) a subgroup of \( G \), and \( S \) is the set of all right cosets of \( H \) in \( G \), then show that there is a homomorphism \( \theta \) of \( G \) into \( A(S) \) and the kernel of \( \theta \) is the largest normal subgroup of \( G \) which is contained in \( H \).

2. a) Prove that \( J[i] \) is a Euclidean ring.

OR

b) Prove that any polynomial in \( F[x] \) can be written in a unique manner as a product of irreducible polynomials in \( f[x] \).
1. Answer any four of the following.  \( \times 4 \)

a) Define characteristics of integral domain, if \( D \) is an integral domain and if \( na=0 \) for some \( a \neq 0 \) in \( D \) and some \( n \neq 0 \), prove that \( D \) is of finite characteristic.

b) Let \( J(2) = \{ x \in \mathbb{R} | x = m + n \sqrt{2}, m, n \text{ are integers} \} \). Define \( \phi: J(2) \to J(2) \) by \( \phi(m + n \sqrt{2}) = m - n \sqrt{2} \). Show that \( \phi \) is a homomorphism of \( J(\sqrt{2}) \) on to \( J(\sqrt{2}) \) and find its kernel.

c) Define deal of a ring. Let \( U \) is an ideal of \( R \). Let \( r(U) = \{ x \in R | xu = 0 \text{ for all } u \in U \} \) prove that \( r(U) \) is an ideal of \( R \).

6. i) Prove that in an \( n \)-dimensional vector space \( V \), any set of \( n \) linearly independent vectors is a basis.  \( \times 6 \frac{1}{2} \)

ii) Show \{\( 1,1,1,1), (1,2,1,2,2) \} \) is a L.I. subset of \( V_4 \). Extend it to a basis for \( V_4 \).  \( \times 6 \frac{1}{2} \)

7. i) Let \( T : U \to V \) be a linear map and \( U \), a finite dimensional vector space. Then show that \( \dim R(T) + \dim N(T) = \dim (U) \).  \( \times 8 \)

ii) Determine the matrix \( (T : B_1, B_2) \) for the linear transformation \( T : V_2 \to V_2 \) by \( T(x,y) = (x,-y) \) and \( B_1 = \{(1,1), (1,0)\}, B_2 = \{2,3), (4, 5)\} \).  \( \times 4 \frac{1}{2} \)

8. Reduce the matrix \( \begin{bmatrix} 3 & 2 & 3 \ 4 & 3 & 5 \ 2 & 1 & 1 \end{bmatrix} \) to row reduced echelon form.

Reduce the matrix \( \begin{bmatrix} 1 & 2 & -2 \ 2 & 1 & 2 \ -2 & 2 & 1 \end{bmatrix} \) to the diagonal form and hence reduce the quadric \( x^2 + y^2 + z^2 + 4yz - 4zx + 4xy = 27 \) to its principal axes.  \( \times 8 \frac{1}{2} \)

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1 which is compulsory.

Group - A
d) Let \( \phi : D \rightarrow F \) be a mapping defined by 
\[ \phi(a) = [a,1], \] 
where \( D \) is an integral domain and \( F \), a field. Show that \( \phi \) is an isomorphism of \( D \) into \( F \).

e) Find the co-ordinates of \((2, 3, 4, -1)\) relative to the ordered basis \( B = \{ 1,1, 0, 0 \}, (0, 1, 1,0), (0, 0, 1, 1) , (1, 0, 0, 0) \} \) for \( V_4 \).

f) Define a linear transformation. Determine a linear transformation \( T : V_2 \rightarrow V_2 \) which maps all the vectors on the line \( x+y=0 \) on to themselves \((T \neq I)\).

g) Let \( A = \begin{bmatrix} 3 & 1 & 4 & 0 \\ 0 & 2 & 2 & 0 \\ 1 & -1 & 0 & 0 \end{bmatrix} \) determine the rank and nullity of \( A \).

h) Determine the eigen values and the corresponding eigen spaces for the matrix 
\[ \begin{bmatrix} 0 & 3 \\ 2 & -1 \end{bmatrix} \].

Group - B

2. a) Define a ring, define a field and show that \( \mathbb{Z}/p \mathbb{Z} \) the ring of integers mod \( p \) is a field. 2+2+4

b) Prove that any field is an integral domain. 4½

3. a) If \( R \) is a commutative ring with unit element and \( M \) is an ideal of \( R \), prove that \( M \) is a maximal ideal of \( R \) if and only if \( R/M \) is a field. 8½

b) Let \( R \) be the ring of all real valued, continuous functions on the closed unit interval and Let \( M = \{ f \in R \mid f(\frac{1}{2}) = 0 \} \) show that \( M \) is an ideal of \( R \). 4

4 a) Let \( \phi \) is a homomorphism of \( R \) into \( R \) with kernel \( I(\phi) \). Then show that \( I(\phi) \) is a subgroup of \( R \) under addition. 4

b) If \( a \in I(\phi) \) and \( r \in R \) then both \( ar \) and \( ra \) are in \( I(\phi) \). 4

c) Let \( R \) be a ring, \( R = R' \). Define \( \phi(x) = x \forall x \in R \) show that \( \phi \) is a homomorphism and \( I(\phi) = \{ 0 \} \). 4½

5. i) Prove that every integral domain can be embedded in a field. 6½
1. Answer any four of the following.  \( 7.5 \times 4 \)
   
   a) Define Word Processor. Discuss the different formatting features of the Microsoft Word.
   
   b) Explain the search and replacement facility of a word processing package.
   
   c) Differentiate between relative and absolute cell addresses in a spreadsheet. Explain the need for these two types of cell addresses.
   
   d) Discuss the transition and Animation on properties related to the presentation of the slides.
   
   e) Write the steps to create the chart and graphs in Microsoft Excel.
f) Define Database and how is it different from DBMS, explain.

g) Discuss the different types of statistical functions in Microsoft Excel.

h) Explain the difference between Text field and numerical field in MS EXCEL.

**Group -B**

2. Define Mailmerge. Why is it used. Explain the steps involved for doing a mail merge.  

3. Discuss the different table properties used in MS Word.  

4. Give a brief note on various charts and in MS Excel.  

5. Explain the usefulness of MICROSOFT powerpoint. Also explain different steps related to create a new presentation.  

6. Write notes on the following:  
   a) Animation and sound in MS Power Point.  
   b) Auto contest wizard.

7. a) Write short notes on the following Hyper link option in MS Power Point.  
   b) Pivot table and its advance features in MS Excel.

8. What is a Report generator? What is the role of it in the overall design and/or usage of a database.
2017
Full Marks - 40
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer all questions
3. Write short notes on any two of the following: 8×2
   a) Scientific Management Approach of Fredrick Taylor.
   b) Types of Disasters.
   c) Elton Mayo's Human Relations Approach.

1. a) Critically examine Max Weber's theory of Bureaucracy. 12

   OR

   b) Discuss the Decision Making approach of Herbert Simon.

2. a) Discuss the meaning of Disasters. Explain the relief measures during disasters.

   OR

   b) Explain the objectives and Principles of Disaster Management and Public Awareness.

V-201-0.5
1. a) Distinguish between the linear and circular polarisation observed in an electromagnetic wave. Calculate \( \frac{E}{H} \) in free space.  

\[7 + 2\]

b) Write a note on invariance of Lorentz gauge.  

\[6\]

OR

c) Derive Kramer-Kronig relations.  

\[10\]

d) What is resonant cavity? Explain its principle.  

\[2 + 3\]

2. a) Discuss the fields and radiations due to oscillating magnetic dipole. Hence find out the expression for total power radiated by it.  

\[15\]

OR

[Turn Over]
Group - B

2. Give a detail account of stratigraphic correlation. 9

3. Give a stratigraphic account of Pre-Cambrian of Singhbum-Odisha province. 9

4. Describe the stratigraphy of Cuddapah supergroup of rocks. 9

5. Describe the stratigraphic classification, Fossil content and economic minerals of Gondwana supergroup of rocks. 9

6. Give a stratigraphic account of Jurassic of Kutch. 9

7. Discuss the 'Evolution of Himalyas". 9

8. Give a detail account of Tectonic divisions of India. 9

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2017

Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Answer any four of the following: 6 × 4
   a) Explain principle of stratigraphy. 9
   b) Write note on Easternghat Group. 9
   c) Note on climatic condition during Gondwana. 9
   d) Give a stratigraphic account of Sausar Group. 9
   e) Note on Deccan Traps. 9
   f) Economic minerals found in Dharwar super group of rocks. 9
   g) Note on Lithostratigraphic Units. 9
   h) Write about Tectonic Elements in Extra-Peninsular region. 9
1. a) Discuss the importance of following items in relation to marginal costing.  
   
   i) Break-even-point  
   ii) P.V. Ratio  
   iii) Margin of safety  
   iv) Contribution.

   OR

   b) Discuss the applications of marginal costing in decision making.

2. a) The following information is given about M/S Dhoni Ltd. for the yearending on Dec. 31, 2016.
Stock turnover ratio: 6 times
Gross profit ratio: 20% on sales
Sales for 2016: ₹ 3,00,000
Closing stock in Rs. 10,000 more than the opening stock

Opening creditors: ₹20,000
Closing creditors: ₹30,000
Trade debtors at the end: ₹60,000
Net working capital: ₹50,000

Find out:
i) Average stock
ii) Purchases
iii) Creditors turnover ratio
iv) Average payment period
v) Average collection period
vi) Working capital turnover ratio.

b) What is the purpose of preparing a Cash Flow Statement? How it is prepared? Explain and illustrate it according to Revise Accounting Standard 3.

3. a) What is Reporting? State the objective of reporting. Discuss different types of reports required by top management

OR

b) Discuss different modes of reporting required at different managerial levels.
1. a) Define entrepreneurship. Explain the characteristics of entrepreneurship. 7½

OR

b) State the difference between entrepreneur and entrepreneurship. 7½

2. a) Define small-scale enterprise. State its importance. 7½

OR

b) Give the meaning of Business Groups, State the features of Business Groups.

3. a) Give the meaning of Self Help Group. Explain the role of self help groups. 12½

OR
1. a) Define entrepreneurship. Explain the characteristics of entrepreneurship. 7½

OR

b) State the difference between entrepreneur and entrepreneurship. 7½

2. a) Define small-scale enterprise. State its importance. 7½

OR

b) Give the meaning of Business Groups, State the features of Business Groups.

3. a) Give the meaning of Self Help Group. Explain the role of self help groups. 12½

OR

4. a) Discuss the various resources for mobilising the required finance for start-ups. 12½

OR

b) Write notes on:

i) Pay back period and its advantages

ii) Net Present Value and its advantages and limitations.
2017
Full Marks - 40
Time - 2 Hours
The figures in the right-hand margin indicate marks
Answer three questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any two of the following:
   a) i) Give an account of discovery of drugs. 5
      ii) How is Chloromycetin synthesised? 2½
   b) Write notes on: 2½ × 3
      i) HIV
      ii) AIDS
      iii) Penicillin.
   c) How is citric acid prepared by fermentation process. 7½
d) Write the structure of: \( 2\frac{1}{2} \times 3 \)
   i) Paracetamol
   ii) Glutamic acid
   iii) Streptomycin

**Group - B**

2. What is meant by drug? Discuss the characteristics of a drug. How are they classified. \( 2+4+6\frac{1}{2} \)

3. a) Name two drugs from each of the following. \( 2 \times 4 \)
   i) Anti-inflammatory agents.
   ii) Central nervous system agents.
   iii) Analgesic agents
   iv) Antifungal agents.

   b) Write a note on aerobic and anaerobic fermentation. \( 4\frac{1}{2} \)

4. Define and explain the following: with suitable examples. \( 2\frac{1}{2} \times 5 \)
   a) Analgesic
   b) Antipyretic
   c) Antibacterial
   d) Antifungal
   e) Antiviral.

5. Describe the synthesis and uses of the following: \( 4\frac{1}{2}+4+4 \)
   a) Chloramphenicol
   b) Sulphacetamide
   c) Aspirin.
3. Discuss on the organisations associated with biodiversity management. 12½

4. Discuss briefly on the importance of forestry with their utilization and commercial aspects. 12½

5. Give an account of important fruit crops and their commercial importance. 12½

1. Answer any two of the following:
   a) Wood and its uses. 7½
   b) Species biodiversity. 7½
   c) Biodiversity information management. 7½
   d) Biodiversity awareness programmes. 7½

2. Answer any two of the following.
   a) Give an account of the different types of loss of biodiversity. 12½
3. What is Vitamin? Discuss various health problems associated with Vitamin deficiency. 12½

4. Give an account of environmental degradation and various health hazards due to pollutants. 12½

5. Discuss the control measures of Rabies, Plague, and Leprosy. 12½

Group - A

1. Give short answer of any two of the following: 7½ × 2
   a) Diabetes
   b) Polio
   c) Thermal pollution
   d) Kwasiorkor.

Group - B

2. Discuss the causes and control measures of Air Pollution.
1. a) Compose a dialogue between two friends on the use of Internet for day to day study.  

OR

b) You meet your friend on the way to post office to drop a letter. Compose a dialogue between you and your friend on the necessity of writing letters and using the telephone to communicate.

2. Prepare a note on the passage given below.  

If I have called in the Cuckoo to illustrate the ordinary man's ignorance, it is not because I can speak with authority on that bird. It is simply because, passing the spring in a parish that seemed to have been invaded by all the cuckoos of Africa, I realized how exceedingly little I, or anybody else I met, knew about them. But your and my ignorance is not confined to cuckoos. It dobbles in all created things,

5. a) Write a note on the ten commandments of the 'Animal Farm'  

OR

Discuss Animal Farm as a political satire.

b) What, according to Haldane is a scientific point of view.  

OR

Write a note on Stephen Leacock's experience with the photographer.
from the Sun and Moon down to the names of the flowers, I once heard a clever lady ask whether the new moon always appears on the same day of the week. She added that perhaps it is better not to know because, if one does not know when or in what part of the sky to expect it, its appearance is always a pleasant surprise. I fancy, however, the new moon always comes as a surprise even to those who are familiar with her time tables. And it is the same with the coming-in of spring and the waves of the flowers. We are not the less delighted to find an early primrose because we are sufficiently learned in the services of the year to look for it in March or April rather than in October. We know, again, that the blossom precedes and not succeeds the fruit of the apple-tree, but this does not lessen our amazement at the beautiful holiday of a May orchard.

3. a) Write a report on the impact of cell phones on our social and family relationship.

OR

b) An exhibition football match was held in your locality to support the flood victims. Write a report on the match.

4. a) Write synonyms of the following:
   - Active, Beautiful, Honour.

b) Write Antonyms of the following:
   - Dull, Brave, Cruel.

c) Use the following words as verb and use them in sentences of your own:
   - Book, Head, Man.

d) Form adjectives of the following words and use them in sentences of your own:
   - Remedy, Faith, Ignorance.

e) Fill in the gaps with appropriate preposition:
   i) Time and tide waits ___ none.
   ii) He prefers tea ____ coffee.
   iii) Bus ___ bus passed by without waiting.
   iv) You should guard ___ catching cold.
   v) The beggar was lame ___ left leg.

f) Do as directed in the brackets.
   i) He was elected captain of the team (change the voice.)
   ii) Let us do the work. (Add a question tag)
1. a) State and explain Gauss law and derive differential form of Gauss law. 12

b) Using Gauss theorem find out the electric field intensity at a point near the infinite plane charge distribution. 8

OR

c) Explain Lorentz force. 4

b) State and explain Biot-Savart law and find out field intensity due to long straight conductor carrying current. 4 + 12

2. a) Derive the expression for current during growth and decay in an L-R circuit containing d.c. source. 7 + 7
3. a) What do you mean by rectification. With neat diagram explain the function of full wave rectifier.

3 + 10

b) Explain the function of filters.

8

3 + 10

4. a) State Bohr's postulates and derive expression for energy of hydrogen atom.

3 + 12

b) Explain energy diagram for hydrogen spectra.

5

OR

5. a) State and explain De Broglie hypothesis

5

b) Describe Davison Germer experiment and outline the results.

15

OR

c) Derive time dependant Schrodinger equation in one dimension and three dimension.

15

d) Write the significance of wave function.

5

V-187-0.1
1. a) State and explain Raoult's law.  
   b) What do you mean by elevation in boiling point? Derive a relationship between elevation in boiling point and molecular mass of the non-volatile, non-electrolyte solute dissolved in the solvent.
   c) Define Osmosis and Osmotic pressure. State and explain laws of Osmotic pressure.
   d) What is meant by isotonic solution?

2. a) State different forms of first law of thermodynamics. Derive mathematical formulation of first law of thermodynamics.
   b) Write different conformation of n-butane and explain their stabilities.
   c) Differentiate between conformation and configuration.
   d) Assign R/S notation to the following.
   (i) \( \text{H} \quad \text{H} \)
      \( \text{CH}_3 - \text{C}-\text{C}_6\text{H}_5 \)
      \( \text{Br} \)
   (ii) \( \text{H}_2\text{O} \quad \text{H}_2\text{N} - \text{C}-\text{COOH} \)

   e) Assign E/Z Notation to the following:
   (i) \( \text{Cl} \quad \text{F} \quad \text{C}-\text{C}<\text{H} \quad \text{Br} \)
   (ii) \( \text{Cl} \quad \text{F} \quad \text{C}-\text{C}<\text{CHO} \quad \text{CN} \)
2. b) Explain with example
   i) Intensive and extensive property. 4
   ii) Isothermal and adiabatic processes. 4

   OR

c) State and explain Kohlrausch’s law. Discuss one application of conductance measurement. 4+3

d) Write notes on:
   i) Buffer solution
   ii) Hess’s law

3. a) Write a note on Werner’s co-ordination theory. 6
    b) Write the IUPAC name of the following.  6
       i) [Cu(NH₃)₄]SO₄
       ii) K₄[Fe(CN)₆]
       iii) Cr[(NH₃)₄(H₂O)Cl]
       iv) Ni[(CN)₄]²⁺
    c) State and explain EAN rule with an example. 1+2

    OR

d) Explain:
   i) Cu²⁺ is blue in colour while Zn²⁺ is colourless. 3
   ii) Transition elements form complexes. 3

4. a) Write notes on the following:
   i) Bronsted-Lowry concept of acids and bases. 4
   ii) Lux-Flood concept of acids and bases. 3

    b) Discuss two methods of preparation and structure of each of
       i) XeF₂
       ii) XeOF₂

    OR

c) Write a note on interhalogen compounds. 5

    d) Discuss the bridge structure of diborane. 4

e) How is chromium extracted from its chief ore. 6

5. a) What is mean by geometrical isomerism? Write the conditions of optical isomerism. 2+2
d) Using ethyl magnesiumbromide how can you prepare?
   i) ethane
   ii) n-propyl alcohol.

   OR

e) How can you separate 1°, 2°, and 3° amines from each other by Hinsberg's method?

f) Phenol is acidic. Explain.

g) How can you convert?
   i) Acetoacetic ester to succinic acid
   ii) dimethyMalonate to adipic acid

h) Discuss the coupling reaction of benzene diazomiumchloride with phonol in presence of alkali. Give mechanism of the reaction.

6. a) Explain Keto-enol tautomerism with an example.
   b) Give one method of preparation of acetoacetic ester with mechanism.
   c) How can you synthesize the following from acetoacetic ester?
      i) 1,3 diketone (acetylacetone)
      ii) Crotonic acid.
b) Discuss the basic principle and theory of spatial frequency filtering.

c) What is the basic principle of holography? Give a quantitative discussion of the principle of holography.

d) Define acceptance angle and the numerical aperture. How are they related to the refractive indices of the core and the cladding? Explain.
2017
Full Marks - 80
Time - 3 Hours
The questions are of equal value
Answer all questions
Symbols used have their usual meaning

1. a) Calculate approximately by Newton-Raphson method a root of the equation \(x^2 + 2x - 2 = 0\) laying between 0 and 1 correct up to two significant figures.

OR

b) Find two iterations by Secant method to obtain an approximation to a root of \(x^3 - x - 1 = 0\) starting with \(x_0 = 1\) and \(x_1 = 2\).

6. a) Solve the following L.P.P. by Simplex method:
Maximize \(z = 3x_1 + 2x_2\)
subject to the constraints:
\[
\begin{align*}
x_1 + x_2 & \leq 4 \\
x_1 - x_2 & \leq 2 \\
x_1 \geq 0, & x_2 \geq 0.
\end{align*}
\]

b) Solve the following L.P.P. by Simplex method:
Maximize \(z = 3x_1 + 2x_2 + 5x_3\)
subject to the constraints:
\[
\begin{align*}
x_1 + 2x_2 + x_3 & \leq 430 \\
3x_1 + 2x_3 & \leq 460 \\
x_1 + 4x_3 & \leq 420 \\
\text{and } x_1, & x_2, x_3 \geq 0.
\end{align*}
\]
b) Using the points \( x_0 = 2, x_1 = 2.5 \) and \( x_2 = 4 \), find the second degree interpolating polynomial for \( f(x) = \frac{1}{x} \) by Lagrange's interpolation formula. Using this polynomial, find the approximate value to \( f(3) = \frac{1}{3} \).

3. a) Evaluate the integral, \( I(f) = \int_0^1 \frac{dx}{1 + x} \) using

i) Compound Trapezoidal Rule

ii) Compound Simpson's \( \frac{1}{3} \)rd Rule with 8 equal subintervals.

OR

b) Find the approximate value of \( I(f) = \int_0^1 e^{-x^2} \, dx \) by

using Gauss-Legendre 2 point and 3 point formulas.

4. a) Solve by Euler's method \( \frac{dy}{dx} = -xy^2; \ y(2) = 1 \). Determine \( y(2.1) \) by choosing \( h = 0.05 \). Compare your result with the exact solution. Carry out all calculations to 4 significant figures.

OR

b) Find the constants \( K_1, K_2, K_3, K_4 \) in RK-method of order four for the numerical evaluation of \( y(0.2) \) where \( y \) is the solution of \( \frac{dy}{dx} = 1 + y^2; \ y(0) = 0 \) Choose \( h = 0.2 \) and also evaluate \( y(0.2) \) approximately.

5. a) Solve the following L.P.P. graphically:

Maximize \( z = 4x_1 + 3x_2 \)

subject to the constraints:

\( 2x_1 + x_2 \leq 1000 \)
\( x_1 + x_2 \leq 800 \)
\( x_1 \leq 400 \)
\( x_2 \leq 700 \)

and \( x_1 \geq 0, \ x_2 \geq 0 \).

OR
7. a) Test the convergence of any three of the following series \( \sum a_n \) where \( a_n \) is given by:

i) \( a_n = \sqrt[3]{n+1} - \sqrt[3]{n} \)

ii) \( a_n = \frac{10^n}{n!} \)

iii) \( a_n = \frac{n}{3^n} \)

iv) \( a_n = 1 - n \log \frac{2n+1}{2n-1} \)

v) \( a_n = \frac{(2n)!^2}{(4n)!} \cdot 10^n \).

8. a) Expand \( e^x \tan^{-1}y \) about \((1, 1)\) upto the second degree in \((x-1)\) and \((y-1)\).

OR

b) If \( f(x, y) = \sqrt{|xy|} \), prove that Taylor's expansion about the point \((x, y)\) is not valid in any domain which includes the origin.
2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any four of the following: 7½ × 4

a) In what important respects does Restoration comedy differ from the Elizabethans? Discuss.

b) Write a note on 'Glorious Revolution'.

c) What is Elegy? Write a short essay on Thomas Gray's 'Elegy Written in a Country Churchyard'.

d) Write a short essay on the theme of the poem, 'Elegy Written in a Country Churchyard' with comparison to the elegies of English Literature.

e) What is Satire? Discuss Dryden as a Neoclassicist.
f) Write a brief essay on the English novel in the 18th Century.

g) Why does Joseph Addison sketch a mastery survey of the early 18th Century British Society? Explain it with reference to his essay, 'Reflections on Westminster Abbey'.

h) What was the first sense of sorrow in Richard Steele's essay, 'Recollections'? Describe it in your own words.

**Group - B**

2. 'The Eighteenth Century was an age of reason but the channels of Romanticism were never dry'. Discuss. 12½

3. Discuss the social and literary conditions which helped in the birth of the English novel in the 18th Century. 12½

4. Discuss Thomas Gray's, 'Elegy Written in a Country Churchyard' is a mournful song of musings on death. 12½

5. Critically analyse the poem, 'Elegy Written in a Country Churchyard'. 12½

6. 'Robinson Crusoe' is a religious or spiritual allegory. Justify. 12½

7. Discuss Daniel Defoe's art and technique of narration inspired by the actual experience of Alexander Selkirk on the island of Juan Fernandez with reference to his novel, Robinson Crusoe. 12½

8. What does Gulliver keep travelling despite his many misfortunes? Explain it in your own words. 12½

9. Discuss Oliver Goldsmith's 'Man in Black' as an essay of clearness of thought, ease of style and simple language. 12½
Group - B

2. Distinguish between Micro economics and Macro economics. Analyse the importance of studying macro economics. 12½

3. What do you mean by circular flow of income? Discuss the circular flow of income in a four sector economy. 12½

4. Discuss the Cash-Balance approach to Quantity Theory of Money. Examine its superiority over Cash-Transaction approach. 12½

5. Define bank money. How do the banks create bank money? Point out the limitation of the banks to create credit or bank money. 12½

6. "Inflation is unjust; deflation is inexpedient of the two deflation is worse". Examine. 12½

7. "Supply creates its own demand" Elucidate. 12½

8. Derive IS Curve and LM Curve. Examine their shape and position. 12½

Group - A

1. Write short notes on any four of the following: 7½×4
   a) National income at market price and national income at factor cost.
   b) Read GD.P and Nominal GDP.
   c) Green Accounting.
   d) Money is a link between present and future.
   e) Weighted index Number
   f) Hyper-inflation.
   g) Fullemployment.
   h) Money mutiplier.
g) Emphasis on Rights as conditions of Social expediency.

h) Universal Human Rights.

**Group - B**

2. Examine critically the provisions of Special Safeguard of Freedoms.  

3. Discuss Freedom of Belief, Expression and Dissent.  

4. Discuss kinds of Equality.  

5. Examine Procedural and Substantive Justice.  

6. What do you mean by Rights? Discuss various kinds of Rights.  

7. Write an essay on Three Generations of Rights.  

8. What is Political Obligations? Why Political Obligations are obeyed by citizens?  

9. Write a note on Tolerance.

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**Group - A**

1. Write short notes on any four of the following:  

   a) Origin and development of the concept of Freedom.

   b) Features and Kinds of Positive Freedom.

   c) Dimension of Equality.

   d) Justify equality in the midst of inequality.

   e) What do you mean by Justice? Discuss its nature.

   f) John Rawl's theory of Justice.
[ 2 ]

**Group - B**

2. Give an account of Trade, Trade Routes and Coinage in North India, Central India and the Deccan. 12½

3. Discuss the marriage and property relations from Circa 300 to CE 300. 12½

4. Write a note on Mauryan Administration. 12½

5. Assess the achievements of Goutamiputra Satakarni. 12½

6. Estimate the nature of polity under Harshavardhan. 12½

7. Analyse the growth of Mahayana Budhism from Circa 2nd Century BC. 12½

8. Review the development of Tamil Literature from Circa 300 to CE 750. 12½

**Group - A**

1. Write short notes on any four of the following: 7½×4
   a) Craft Production.
   b) Varna and Jati
   c) Kaniska-I
   d) Urban Settlement
   e) Varnashrama
   f) Hinayana Budhism from Circa 2nd Century B.C.
   g) Development of Sanskrit Literature Circa 300 to CE 750
   h) Gandhara School of Art.
g) Radhakrishnan's view on the distinction between intellect and intuition.

h) The concept of Satyagraha of M.K. Gandhi.

**Group - B**

2. Discuss Swami Vivekananda's concept of religion. 12½

3. Explain Tagore's concept of reality. 12½

4. Discuss Sri Aurobindo's concept of 'Saccidananda'. 12½

5. Explain and examine Sri Aurobindo's view on creation. 12½

6. Discuss the Gandhiji's view of Ahimsha. 12½

7. Explain the concept of Absolute of Radhakrishnan. 12½

8. What is Radhakrishnan's idealist view of life? Discuss. 12½

II-UG-Phil(CC)-III

2017

Full Marks - 80

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1

which is compulsory.

**Group - A**

1. Answer any four of the following: 7½ ×4

a) Nature of Universal religion of Swami Vivekananda.

b) Humanism of Tagore.

c) Concept of Supermind of Sri Aurobindo.

d) Integral Yoga of Sri Aurobindo.

e) Gandhiji's statement that Truth is God and God in Truth.

f) Swami Vivekananda's statement that man is the maker of his own destiny.
g) Explain Weber's concept of 'Social Action'.

h) Explain Max Weber's explanation of authority.

**Group - B**

2. Discuss Comte's Hierarchy of sciences.  
4. Discuss Marx's theory of Class Struggle.  
5. Explain Durkheim's Theory of Suicide.  
6. Explain Marx's dialectical Materialism.  
7. Discuss Weber's Protestant ethic and the Sprit of Capitalism.  
8. Explain Weber's concept of Bureaucracy and its important features.

**Group - A**

1. Write short notes on any **four** of the following:  
   a) Briefly discuss the law of three stages.  
   b) Write a note on positivism.  
   c) Discuss Spencer's Organismic Analogy.  
   d) Explain Marx's analysis of Alienation.  
   e) Briefly explain Sociology of Capitalism as explained by Karl Marx.  
   f) Explain Durkheim's concept of mechanical solidarity and organic solidarity.
Group - B

2. Write the definition and scope of archaeological anthropology and relationship of other discipline of anthropology? 9


4. Give details about the Geochronology of Pleistocene epoch? 9

5. Briefly discuss on the different types of geoclimatic events. 9

6. Discuss details about the techniques of Lithic stage of archaeology? 9

7. Give an account of the classification of the tools and with suitable examples? 9

8. Describe the earliest evidence of the culture in the World, Specially in Kuliana. 9

Group - A

1. Write short notes on any four of the following: 6×4
   a) Archaeological Anthropology meaning
   b) Absolute dating
   c) Palaeontology
   d) Epoch
   e) Glacial and Interglacial Stage
   f) Write how to prepare tool and give one example
   g) Paleolithic techniques
   h) Olduvai Gorge.
5. Find:
   a) \(\int \frac{a + x}{a - x} \, dx\)
   b) \(\int 3x \sqrt{5 - x^2} \, dx\)

6. Prove that the \(r\)th difference of a polynomial of degree \(n\) is a polynomial of degree \((n - r)\), if \(r < n\). Find out the value of \(r\)th difference for \(r = n\) and \(r > n\). Hence obtain \(\Delta^6(k - ax)(k - bx^2)(k - cx^3)\).

7. State and prove Simpson's Three-Eighth rule for numerical integration.

8. a) Test the convergence of 
   \[\sum_{n=1}^{\infty} \frac{(a_n)^n}{n!}, \quad a > 0\]

b) Test the absolute convergence of the series 
   \[\frac{1}{1.2} - \frac{1}{3.4} + \frac{1}{5.6} - \frac{1}{7.8} + \ldots\]

9. Prove that the \(r\)th difference of a polynomial of degree \(n\) is a polynomial of degree \((n - r)\), if \(r < n\). Find out the value of \(r\)th difference for \(r = n\) and \(r > n\). Hence obtain \(\Delta^6(k - ax)(k - bx^2)(k - cx^3)\).


10. Find:
   a) \(\int \frac{a + x}{a - x} \, dx\)
   b) \(\int 3x \sqrt{5 - x^2} \, dx\)

11. Prove that the \(r\)th difference of a polynomial of degree \(n\) is a polynomial of degree \((n - r)\), if \(r < n\). Find out the value of \(r\)th difference for \(r = n\) and \(r > n\). Hence obtain \(\Delta^6(k - ax)(k - bx^2)(k - cx^3)\).


13. a) Find limit of the following:
   i) \(\lim_{x \to \infty} \left(\frac{x^2 + 4x - 3}{x^2 - 2x + 5}\right)^x\)
   ii) \(\lim_{x \to 1} \left(\frac{x + x^2 + x^3 + \ldots + x^n - n}{x - 1}\right)\)

b) Show that the function \(f(x)\) defined by
   \[f(x) = \begin{cases} 
   x & \text{for } x < 1 \\
   2 - x & \text{for } 1 \leq x \leq 2 \\
   -2 + 3x - x^2 & \text{for } x > 2 
   \end{cases}\]
   is differentiable at \(x = 2\) but not at \(x = 1\)
c) Evaluate
   i) \( \int \sec^3 x \, dx \)
   ii) \( \int \sin \sqrt{x} \, dx \)

d) Use the method of separation of symbols to prove that

\[
U_0 + \frac{U_1 x}{1!} + \frac{U_2 x^2}{2!} + \ldots = e^x \left[ U_0 + x \Delta U_0 + \frac{x^2 \Delta^2 U_0}{2!} + \ldots \right]
\]

e) Show that \( \left( \frac{\Delta}{E} \right)^2 U_x \neq \frac{\Delta^2 U^x}{E^2 U_x} \)

f) State and prove Lagrange's Interpolation formula.

g) Apply Simpson's rule to estimate the value of the integral \( \int_1^2 \frac{dx}{x} \) by dividing the interval (1, 2) into four equal parts.

h) Discuss the convergence of \( \sum a_n \) where

\[
a_n = \begin{cases} 
\frac{1}{3^{3k}} & \text{for } n \text{ even} \\
\frac{1}{n^2} & \text{for } n \text{ odd} 
\end{cases}
\]

Section - B

2. a) Find \( \frac{dy}{dx} \) if \( x^y = y^x \)

b) If \( y = x^{x^x} \) then find \( \frac{dy}{dx} \).

3. Find the greatest value of \( f(x) = (x + 1)^{\frac{1}{3}} - (x - 1)^{\frac{1}{3}} \) on 0, 1

4. Integrate:
   a) \( \frac{x^2 \, dx}{x^2 + 4} \)
   b) \( \frac{dx}{\sin^2 x \cdot \cos^2 x} \)
The figures in the right-hand margin indicate marks.

Answer \textit{five} questions including Q.No. 1
which is compulsory.

\textbf{Group -A}

1. केषाब्धित् चतुर्वार्ष प्रस्नानां उत्तरं प्रदेयम् ।

\( 7\frac{1}{2} \times 4 \)

क) (i) सप्रसई व्याख्या कार्याः —

भवन्ति नमस्तरव: फलागमे:-

नवामुखिर्विलम्बनो घना: ।

अनुदताः सतपुरुष: समुद्धिभि:-

स्वभाव एवैष परोपकारिणाम् ।

अववा

(ii) दिश्याया शाकुन्तला साध्वी

सदन्यायिणिः भवन्तः ।

श्रद्धा विचित्रं विधिक्षेति

त्रित्यं तत् समागतम् ।

[Turn Over]
ख) (i) उत्तलभाषाया आझलभाषाया वा अनुवांद कुँ।
आललाम समो भरा जयन्तप्रतिमः सुतः।
आशीर्न्या न ते योग्या पौल्मी स्वतः भव।
अवबा
(ii) यो हरिश्चर्ति वच्चं त्वं रक्ष्यं हरिश्चर्ति द्विजम्।
हंसं हि श्रीरमद् तन्मिश्रा वर्षयत्यमः।
ग) संस्कृत छाया प्रदेया –
i) आहिमणबहललसु तुमं तह परिचुमिब्र चूभुमजरी।
कमलकलस्वितिविवष्यरण्वकुदो महुअर विम्मरों सिंह कह।]
अवबा
ii) शहजे कित जो विणिद्धें न हु देक कम विवज्जीक्रो।
पशुमालणकम्बललुणे अगुम्मयाव्तु एव शोषिति।
घ) सानुमती का? नाटके तस्य आभमनस्य किं कारणम्?
ड) सार्थवाह धनमित्र वृतान्तस्य किं नाटकीय प्रयोजनम्?
च) प्रकारणस्य लक्षणोदाहरणं दर्पणदिनिया लिखत।
छ) विष्कप्तमयं लक्षणोदाहरणं वथाप्रवं विवृतत।
ज) आरम्भमययो:लक्षणोदाहरणं संक्षेपनं विचारित।
निम्नलिखित प्रश्नों में से किन्हीं दोनों के उत्तर दीजिए : 6 × 3

क) आधुनिक काल की राजनीतिक और सामाजिक परिस्थितियों पर अधिकार प्रकाश डालें।
ख) छायावाद के नामकरण पर विचार कीजिए।
ग) प्रगतिवादी कविता का मुख्य स्वर क्या है? स्पष्ट कीजिए।
घ) भारतेन्दु मण्डली के योगदान पर आलोचना कीजिए।
ड) प्रेमचंद पूर्व हिंदी उपन्यास पर विचार कीजिए।
च) खड़ीबोली के उद्भव और विकास पर टिप्पणी लिखिए।
छ) द्वितीय युग की कविताओं की राष्ट्रीय भावना पर विचार कीजिए।
2. क) आधुनिक काल को नवजागरण काल क्यों कहा जाता है ?
सतर्क उत्तर दीजिए। 12½

ख) भारतेनु युगीन साहित्य की पृथ्वीभूमि पर आलोचना कीजिए। 12½

ग) प्रयोगबाद की काव्य प्रबृतियों पर प्रकाश पालिकिए। 12½

घ) हिन्दी नटक के उद्वेग और विकास पर प्रकाश पालिकिए। 12½

ङ) स्वतंत्रतापूर्व हिन्दी उपन्यास की विकास धारा का परिचय दें। 12½

च) नईकविता की विशेषताओं पर आलोचना कीजिए। 12½

छ) द्वितीय युग के प्रमुख कवियों और उनकी काव्य कविताओं पर विचार कीजिए। 12½

3. अति संक्षिप्त उत्तर दीजिए: 1 × 12

क) छात्रावादी कवियों की बृहत्तुष्ट्यों का नाम लिखिए।

ख) भारतेनु द्वारा प्रकाशित एक पत्रिका का नाम लिखिए।
Group - A

1. Explain the term "conservation" and its importance. 12½

2. Define the concept of "sustainability" and discuss its relevance in contemporary times. 12½

3. Discuss the role of education in promoting environmental conservation. 12½

4. Explain the importance of biodiversity and discuss its conservation strategies. 12½

5. Describe the impact of human activities on the environment and suggest ways to mitigate it. 12½

6. Discuss the significance of renewable energy sources and their potential to reduce carbon emissions. 12½

7. Explain the concept of "ecological footprint" and its relevance in measuring the environmental impact of human activities. 12½

8. Discuss the significance of environmental laws and regulations in protecting the environment. 12½

Group - B

1. Evaluate the effectiveness of current conservation policies and suggest possible improvements. 7½ × 4

2. Discuss the impact of climate change on biodiversity and suggest ways to address it. 12½

3. Analyze the role of technology in conservation and its ethical implications. 12½

4. Examine the potential of eco-tourism as a conservation tool and discuss its challenges. 12½

5. Discuss the role of NGOs and community-based organizations in conservation efforts. 12½

6. Evaluate the success of international biodiversity agreements and suggest ways to strengthen them. 12½

7. Discuss the role of agriculture in conservation and propose sustainable practices. 12½

8. Analyze the impact of urbanization on biodiversity and suggest ways to minimize it. 12½

The figures in the right-hand margin indicate marks. Answer five questions including Q.No. 1, which is compulsory.
1. a) "Personal selling process is the logical sequence of steps that a sales person takes in dealing with prospective customer". Discuss this statement and discuss the various stages in the personal selling process.

   OR

   b) What do you mean by advertising budget? List the different methods used to set advertising budgets. Which one do you think most effective? Why?

2. a) "Marketing research is necessary for strong marketing strategy". Do you agree with this statement? Explain critically.

   OR

   b) Write notes on the following:

   i) Cyber marketing
   ii) Green marketing
   iii) Marketing of services
   iv) Export trade.
Group - B

2. Discuss nature and scope of Educational Psychology.

3. What do you mean by emotional development? Discuss important emotional development during adolescence period.

4. Explain Piagetian stages of cognitive development with educational implications.

5. What is motivation? Discuss important techniques used by teachers in motivating students in classroom situation.

6. What is creativity? Discuss the nature of creative thinking.

7. What is individual difference? Discuss factors causing individual differences.

8. What do you mean by adjustment mechanism? Explain any two defence mechanisms with examples.

Group - A

1. Answer any four of the following: 6 x 4
   a) How is survey method is used in studying the pupil behaviour?
   b) State the relationship between education and psychology.
   c) Differentiate between growth and development.
   d) Discuss two-factor theory of intelligence.
   e) Explain learning.
   f) State the nature of personality.
   g) Explain the factors affecting mental health of teachers.
   h) Explain insightful learning.
II-UG-Psy(CC)-III

2017

Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any four of the following within 150 words:

   a) What is sensory adaptation?
   b) Describe the figure and ground relationship in perception.
   c) Discuss the nature of observational learning.
   d) Write notes on episodic and semantic memory.
   e) What is language acquisition?
   f) Discuss the different speech errors.
   g) What are the processes of thinking?
   h) Describe the different steps in problem solving.

Group - B

Each answer should be within 250 words.

2. Discuss the structure and function of eye with diagram. 9

3. What is perception? Discuss the Gestalt laws of perception. 9

4. Citing the experimental examples discuss the principles of classical conditioning. 9

5. Describe the various causes of forgetting. 9

6. Discuss on the different means of effective communication. 9

7. What are the factors of influencing decision making? Explain with examples. 9

8. What is reasoning? Discuss the characteristics of Inductive and deductive reasoning. 9
8. A man deposits Rs.10,000 each year at 10% p.a. compound interest for 25 years. Find the sum of the deposit (principal and interest) after the end of 25th year. 12½

1. Answer any four of the following : 7½ × 4

a) If \( f(a) = \frac{a}{a - 1} \)

Prove that \( \frac{f(a)}{f(a+1)} = f(a^2) \)

b) Evaluate : \( \lim_{x \to 0} \frac{5x + 3}{x^2 + 6x - 2} \)

c) Show that a given sum of money if accumulates at 20 per cent per annum becomes doubles in 4 years at compound interest.

d) Find three numbers in GP. such that, their sum is 130 and their product is 27000.
e) Find the inverse of the matrix.
\[
\begin{bmatrix}
1 & 2 & 1 \\
2 & 1 & 2 \\
2 & 1 & 1 \\
\end{bmatrix}
\]

f) State the procedure of solving linear equation by Cramers rule. (Take imaginary equations)

g) Evaluate \( \int \frac{1}{x^2 + 4x - 5} \, dx \)

h) Differentiate w.r.t. \( x \)
\[
\sqrt{\frac{1-x^2}{1+x^2}}
\]

**Group - B**

2. Find \( \frac{dy}{dx} \) of the following function
\( x^2 - y^2 + 3x = 4y \)

3. Evaluate the following integral
\[
\int \frac{xe^x}{(x+1)^2} \, dx
\]

4. Solve the following equation by matrix method
\[
\begin{align*}
3x - 2y + z &= 1 \\
2x + y - 5z &= 2 \\
x + y - 2z &= 3
\end{align*}
\]

5. Prove that
\[
\begin{vmatrix}
2b & -c & 2a \\
2b & b-c-a & 2c \\
2c & 2c & c-a-b
\end{vmatrix}
= (a + b + c)^2
\]

6. There are four numbers. The first three are in A.P. The last three are in G.P. The sum of the 1st term and last terms is 11. The sum of the other two terms is 10. Find the numbers.

7. Show that \( f(x) = \frac{x}{1 + e^x} \) is continuous at \( x = 0 \),

Provided \( x \neq 0, \quad f(0) = 0 \)
3. a) Examine the importance of time element in determination of price under perfect competition.

OR

b) What is discriminating monopoly? What are the conditions for discrimination to be profitable?

4. a) Define Oligopoly? Why is there indeterminate pricing and output under Oligopoly?

OR

b) How price and output are determined under monopolistic competition?

5. a) Explain how wage rate is determined under perfect competitive market.

OR

b) What is the nature of profit? Examine Schumpeter's innovation theory of profit.
The figures in the right-hand margin indicate marks
Answer all questions

1. a) 

b) 

c) 

d) 

e) 

2. a) 

b) 

c) 

3. a) 

b) 

V-205-0.5

4. a) 

b) 

5. a) 

b) 

V-205

[ Turn Over
3. Answer any two of the following.  

a) Why does India remain a non-signatory to the Nuclear Non-Proliferation Treaty of 1968.

b) Do you think science and technology can be utilised to bring about international peace and security? Justify your answer.

c) Explain India's attitude towards global terrorism.

d) "For about a decade, India has been paying a lip service to the NAM". Comment.

2017

Full Marks - 40
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer all questions

1. a) "Globalization has been affecting international relations in every aspect"—Elucidate. 12

OR

b) "Humanitarian interventions on most cases are politically motivated". Examine citing suitable examples.

2. a) Give an account of the Indo-American relationship in the post-Cold War period. 12

OR

b) "Economic interests are the guiding force behind the making of India's foreign policy in the post-globalization period". Examine
The figures in the right-hand margin indicate marks

Answer all questions.
2017

Full Marks - 40

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer all questions

1. a) Solve the boundary value problem

   \[ y'' + 4y = e^x, \ y(0) = 0, y'(\pi) = 0 \]

   \[ \text{8 marks} \]

   OR

   b) Solve the boundary value problem

   \[ y'' = x, \ y(0) = 0, y(1) = 0 \]

2. a) Find the power series solution of the initial value problem

   \[ y'' - xy' - y = 0, \ y(0) = 1, y'(0) = 0 \]

   \[ \text{8 marks} \]

   OR

   [Turn Over]
2. Show that 

\[ P_{2n}(0) = \frac{(-1)^n \cdot 1 \cdot 3 \cdot 5 \cdot (2n-1)}{2 \cdot 4 \cdot 6 \cdots 2n} \]

and 

\[ P_{2n+1}(0) = 0 \]

3. a) Using Picard’s method of successive approximation find the solution of the initial value problem. 

\[ y' = xy, \quad y(0) = 1 \]

OR

b) Find the largest interval on which the solution of initial value problem 

\[ y = e^x, \quad y(0) = 0 \]

exists and unique.

4. a) Using Laplace transformation solve the initial value problem. 

\[ y'' - 4y' + 4y = 0, \quad y(0) = 0, \quad y'(0) = 3 \]

OR

b) Show that 

\[ (x^2 - 1)P_n^l(x) = nXP_n(x) - nP_{n-1}(x) \]
3. a) Discuss the equilibrium of the firm under perfect competition in the short and long run.

OR

b) Compare perfect competition with monopoly in respect of determination of price, output and profit.

4. a) How price and output are determined under monopolistic competition?

OR

b) Discuss the characteristics of Oligopoly. Explain Kinked demand curve theory of Oligopoly.

5. a) Explain how wage rate is determined under perfect competition market.

OR

b) Discuss the liquidity preference theory of interest.

1. a) What is price elasticity of demand? Explain the role of price elasticity of demand in business decisions.

OR

b) What is demand forecasting? Discuss the methods of demand forecasting.

2. a) What is Isoquant? Explain the laws of Return to scale with the help of Isoquants.

OR

b) Examine the impact of internal and external economies on production and costs of a business firm.
2. Give a brief account of the structure of the atmosphere. 9

3. Explain the heat budget of the earth. 9

4. Elucidate the formation and characteristics of planetary pressure belts. 9

5. Discuss the factors affecting insolation. 9

6. Describe the planetary winds. 9

7. Elaborate different types of rainfall. 9

8. Discuss the characteristics and formation of tropical cyclones. 9

1. Write short notes on any four of the following: 6 × 4

   a) Homosphere

   b) Weather and Climate

   c) Albedo

   d) Radiation inversion

   e) Pressure Gradient force

   f) Jet Stream

   g) Relative humidity

   h) Warmfront.
6. Explain phenomenon of Hysteresis in Ferromagnetic materials with reference to the B–H curve and calculate the Hysteresis loss per cycle. 5+4

7. Obtain the expression for the current in a series LCR circuit connected to an AC voltage source \( V = V_0 \sin(\omega t) \) using phasor method. Discuss the sharpness of resonance and quality factor of the circuit. 5+2+2

8. State and prove the maximum power transfer theorem in AC networks. Show that the maximum power delivered to the passive network is half the total power generated by the internal generator. 7+2

2017
Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Answer any four of the following:
   a) State and prove the uniqueness theorem. 5+1
   b) Derive the expression for the torque on an electric dipole placed in an external electric field. What is the effect of the torque. 5+1
   c) Calculate the self force experienced by a conductor surface due to charge on itself. How is the stress related to energy density near the surface? 4+2
   d) Derive the expression for the capacitance of a cylindrical capacitor filled with a dielectric of dielectric constant K. 6
2. Find the expressions for the electric field at points inside, outside and on a spherical charged distribution with charge density given by

\[ p(r) = \begin{cases} 
  \frac{k}{r^2}, & 0 < r < R \\
  0, & r > R
\end{cases} \]

a) Show that the electric field due to a small electric dipole is given by:

\[ \vec{E}(\vec{r}) = \frac{1}{4\pi \varepsilon_0} \frac{3\vec{p} \cdot \vec{r} - \vec{p}}{r^5} \]

where \( \vec{p} \) is the dipole moment.

b) Prove that this field is conservative.

[Turn Over]
6. a) Describe hydroboration-oxidation of alkene. 6
   b) What is ozonolysis. Give the ozonolysis product of 2, 3- dimethyl but-2-ene. 1+2
7. a) Write postulates of Bayer's Strain theory. Write its limitations. 3+2
   b) i) Why acetylene is acidic in nature. 2
   ii) Convert acetylene to But -2-yne. 2
8. a) i) Examine the aromaticity of cyclopropyl cation. 1
   ii) Describe the nitration of benzene with mechanism. 4
   b) Write notes on the following. 2+2
      i) Sulphonation of benzene
      ii) Chlorination of benzene
9. a) Describe Friedel craft's alkylation with mechanism. Give its limitation. 5
   b) Why benzene gives only one mono-substituted product. 2
   c) Complete the following:
      i) \( \text{NO}_2 \quad \text{Br}_2 \quad \text{Fe Br}_3 \rightarrow \)
      (ii) \( \text{OH} \quad \text{dil. HNO}_3 \rightarrow \)
1. Answer any four of the following:
   a) Define carbocation. Give one method of preparation of carbocation. Describe its stability and structure. 6
   b) i) Make a distinction between inductive effect and electromeric effect. 4
      ii) Why formic acid is stronger than acetic acid. 2
   c) i) What is Wurtz reaction. Describe its mechanism and limitations. 3
      ii) Describe the mechanism of chlorination of methane. 3
   d) What is inductive effect. Write its characteristics. How does it influence the relative strength of acid and base. 1+2+3
e) What do you mean by resolution of racem mixture. Describe the following method of resolution. (i) Kinetic method (ii) Selective adsorption method.

f) i) Write characteristics of geometrical isomerism.
   ii) Assign R and S configuration to the following compounds

   (i) \( \text{H}_2\text{N} - \text{C} - \text{OH} \)
   (ii) \( \text{H}_2\text{C} - \text{C} - \text{H} \)
   (iii) \( \text{H} - \text{Br} - \text{COOH} \)

   \[ \begin{array}{c}
   \text{CH}_3 \\
   \text{H}_2\text{N} - \text{C} - \text{OH} \\
   \text{H}_2\text{C} - \text{C} - \text{H} \\
   \text{H} - \text{Br} - \text{COOH}
   \end{array} \]

   g) i) Make a distinction between diastereomers and enantiomers.
   ii) State and explain Huckel's rule of aromaticity.

h) Complete the following reactions

   i) \( \text{CH} \equiv \text{CH} + \text{H}_2\text{O} \xrightarrow{\text{H}_2\text{SO}_4} \text{HgSO}_4 \)

2. What is resonance. Write its conditions, characteristics and application.

3. a) Write notes on:
   i) Hyperconjugation
   ii) Nucleophilicity and basicity.
   b) Discuss the relative stability of primary, secondary and tertiary Carbanion.

4. Describe oxymercuration-demercuration of alkene with mechanism and examples.

5. Write notes on the following:
   i) Markownikoff's rule
   ii) Antimarkownikoff's rule.
   i) Saytezeff's rule.
Group - B

2. Give an account of life cycle of *penicillum.*

3. Discuss the general characteristics and life cycle of *Saccharomyces.*

4. Give an account of ecology and life cycle of *Albugo.*

5. Discuss the application of fungi in agriculture and its biological control.

6. Give an account of the range of thallus organization and nature of association of algal and fungal partners in *Lichen.*

7. Give an account of the causal organism, symptoms, mode of infection and control of disease of Black stem rust.

8. Discuss the type of fruiting bodies and plasmodia in allied fungi.

Group - A

1. Write notes on any four of the following: 6 x 4
   a) Asexual reproduction in *Aspergillus.*
   b) Bioluminescence
   c) Late blight of potato
   d) Affinities of fungi with plants and animals.
   e) Types of fruiting bodies in fungi.
   f) Medical Mycology
   g) Tobacco mosaic viruses
   h) Endomycorrhiza and their significance.
Group - B

2. Give an account of Metamerism in annelida. 9

3. Describe the various larval forms in crustacea. 9

4. Discuss affinities and evolutionary significance of peripatus. 9

5. Give an account of respiration in mollusca. 9

6. Give an account of Larval forms in Echinodermata. 9

7. Write in detail the process of respiration in insecta. 9

8. Describe the process of metamorphosis in insects and add a note on its hormonal control. 9

9. Classify phylum mollusca upto class with characters and examples. 9

Group - A

1. Write notes on any four of the following: 6 × 4
   a) General characteristics of annelida.
   b) Social life in bees.
   c) Significance of trochophore larva.
   d) Water vascular system in Asteroidea.
   e) Pearl formation in bivalves.
   f) General characters of Peripatus.
   g) Excretion in annelid.
   h) Detorsion in Gastropoda.

II-UG-Zool(CC)-III

2017

Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.
2017

Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1
which is compulsory.

Group -A

1. Answer any four of the following:
   a) What is class? Explain how does it exhibit data
      hiding property.                    2+4  
   b) Explain the concept of message passing in C++
      with an example.                    6   
   c) Write the way of compiling and executing a C++
      program.                            6   
   d) How type conversion is done? Explain with
      example.                            6   
   e) What is a stream? Describe briefly the features
      of I/O system supported by C++.       2+4  

V-232 [Turn Over
f) Write a program to demonstrate the concept of rethrowing on exception.  

6

g) Write the rules for overloading operations and explain.  

6

h) How do structure of C and C++ differ? Explain with example.  

6

**Group - B**

2. a) What is an Object Oriented Programming? Explain how object oriented programming is different from the procedural oriented programming.  

2+4

b) Explain the concept of reference variable with an example.  

3

3. How function overloading differs from function overriding? Explain with a suitable example.  

9

4. Explain the concept of friend function and friend class with a suitable C++ programme.  

9

5. Write a program in C++ to add the two complex numbers demonstrating the concept of binary operator overloading.  

9

6. What is Visibility mode? What are different inheritance visibility modes supported by C++?  

9

7. a) Discuss the various forms of get() function supported by the input stream. How are they used.  

6

b) How do I/O facilities in C++ differ from that in C.

8. What do you mean by command line arguments? Why is it essential? Explain with a suitable example.  

9
Then prove that the alternating series
\[ \sum_{n=0}^{\infty} (-1)^n b_n = b_0 - b_1 + b_2 - b_3 + \ldots. \]
converges and its sum 'S' satisfies
\[ b_0 - b_1 \leq S \leq b_0. \]

1. Answer any **four** of the following : \[7\frac{1}{2} \times 4\]
   a) Let \( a, b \in F \), then prove that
   \[ |a+b| \leq |a| + |b| \& |a| < |b| \Rightarrow |a-b| \]
   b) Let \( S \) be a non-empty subset of \( R \) and let \( \alpha \in R \).
   Then prove that
   \[ \alpha \sup S = \begin{cases} \sup (\alpha S) & \text{if } \alpha > 0 \\ \inf (\alpha S) & \text{if } \alpha < 0 \end{cases} \]
   c) Prove that \( \sqrt{3} \in R - Q \)
d) Let \( a, b \in \mathbb{R}_+ \) such that \( a < b \). Then there exists a rational number \( \frac{k}{10^n} \) where \( k \in \mathbb{Z}, n \in \mathbb{N} \) such that \( a < b - \frac{1}{10^n} < \frac{k}{10^n} < b \).

e) Prove that the limit of a convergence sequence is unique.

f) Prove that \( \lim_{n \to \infty} \left( \frac{n}{\sqrt{n}} \right) = 1 \).

g) Determine the least value of \( n_0 \) such that for \( n > n_0, \frac{n}{n^2 + 1} < 0.0001 \).

h) Prove that if \( \lim x_n = l \), then \( \lim |x_n| = |l| \) but that the converse is not necessarily true.

**Group - B**

2. An ordered field \( F \) has least upper bound if and only if it has greatest lower bound property. Prove the above first defining G.L.B. and L.U.B. property.

3. For every real number \( x > 0 \) and every positive integer \( n \), there exists and unique \( y \in \mathbb{R}_+ \) such that \( y^n = x \).

4. Every infinite set has a countably infinite subset.

5. Prove that \((0, 1)\) is uncountable.


7. Prove that the series

\[
\sum_{n=1}^{\infty} \frac{1}{n!} = 1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n} + \ldots
\]

converges to the value \( e \), which is an irrational number.

8. Let \((b_n)\) be real such that

(i) \( b_n \) is nonnegative and non-increasing

(ii) \( \lim b_n = 0 \)
h) What type of marketing strategies are needed during maturity stage of product life?

Group - B

2. What are the problems of small scale industries in India.

3. Discuss the positive effects of globalisation on Indian economy.

4. Discuss the merits and demerits of partnership firm.

5. What do you mean by co-operative organisation? Explain its main characteristics.

6. Explain the various steps involved in decision making process.

7. Explain the main theories of leadership.

8. Explain price as an element of marketing mix. Also explain any four factors that affect the fixation of price of a product.
II-UG-Com(CC)-III (BOM)

2017
Full Marks - 80
Time - 3 Hours
The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any four of the following : 7½ × 4
   a) What is the role of service sector in the Indian economy.
   b) What do you mean by business ethics? What are its elements?
   c) State the important features of partnership firm.
   d) What are the merits of company form of organisation?
   e) What is formal organisation?
   f) What are the main points in the definition of planning?
   g) Explain the organisational barriers to communication.

Group - B

2. What are the problems of small scale industries in India.

3. Discuss the positive effects of globalisation on Indian economy.

4. Discuss the merits and demerits of partnership firm.

5. What do you mean by co-operative organisation? Explain its main characteristics.

6. Explain the various steps involved in decision making process.

7. Explain the main theories of leadership.

8. Explain price as an element of marketing mix. Also explain any four factors that affect the fixation of price of a product.
3. Explain Mendel's law of segregation with examples. 12

OR
Write notes on any two of the following: 6 x 2
a) Co-dominance
b) Lethal alleles
c) Crossing over.

4. Explain Sex-linked inheritance with reference to man giving examples. 12

OR
Write notes on any two of the following: 6 x 2
a) Sex-chromosomes
b) Intra-chromosomal aberrations
c) Diabetes mellitus.

5. Give an account of structure, location and functions of connective tissue proper. 12

OR
Write notes on any two of the following: 6 x 2
a) Compound epithelium
b) Cartilage
c) Cardiac muscle.

1. Describe the structure of Mitochondria. 12

OR
Write notes on any two of the following: 6 x 2
a) Prokaryotic cell
b) Golgi complex
c) Nucleolus.

2. Give an account of general structure and types of chromosomes. 12

OR
Write notes on any two of the following: 6 x 2
a) Mitosis
b) Significance of Meiosis
c) Cancer cell.
The questions are of equal value
Answer all questions

1. a) Discuss on Nationalist struggle for Independence.

OR

b) Examine the composition and jurisdiction of the Supreme Court of India.

2. a) Discuss the Fundamental Rights enjoyed by the citizens of India.

OR

b) Examine the salient features of the Constitution of India.

3. a) Discuss the powers and position of the Prime Minister of India.

OR

b) Explain the composition and functions of the Legislative Assembly of Odisha.

4. a) The Governor of a state is a figure head. Examine.

OR

b) Examine the nature of Party System in India.

5. a) Critically examine the role of caste in Indian Politics.

OR

2017
Full Marks - 80
Time - 3 Hours
The figures in the right-hand margin indicate marks
Answer all questions

1. a) ‘ধীর্ঘ বিচার’ দৈনন্দিন সাধারণ প্রথম ঐতিহ্য
2)  ১৫

খাদক

3) ‘ধীর্ঘ বিচার’ দৈনন্দিন সাধারণ প্রথম ঐতিহ্য অংশ–
খাদক ১

4. a) ‘প্রজিতা’ দৈনন্দিন যৌথ সাধারণ প্রথম ঐতিহ্য
2)  ১৫

খাদক

5) প্রজিতা দৈনন্দিন যৌথ বিচার সাধারণ যৌথ
যুক্তি বিচার ১
| [2] |
|---|---|
| 7.  | ଦେପାଣିତୀ ତୁରୀତୀ ସ୍ୱଭାଵର ବାପର ୬ାଦ :  4 × 9 |
| 3)  | କାରଣ-କାରତୁ ଓଇରାଇଛନ୍ତି କଥା ବନ୍ଧିତ ବହୁତେ ଭାବେ 8 ବାବୁର ମାନନ୍ତର । |
| 4)  | ପିଜି-ପିଜି ବାବାସର ବାଦ କାଗିତ ବନ୍ଧିତ ହେବା କାରଣ ଗାଢ୍ବାଇନ୍ତି 8 ବାବୁର ମାନନ୍ତର । |
| 5)  | ପୁରୁଷ ପାଣ୍ଡ, ପ୬ାଣ୍ଡ ବୁଦୁନୀ ବପ୍ପାକୁ ପୁରୁଷ ପାଣ୍ଡ ବୁଦୁନୀ ବପ୍ପାକୁ । |
| 6)  | ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ ଲକିଣ । |
| 8.  | ‘ଖାଦ୍ୱ ଦେଶି’ର ତିକିନ୍ଦ୍ରଣ-କଗାଢ୍ବାଇ କଥାକୁ ବଣ୍ଟି ବିଢ୍ବୁ ଯାଇ । |
| [3] |
| 9)  | ଚୁଡାନା କବିକ, କୁଠାପହାର, ଜିଲ୍ଲାର ଜିଲ୍ଲା କବିକ ବୀତି ଯୁକ୍ତତା କବିକ କବିକ କବିକ । |
| 10. | ଦେଶାବୃତ୍ତି ଲେଖାକୁ ବ୍ୟବସ୍ୟକ ପ୍ରତିକ ବାବୁର ମାନନ୍ତର । |
| 11. | ପୁଷକ ଓ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ । |
| 12. | ତିକିନ୍ଦ୍ରଣ-କଗାଢ୍ବାଇ କଥା ଓ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ ପୁଷକ । |

V-295-0.1
8. a) State and prove Cauchy's completeness principle.

OR

b) Discuss the convergence of the following series

i) \( \sum_{n=1}^{\infty} \frac{n!}{n^n} \)

ii) \( \sum_{n=1}^{\infty} \frac{\sqrt{n+1} - \sqrt{n-1}}{n} \)

9. a) State and prove intermediate value theorem.

OR

b) Prove that every bounded infinite subset of \( \mathbb{R} \) or \( \mathbb{C} \) has at least one limit point.

10. a) State and prove Rolle's theorem and give its geometrical interpretation.

OR

b) Use mean value theorem prove the following:

i) \( 0 < x - \log(1 + x) < \frac{x^2}{2}, \quad (x > 0) \)

ii) \( \frac{x}{1 + x^2} < \tan^{-1} x < x, \quad (x > 0) \)
b) Prove that \( a \equiv b \mod n \) is an equivalence relation on the set of integers.

3. a) Prove that if \( G \) is an abelian group, then for all \( a, b \in G \) and all integers \( n, (a \cdot b)^n = a^n \cdot b^n \).

OR

b) Prove that a non-empty subset \( H \) of the group \( G \) is a subgroup of \( G \) if and only if
   (i) \( a, b \in H \) implies that \( a \cdot b \in H \)
   (ii) \( a \in H \) implies that \( a^{-1} \in H \).

4. a) Prove that a subgroup \( N \) of a group \( G \) is a normal subgroup of \( G \) if and only if the product of two right cosets on \( N \) in \( G \) is again a right coset of \( N \) in \( G \).

OR

b) Let \( \phi \) be a homomorphism of \( G \) onto \( \overline{G} \) with kernel \( K \). Then prove that \( \frac{G}{K} \cong \overline{G} \).

5. a) Prove that any field is an integral domain.

   OR

b) Define homomorphism of rings. If \( \phi \) is a homomorphism of a ring \( R \) into a ring \( R' \) with kernel \( I(\phi) \), then show that
   (i) \( I(\phi) \) is a subgroup of \( R \) under addition.
   (ii) If \( a \in I(\phi) \) and \( r \in R \) then both \( ar \) and \( ra \) are in \( I(\phi) \).

6. a) Prove that an ordered field \( F \) has least upper bound property if and only if it has greatest lower bound property.

   OR

b) State and prove Archimedean principle.

7. a) i) Prove that every infinite set has a countably infinite subset.

   ii) Prove that every subset of a countable set is a countable set.

   OR

b) Prove that \((0, 1)\) is uncountable.

V-297
3. Discuss the uses and over exploitation of surface and ground water.

4. Discuss the environmental movements of India.

5. Describe the causes and effects of Air Pollution.

1. Write notes on any two of the following. 7½ × 2
   a) Food web
   b) India as a mega biodiversity Nation.
   c) Floids
   d) Noise Pollution.

2. Give an account of the structure and function of an eco-system. 12½
3. Discuss the uses and over exploitation of surface and ground water.

4. Discuss the environmental movements of India.

5. Describe the causes and effects of Air Pollution.

1. Write notes on any two of the following. \(7\frac{1}{2} \times 2\)
   
a) Food web
   
b) India as a mega biodiversity Nation.
   
c) Floods
   
d) Noise Pollution.

2. Give an account of the structure and function of an eco-system. \(12\frac{1}{2}\)
II-UG-BBA (GE)-II (B.Env)

2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1
which is compulsory.

Group -A

1. Write notes on any four of the following. \(7\frac{1}{2} \times 4\)
   a) What is business environment?
   b) What do you mean by business policy?
   c) What is globalisation?
   d) Foreign Direct Investment in India.
   e) What are the objectives of Industrial licensing?
   f) What are the features of Industrial Policy, 1956.
   g) Objectives of public sector in India.
   h) Scope of privatisation at present.

2. Discuss the components of business environment. \(12\frac{1}{2}\)

3. State the importance of economic environment to business. \(12\frac{1}{2}\)

4. Critically examine the New Industrial policy, 1991 of Government of India. \(12\frac{1}{2}\)

5. Discuss the industrial licensing policies with their changes in India. \(12\frac{1}{2}\)

6. Explain the performances and reforms in India's public sector industries. \(12\frac{1}{2}\)

7. What is Privatisation? Discuss arguments in favour and against privatisation in India. \(12\frac{1}{2}\)

8. Explain how globalisation and foreign direct investment boost Indian business at present.
The figures in the right-hand margin indicate marks
Answer all questions

1. a) What is Social Science Research? Critically examine the importance of Historical Research in social science. 12

   OR

   b) As a scholar you choose a topic of your own choice and apply the principles of descriptive research in it.

2. a) What is Content Analysis? Explain its importance in Analysing Data. 12

   OR

   b) Give a sketch of Report Writing on child labour in India.

3. Write notes on any two of the following: 8 × 2
   a) Meaning of Experimental Research.
   b) Features of Experimental Research.
   c) Types of Report.
   d) Classification of Data.
1. Find the maxima and minima of the function,

\[ y = 2x^3 + 3x^2 - 36x + 10 \]

OR

Find \( \frac{dy}{dx} \) of the following w.r.t. \( x \).

a) \[ y = \frac{1}{x} + \sqrt{x} + e^x \]

b) \[ y = \log \left( \frac{x + 5}{3x + 8} \right) \]

2. Evaluate the following integrals

a) \[ \int \frac{dx}{x^2 - 9} \]
3. Prove that
\[
\begin{vmatrix}
  a + b & b + c & c + a \\
  b + c & c + a & a + b \\
  c + a & a + b & b + c \\
\end{vmatrix}
= -2 \left(a^3 + b^3 + c^3 - 3abc\right)
\]
OR
Solve by matrix method
\[
\begin{align*}
  x + 2x - 3z &= 4 \\
  2x + 3y - 5z &= 7 \\
  x - 5y + 2z &= 3
\end{align*}
\]

4. A man creates a sinking fund by depositing Rs. 12,000/- per year @ 10% p.a. compound interest for 25 years. Find the value of the sinking fund at the end of 25 years.
OR

5. a) Explain:
   i) Objective function
   ii) Constraints
   b) State the procedure of formulating a linear programming model.

OR
Solve by graphic method the following L.P.P.
\[
\begin{align*}
  \text{Min,} & \quad z = 3x_1 + 2x_2 \\
  \text{Subject to} & \quad 5x_1 + x_2 \geq 10 \\
 & \quad x_1 + x_2 \geq 6 \\
 & \quad x_1 + 4x_2 \geq 12 \\
 & \quad x_1, x_2 \geq 0
\end{align*}
\]
1. a) How many types of storage are normally there in the storage unit of a computer system? Justify the need for each storage type.  
   
   b) What is operating system.  

   OR  

   c) What are the five basic operations performed by any computer system? What are the basic components of the CPU of a computer system? Describe the role of each component in the functioning of a computer system.  

2. a) What is E-mail? List some advantages and disadvantages of E-mail services against telephone services.
What is meant by computer networking? Discuss different types of computer networking.  

OR

What is the Internet? Describe some uses of the internet in commercial organizations.

Write short notes on:
   i) Types of Networks
   ii) Business data processing.

Describe the various elements of WINDOWS operating system.

OR

How will you insert horizontal page break and vertical page break while printing a worksheet in EXCEL?

How can you create a new template based on an existing template.

Write the steps involved to go to a particular page directly in a multi-page document.

Write a program to calculate and display sum of series 5, 10, 15, ....100 in Fox Pro.

What is Form-Wizard? How can you create a form using Form-Wizard? Write all its steps.

Write a program in FoxPro to find out factorial of a input number.

How to create a table using Database view?

What is meant by Ledger? How can you create a single and a multiple ledger? Create a single ledger of your own.

Name the different tasks performed by the computerized inventory control system. What are the different types of reports used for inventory stores? Describe briefly the method of accounting invoices.
b) i) Construct a Turing machine that will compute \( f(x,y) \) where \( f \) is multiplication. 5
ii) Prove that every partial recursive function is a partially computable function. 5

1. a) What do you mean by "Hasse diagram"? Draw the Hasse diagram of the relation \( R \) on a set \( A \) where \( A = \{1,2,3,4\} \) and \( R = \{(1,1), (1,2), (2,2), (2,4), (1,3), (3,3), (3,4), (1,4), (4,4)\} \) 10

OR

b) Define a chain. Give the general discussion of lexicographic ordering. Illustrate with examples. 10

2. a) Define characteristic function of a set \( A \). Show that

i) \( A \cap (B \cup C) = (A \cap B) \cup (A \cap C) \)

5+5

V-211-0.5
ii) \( f(A \cap B) \subseteq f(A) \cap f(B) \)
   and construct an example to show that in general it is not possible to replace \( \subseteq \) by \( = \).
   Under what condition will
   \( f(A \cap B) = f(A) \cap f(B) \)
   OR

b) i) Define a sublattice and show that every interval of a lattice is a sublattice
   ii) Simplify the Boolean expression
       \( (a \cdot b)' \oplus (a \oplus b)' \)

3. a) i) Define a partial recursive function. Show that the function \( f(x) = \frac{x}{2} \) is a partial recursive function.
   ii) Show that the set of divisors of a positive integer \( n \) is recursive.

   OR

b) i) Show that the function \( f(x, y) = x - y \) is partial recursive.
   ii) Show that the predicate 'x' is prime is primitive recursive.

4. a) i) Give a context free grammar which generates \( L = \{ w \mid w \text{ contains twice as many } 0s \text{ and } 1s \} \)
   ii) Compute the inverse of each element in \( Z_7 \) using Fermat's theorem.

   OR

b) i) Show that the minimum weight of the non-zero code words in a group code is equal to its minimum distance.
   ii) Obtain a context-sensitive grammar for the language \( \{ a^{m^2} / m \geq 1 \} \)

5. a) i) Construct a Turing machine that will compute the function \( f(n) = n - 3 \) if \( n \geq 3 \) and \( f(n) = 0 \) for \( n = 0, 1, 2 \) for all non-negative integer \( n \).
   ii) Let a language \( L \) be accepted by a non-deterministic finite state acceptor. Then show that there exist an equivalent deterministic finite state acceptor that accepts \( L \).

   OR
**Group - A**

1. Answer any **four** of the following: \(6 \times 4\)
   
   a) Write a note on parameter and indices.
   
   b) Describe axial relation of Tetragonal system.
   
   c) Write a note on symmetry elements.
   
   d) Write a note on clay minerals.
   
   e) Write a note on stereographic projection.
   
   f) Describe physical properties of Quartz.
   
   g) Write a note on crystal imperfection.
   
   h) Describe Moh's scale of hardness.
b) He is so weak that he cannot walk.  
(Convert into a simple sentence without changing meaning)

c) God helps those who help themselves.  
(Find out the Adjective clause in the sentence)

d) You will get what you want.  
(Find out the subordinate clause and name it)

e) No sooner the master entered the room, everyone was silent. (correct if there is an error)

f) Shyamalendu resembles his father.  
(Use a phrasal verb in the place of “resembles”)

g) Time waits ___ none. (fill in the blank)

h) The office starts ___ ten in the morning.  
(Fill in the blank with appropriate preposition)

i) The inspector as well as two constables (has / have) started the investigation.  
(Use the suitable alternative)

j) He is a M.L.A.  
(Correct if there is any error in the sentence).

1. Answer any two of the following: 7½ × 2

a) Paraphrase the following and comment on Anton Chekhov’s attitude to the downtrodden.  
“Are you munching?” Iona asks his mare, seeing her eyes shining. “There, munch away, munch away..... Since we have not earned enough for oats, we will eat hay. Yes, I have grown too old to drive....My son ought to be driving now. He was a real Cabman. he ought to have lived....” Iona is, silent for a while, then he goes on.  
“That is how it is old girl...Kuzma Lontch is gone. He said good by to me. He went and died for no reason. Now suppose you had a little colt...And all at once that same little colt went and died....you’d be sorry, wouldn’t you?” The little mare munches, listens and breathes on her master’s hands. Iona is carried away and tells her all about it.
b) Comment on Madame Oreille’s passion for saving money. How did she get the price for the broken umbrella?

c) Interpret the following passage in your own words. What picture of Indian society do you find in the passage?

Chandu had conceived a new notion this time, newer than those he had thought of before. Having seen the shop of Nringan Das, the barber of the town, he had applied his brain to the scheme of opening a shop on the wayside at the head of the bazar, in partnership with her cousin, the barber of Verka; and with Dhunoo and other barbers within a range of seven miles from his village.... he convinced them all that it was time that the elders of the village came to them to be shaved rather than they should attend their lords and masters. “Rajkot Dist. Barber Brothers’ Hair dressing and Shaving Saloon” has been followed by many other active Trade unions of working class men in our parts.

d) Write a brief note on R. K. Narayan’s narrative style as revealed in “The Axe.”

2. Answer any two of the following. 7½ × 2

a) Suppose you are a scientist engaged in research work in a lab. In your presence the lab caught fire and some valuable instruments were damaged. Prepare a report addressed to your authority, pointing out the causes behind the mishap and a list of damaged instruments.

b) Expand the following idea:

‘Solid Waste Management is the only way to keep urban areas free from pollution.’

c) You received an email message from your authority that a team of supervisors would visit your branch office in which you are the Manager. Prepare a notice to be viewed by all the clerks, section officers and peons of the branch office in regard to the visit and also provide them with necessary instructions.

d) Prepare a CV to be attached to your application for the post of a Junior Scientist.

3. Do as directed. 1 × 10

a) I bought a box. The box was soon lost.
(Join the two sentences into a complex sentence)
1. किन्हीं दो प्रश्नों के उत्तर दीजिए : 12 × 2
   क) राजभाषा और राष्ट्रभाषा में अन्तर स्पष्ट कीजिए।
   ख) लिखित सम्बन्धित पर विचार कीजिए।
   ग) सम्बन्धित की प्रक्रिया पर संक्षिप्त लेख लिखिए।
   घ) व्यंजन की परिभाषा देते हुए इनका वर्गीकरण कीजिए।

2. किन्हीं चार प्रश्नों के उत्तर दीजिए : 4 × 2
   क) किन्हीं दो शब्द के दो दो पर्यायवाची शब्द लिखिए।
   देवता, स्त्री, पुरुष, वृक्ष
   ख) किन्हीं दो शब्द के बिलोम शब्द लिखिए:
   अग्रज, अथ, कृतज्ज, एडी।
ग) किन्हीं दो पदों के लिए एक शब्द लिखिए?
   i) जल में जन्म लेना वाला
   ii) इन्द्रियों को जीतनेवाला
   iii) जो कहा गया
   iv) खाने योग्य

घ) किन्हीं दो शब्दों के शुद्ध रूप लिखिए:
   बौध्य, भौतिक, पुल, अभिवृत्त

ड) किन्हीं दो वाक्य को शुद्ध कीजिए:
   i) मेरा नाम श्री पवन कुमार जी है
   ii) शिक्षक प्रमन पूछते है
   iii) उसने बोला
   iv) उसका प्राण निकल गया

च) किन्हीं दो का अर्थ लिखकर वाक्य में प्रयुक्त कीजिए:
   i) मक्खियाँ मारना
   ii) आस्तीन का साँप
   iii) अंदी मारना
   iv) न रहने बाँस न बजेगी बाँसुरी
2. The figures in the right-hand margin indicate marks
Answer all questions

5.  

1)  

2)  

3)  

4)  

6.  

1)  

2)  

3)  

4)  

5)  

6)  

V-239

2017

Full Marks - 40
Time - 2 Hours

The figures in the right-hand margin indicate marks

Answer all questions

1.  

2)  

3)  

4)  

5)  

6)  

V-239-2

II-UG-ODI-(AECC)-II (Sc)
1. The figures in the right-hand margin indicate marks. Answer all questions.

9. (a) All India Radio ध्वनिक चौक में एक क्षण के लिए 12 गायकों का ध्वनि की गई?
(b) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(c) 'दीवार' फ़िल्म की फुलडानी के लिए केसी के साथ उपलब्ध है?
(d) 'दीवार' का फुलडानी के साथ उपलब्ध है?
(e) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(f) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(g) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(h) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(i) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(j) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(k) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(l) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?

2. (a) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(b) 'दीवार' फ़िल्म की फुलडानी के लिए केसी के साथ उपलब्ध है?
(c) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(d) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(e) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(f) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(g) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(h) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(i) 'दीवार' फ़िल्म की फुलडानी के लिए केसी के साथ उपलब्ध है?
(j) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(k) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?
(l) एक शेर के लिए एक बाज रजिस्टर के लिए कितने के साथ उपलब्ध है?

V-239-2
6. In a debate competition in a college two judges A and B independently awarded the following marks to 7 competitors.

Debator       1  2  3  4  5  6  7  
Marks by A  40 34 28 30 44 38 31
Marks by B  32 39 26 30 38 34 28
An eighth debator was awarded 36 marks by Judge A while Judge B was not present.
If Judge B was also present, how many marks would you expect him to award to eighth debator assuming same degree of relationship exists in Judgement. 12½

7. Calculate Fisher's Index number using the following data and show how it satisfies the factor reversal test. 12½

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Year 2008</th>
<th>Year 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price(Rs)</td>
<td>Value(Rs)</td>
</tr>
<tr>
<td>Rice</td>
<td>10</td>
<td>200</td>
</tr>
<tr>
<td>Wheat</td>
<td>8</td>
<td>128</td>
</tr>
<tr>
<td>Dal</td>
<td>20</td>
<td>160</td>
</tr>
<tr>
<td>Sugar</td>
<td>18</td>
<td>144</td>
</tr>
<tr>
<td>Tea</td>
<td>35</td>
<td>280</td>
</tr>
</tbody>
</table>

8. Explain briefly the various components of time series. 12½
c) Distinguish between mean deviation and standard deviation.

d) The marks obtained by 10 students in an examination in statistics are 70, 65, 68, 70, 75, 73, 80, 70, 83 and 86. Find mean deviation and variance.

e) From a pack of 52 cards, 4 cards are drawn at random. What is the probability that all of them are spades?

f) Distinguish between Correlation and Regression.

g) Distinguish between Fixed Base Index Number and Chain Base Index Number.

h) Explain the method of moving average for measurement of trend component in a time series.

**Group - B**

2. Find the missing frequency from the following data.

<table>
<thead>
<tr>
<th>Marks</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>10</td>
</tr>
<tr>
<td>5-10</td>
<td>12</td>
</tr>
<tr>
<td>10-15</td>
<td>16</td>
</tr>
<tr>
<td>15-20</td>
<td>?</td>
</tr>
<tr>
<td>20-25</td>
<td>14</td>
</tr>
<tr>
<td>25-30</td>
<td>10</td>
</tr>
<tr>
<td>30-35</td>
<td>8</td>
</tr>
</tbody>
</table>

The mean mark is 16.82.  

3. Below is given the distribution of heights of a group of 60 college students.

<table>
<thead>
<tr>
<th>Heights (in cms)</th>
<th>No. of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>145.0 - 149.9</td>
<td>2</td>
</tr>
<tr>
<td>150.0 - 154.9</td>
<td>5</td>
</tr>
<tr>
<td>155.0 - 159.9</td>
<td>9</td>
</tr>
<tr>
<td>160.0 - 164.9</td>
<td>15</td>
</tr>
<tr>
<td>165.0 - 169.9</td>
<td>16</td>
</tr>
<tr>
<td>170.0 - 174.9</td>
<td>7</td>
</tr>
<tr>
<td>175.0 - 179.9</td>
<td>5</td>
</tr>
<tr>
<td>180.0 - 184.9</td>
<td>1</td>
</tr>
</tbody>
</table>

Draw the histogram of the distribution and find the modal height therefrom. Check this result by using the formula.

4. What are the objectives of measuring dispersion? In your opinion which is the best method of finding out dispersion and why?

5. A bag contains 8 red balls and 5 white balls. Two successive draws of 3 balls are made without replacement. Find the probability that the first drawing will give 3 white balls and the second 3 red balls.
2. अधोलिखितेषु कयोऽितः द्वयोः उत्तरं प्रदेयम् : \( 12\frac{1}{2} \times 2 \)

क) कठोपनिषद् आधारंण स्रष्ट्वकस्य दार्शनिक तत्त्वं विचार्यत।

ख) कथं जीवः मृत्युमुखात् प्रमुच्यते।

ग) योगीना सह कुर्मस्य सादृश्यं कथं क्रियते?

घ) व्याख्या काय्याः:

या निशा सर्वभूतानां तस्या जागर्ति संपत्मी।

यस्यं जाग्रति भूतानि सा निशा परश्यतो मुने: ॥

Himalayas is the soul of India and scale of the world. Alzebra traveled to Europe from India on the way of Arab. Chanayak contemplated indivisible India.
d) Write one method of preparation, two chemical properties and uses of the following compounds.
   (i) KMnO₄ (ii) K₂Cr₂O₇ (1+2+1)×2

5. a) How does acetone react with
   (i) H₂NHOH (ii) Phenylhydrazene ? 2 + 2

b) Explain the relative acidity of:
   i) Cl₃CCOOH > Cl₂CHCOOH < ClCH₂COOH < CH₃COOH 3

c) Why are the α-hydrogen of aldehydes and ketones acidic in nature? 3

d) Explain Keto-enol tautomerism with an example. 2½

OR

e) How does C₂H₅NH₂ react with CH₃COCl and CHCl₃ in presence of KOH ? 4

f) How will you distinguish between primary secondary and tertiary amines. 4½
2. a) Write notes on: 3+3+3+3½
   i) Brownian movement
   ii) Peptisation
   iii) Application of electrophoresis.
   iv) Application of adsorption.

OR

b) State and explain Lambert Beer Law. 5½

c) Discuss:
   i) Colloids and the stability of colloids 2+3
   ii) Gold number. 2

3. a) Write the main postulates of VSEPR theory. Basing upon this theory how can you explain the structure of the following compounds.
   i) NH₃ 4 + 6
   ii) H₂O
   iii) PF₅

b) Define and explain ionic bond with an example 2½

OR

c) Discuss three factors influencing the formation of ionic bond. 7½

d) Draw the molecular orbital diagram of O₂ molecule. Calculate its bond order and predict its magnetic character. 3+2

4. a) Explain with suitable examples: 3 × 3
   i) Transition elements exhibit variable valencies.
   ii) Transition elements are capable of forming complex compounds.
   iii) Cu²⁺ ions are blue in colour while Zn²⁺ ions are colourless. Why?

b) Prove that the transition metal manganese exhibit variable oxidation states. Explain with examples. 3½

OR

c) Prove with three different examples of first row elements acting as catalysts. Give reactions. 4½
e) Discuss the basic principles of IR spectroscopy.  

f) What do you mean by conformation? Discuss different conformations of n-butane and explain their stability.  

g) Write a note on asymmetric synthesis.  

6. a) Explain the mechanism of SN₁ reaction with an example.  

b) What is meant by optical isomerism? Discuss optical isomerism in lactic acid.  

c) Write the conditions required for geometrical isomerism.  

d) Assign R and S configuration to the following compounds.  

(i) 

(ii) 

\[
\begin{align*}
\text{OR} & \\
\text{(i) } & \\
\text{H} & \\
\text{I - C - Cl} & \\
\text{Br} & \\
\text{(ii) } & \\
\text{NH}_2 & \\
\text{HO - C - H} & \\
\text{CH}_3 & 
\end{align*}
\]
3. Give a brief idea on tools and technique of genetic engineering.

   OR

   Write notes on any two of the following:
   a) Concept of gene
   b) Structure of t-RNA
   c) Application of biotechnology in Waste Management.

4. Write an essay on modern synthetic theory of evolution.

   OR

   Write notes on any two of the following:
   a) Biochemical origin of life
   b) Theory of natural selection
   c) Role of isolation in evolution.

5. Give an account of structure, location and functions of simple epithelial tissue

   OR

   Write notes on any two of the following:
   a) Fluid connective tissue
   b) Striated muscle
   c) Structure of nervous tissue.

1. Describe the structure and function of Endoplasmic reticulum

   OR

   Write notes on any two of the following:
   a) Lysosome
   b) Fluid mosaic model of plasma membrane
   c) Prophase - I of Meiosis

2. What is linkage? Describe the process of linkage with examples.

   OR

   Write notes on any two of the following:
   a) Co-dominance
   b) Dihybrid cross
   c) Chromosomal mechanism of sex-determination.
1. a) If \( \alpha, \beta, \gamma \) be the roots of the cubic equation \( x^3 + px^2 + qx + r = 0 \), then find the value of

(i) \( \sum \alpha \)

(ii) \( \frac{\beta^2 + \gamma^2}{\beta \gamma} \)

OR

b) Solve by Cardan’s method the cubic

\[ 35x^3 - 18x^2 + 1 = 0 \]

2. a) Prove that any positive integer \( a > 1 \) can be factored in a unique way as \( a = p_1^{\alpha_1}p_2^{\alpha_2} \cdots p_t^{\alpha_t} \)

where \( p_1 > p_2 > \cdots > p_t \) are prime numbers and where each \( \alpha_i > 0 \)

OR

b) Prove that the relation congruence modulo \( n \) defines an equivalence relation on the set of integers.
3. a) Prove that if $G$ is a group, then
   i) The identity element of $G$ is unique.
   ii) For all $a, b \in G$, $(a \cdot b)^{-1} = b^{-1}a^{-1}$

   OR

   b) If $G$ is a finite group and $H$ is a subgroup of $G$, then show that $O(H)$ is divisor of $O(G)$

4. a) If $H$ is a subgroup of $G$ such that the product of two right coset of $H$ in $G$ is again a right coset of $H$ in $G$, then prove that $H$ is a normal in $G$.

   OR

   b) If $\phi$ is a homomorphism of $G$ onto $\overline{G}$, then prove that
   i) $\phi(e) = \mathcal{E}$, the unit element of $\overline{G}$
   ii) $\phi(x^{-1}) = \phi(x)^{-1}$, for all $x \in G$

5. a) Prove that the homomorphism $\phi$ of $R$ into $R'$ is an isomorphism if and only if $I(\phi) = 0$

   OR

   b) If $U$ is an ideal of the ring $R$, then show that $R/U$ is a ring and is a homomorphic image of $R$.

6. a) Prove that $Q$ is not complete.

   OR

   b) Prove that an ordered field $F$ has least upper bound property if and only if it has greatest lower bound property.

7. a) Prove that the union of a family of countable sets is countable.

   OR

   b) Prove that:
   i) The set of algebraic numbers is countably infinite.
   ii) The set of transcendental numbers is uncountable.

8. a) Prove that:
   i) Every Cauchy's sequence is bounded
   ii) Every convergent sequence is Cauchy.

   OR

V-305
1. a) Show that
\[ \vec{A} \times (\vec{B} \times \vec{C}) + \vec{B} \times (\vec{C} \times \vec{A}) + \vec{C} \times (\vec{A} \times \vec{B}) = 0 \]
6
b) State Gauss divergence theorem. 3

c) Prove that
\[ \nabla \cdot (\vec{A} \times \vec{B}) = \vec{B} \cdot (\nabla \times \vec{A}) - \vec{A} \cdot (\nabla \times \vec{B}) \]
6

OR

d) Prove that
\[ \text{Curl } \nabla A = \nabla \times \vec{A} = \nabla \times (\nabla \times \vec{A}) \]
6
e) Show that \( \text{Curl } \vec{f} = 0 \) 3
f) Show that curl of gradient of a scalar function is zero. 6

2. a) Obtain the cardinal points of a thick lens and write three properties of principal points. 12 + 3

OR

3. a) Describe with necessary theory and diagram Newton's ring experiment for determination of wavelength. 15

OR

b) Describe with necessary theory the biprism experiment to determine the wavelength of a monochromatic light. 15

4. a) Discuss Fraunhofer type of diffraction produced by a narrow single slit and illuminated by a monochromatic light. 15

OR

b) What is a diffraction grating. Give the theory and construction of plane transmission grating and explain the formation of spectra by it. 2 + 13

5. a) What is double refraction. Explain the phenomenon of double refraction in uniaxial crystal. 15

OR

b) Briefly describe the construction, theory and working in Nicol Prism. 15
1. a) Narrate the effects of Renaissance in the field of literature, architecture and painting.
   OR
   b) Give an account of Lutheranism in Germany.

2. a) Analyse the Socio-political causes of the French Revolution of 1789.
   OR
   b) Examine Napoleon's achievements as First Consul.

3. a) Discuss the composition and works of the Congress of Vienna.
   OR

4. a) Describe the causes of the First World War.
   OR
   Trace the causes of the failure of League of Nations

5. a) Analyse the factors for the rise of Nazism in Germany.
   OR
   b) Examine the causes of the outbreak of the second world war.
Perform any one of the following experiments.  

a) Study the static and dynamic characteristics of a triode.

b) Study the transistor characteristics in CE and CB mode (Using NPN or PNP transistor)

c) Study triode as an amplifier.

d) Study a Hartley Oscillator.

e) Study a rectifier using different filters.

f) Draw the characteristics of a Zener diode.

2. Viva-Voce.  

3. Record
1. Answer any five questions: 
   
   a) Write a program to check the number is Prime No. or not.

   b) Write a program to develop Fibonacci series up to 'n' terms.

   c) Write a program to evaluate the series up to 'n' term:
      \[ y = \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \ldots + \frac{1}{N!} \]

   d) Write a program to find the factorial of a number.

   e) Write a program to sum the series:
      \[ 1+3+5+7+9+11+\ldots \]

   f) Write a program to convert binary number to decimal number.

2. Viva-Voce.

3. Practical Record

---

[Turn Over]
1. a) How will you insert horizontal page break and vertical page break while printing a worksheet in EXCEL? 8

b) What is a range? How are cell ranges named? What are the advantages of assigning a name to a cell or a range of cells? Can you rename a range or delete a range? 8.6

OR

c) How can you insert a graphic image into a word document? 5

d) Write the steps involved to go to a particular page directly in a multipage document. 5
2. a) How to copy a slide from one presentation to another? Write all the steps.

   b) How text and graphics objects are animated in a slide? Write all the steps.

   c) Write a program to calculate and display sum of series 5, 10, 15, ....100 in Fox Pro.

   OR

   d) How to create a table using Database view? Write all its steps.

   e) What is Form-Wizard? How can you create a form using Form-Wizard? Write all its steps.

   f) How can you insert Header and Footer? Write all the steps.

3. a) Explain the features of the spelling check facility in Word. How do you add new words to a dictionary.

   b) Briefly explain how you will search for a particular word in the document and replace it with a new word.

   c) How many types of breaks are there in MS-Word? How is a page break different from section break?

   OR

   d) Explain different components of MS-Excel.

V-313-1
2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Answer any four of the following.  $7\frac{1}{2} \times 4$

a) How was the Romantic Movement in English poetry a revolt against tradition and social authority? Give a reasoned answer.

b) Define the concept "Romanticism" and discuss its salient features.

c) William Blake was an out and out rebel against all the social, political and literary conventions of the 18th Century. Explain it with reference to his poems.

d) "Sincerity and passion are the chief keys of Robert Burns' poem". Explain it with reference to his poem, Explain 'My love is like a Red, Red Rose'.
e) Summarise the ideas contained in the poem, 'Tintern Abbey'.

f) Discuss John Keats as 'a poet of Beauty' with reference to his poem, 'Ode on the Grecian Urn'.

g) What is Gothic Novel? Mention the chief characteristics of the Gothic Novel.

h) What expectations does William Hazlitt make to his opening statement: 'but I like to go by myself', and why does he do so?

**Group - B**

2. Discuss the impact of the French Revolution on early 19th Century English Romantic poetry. 12½

3. Critically appreciate William Collins' poem, 'Ode to Evening'. 12½

4. Write a note on Coleridge as a poet of Supernatures discuss it with reference to his poem 'Kubla Khan'. 12½

5. What prominent characteristics of P.B. Shelley as a poet do you find in 'Ode to the west wind'? Discuss. 12½

6. 'Dream Children : A reverie'. Justify the relevance of the title. 12½

7. 'De Quincey excels in the analysis of his own emotional reactions, but unlike Hazlitt's his reactions grow out of a depth of reading'. Explain it with reference to his essay, 'On Knocking at the Gate in Macbeth'. 12½

8. Discuss Mary Wollstonecraft Shelley as the first of the writers of science and the last of the novelists of the terror school. 12½

9. Discuss Mary W. Shelley's 'Frankenstein' as a story of the ravages of a man-made monster equivalent to the modern 'Robert'. 12½

Group - A

1. Answer any four of the following. 7½ × 4
   a) Explain the nature of Indian state during 1967-1991.
   b) Explain the implementation of Mandal Commission report on Reservation for OBCs.
   c) Explain the constitutional strategies to attack on the evils of caste system in India.
   d) Discuss the main features of Indian caste system.
   e) Explain the secular features of Indian Constitution.
   f) Write down the Remedies against Communalism.
   g) Analyse the possible steps for removing regional imbalances.

2. Explain the salient features of Political party system in India. 12½

3. Discuss the various determinants of voting behaviour. 12½

4. Explain different forms of Regional Aspirations present in India politics. 12½

5. Depict a picture and character of caste politics found in India. 12½

6. Discuss the functions of National Commission for women as an affirmative action for welfare of women. 12½

7. Discuss the Nehruvian Model of Development. 12½

8. Explain the nature and working of Multi Party Coalition. 12½

9. "Secularism is the best remedy against Communalism". Comment. 12½

Group - B

2. Explain the salient features of Political party system in India. 12½

3. Discuss the various determinants of voting behaviour. 12½

4. Explain different forms of Regional Aspirations present in India politics. 12½

5. Depict a picture and character of caste politics found in India. 12½

6. Discuss the functions of National Commission for women as an affirmative action for welfare of women. 12½

7. Discuss the Nehruvian Model of Development. 12½

8. Explain the nature and working of Multi Party Coalition. 12½

9. "Secularism is the best remedy against Communalism". Comment. 12½

2017

Full Marks - 80
Time - 3 Hours
The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1 which is compulsory.
The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

'3' Question

5. হল তীব্র সত্ত্বনা কারণ কি : 7½ × 4
   1) বাঙালি লেখকের লেখা লেখকের লেখিত শিক্ষিত লেখকের লেখক
   2) বাঙালি লেখকের লেখা লেখকের লেখিত শিক্ষিত লেখকের লেখক
   3) বাঙালি লেখকের লেখা শিক্ষিত শিক্ষিত লেখকের লেখক
   4) বাঙালি লেখকের লেখা শিক্ষিত লেখকের লেখক
   5) বাঙালি লেখিত বাঙালি লেখকের লেখিত শিক্ষিত শিক্ষিত

6. হল তীব্র সত্ত্বনা কারণ কি : 7½ × 4
   1) বাঙালি লেখকের লেখা লেখকের লেখিত শিক্ষিত শিক্ষিত শিক্ষিত
   2) বাঙালি লেখকের লেখা লেখকের লেখিত শিক্ষিত শিক্ষিত
   3) বাঙালি লেখকের লেখা শিক্ষিত শিক্ষিত শিক্ষিত
   4) বাঙালি লেখকের লেখা শিক্ষিত শিক্ষিত
   5) বাঙালি লেখকের লেখা শিক্ষিত শিক্ষিত

V-249-1
Group - A

1. Answer any four of the following: 7½ × 4
   a) Write short notes on Dharma.
   b) Define Artha.
   c) Write short notes on Samyak Jyana.
   d) Explain eight fold path of Buddhism.
   e) Write short notes on Vikarma.
   f) Explain satyagraha of Gandhi.
   g) What is Headonism?
   h) Define Moksa.

Group - B

2. Give an account of Purusartha. 12½

3. Explain and examine Carvaka's materialism. 12½

4. What are the Triratna (Three Jewels) of Jainism? How these are indispensable for liberation? Discuss. 12½

5. Explain the Four Nobel Truth of Buddhism. 12½

6. What is meant by dependent origination of Buddhism? Explain. 12½

7. Explain the Naskama Karma of Bhagvad Gita. 12½

8. Means justify the ends. Explain it in the light of Gandhian ethics. 12½
II-UG-Hist (CC)-IV

2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1
which is compulsory.

Group - A

1. Write short notes any four of the following: 7½×4
   a) Plebein
   b) Christianity in Roman Empire
   c) Slave society in Rome
   d) Status of serfs in Middle Age.
   e) Characteristics of Feudalism
   f) Role of St. Paul in spreading Christianity.
   g) Sufism in central Islamic world.
   h) Abu Bekr and Islam.

2. Write a note on the evolution and growth of Roman Republic. 12½

3. Analyse the contributions of Romans to the human civilisation. 12½

4. Discuss the teachings of Jesus Christ and spread of Christianity in Rome. 12½

5. Give an account of the crisis and decline of Roman Empire. 12½

6. State the merits and demerits of Feudalism. 12½

7. Describe the life and teachings of Prophet Mohammad. 12½

8. Narrate the causes and consequences of crusade wars from 11th Century to 13th Century. 12½

9. Throw light on the urbanisation and trade during middle age. 12½

Group - B

2. Write a note on the evolution and growth of Roman Republic. 12½

3. Analyse the contributions of Romans to the human civilisation. 12½

4. Discuss the teachings of Jesus Christ and spread of Christianity in Rome. 12½

5. Give an account of the crisis and decline of Roman Empire. 12½

6. State the merits and demerits of Feudalism. 12½

7. Describe the life and teachings of Prophet Mohammad. 12½

8. Narrate the causes and consequences of crusade wars from 11th Century to 13th Century. 12½

9. Throw light on the urbanisation and trade during middle age. 12½
Group - B

2. Bring out the relationship between Social Change Social Evolution and Social Progress. 12½

3. Write a short essay on Social Evolution. 12½

4. Critically examine the cyclical theory of social change. 12½

5. Discuss how technology brings out social change. 12½

6. Analyse the indicators of Social Development. 12½

7. Answer in brief, the meaning and theory of Economic Growth. 12½

8. Analyse the capitalist models of development. 12½

Group - A

1. Answer any four of the following: 7½ × 4
   a) Define social progress and discuss its features.
   b) Write a short essay on social development.
   c) Analyse evolutionary theory in brief.
   d) Discuss how ideological factor brings social change.
   e) Bring out the relationship between economic factor and social change.
   f) Write a short note on Human Development Index.
   g) Discuss factors favouring economic growth.
   h) Mention the characteristics of socialistic models of development.
### Group - B

1. तुल्यायम् प्रयत्नं सत्याग्यम्-सूत्र व्याख्या कुरुत। 12½

2. अणुदित् सर्वस्यम् चाप्रत्ययः-सूत्रव्याख्या कुरुत। 12½

3. येनविविष्टदन्तस्य-सूत्रव्याख्या कार्यः। 12½

4. इत्यक्ष्या, वचनविलक्षणं-छदमं सोदहरणं लक्षणं लिखत। 12½

5. मन्त्रक्षणं, अस्तुनु-छदमं लक्षणं सह उद्दाहरणं संगमयत। 12½

6. गणपथ आयामयोः परिचयं दैयत। 12½

7. पूर्वाखसिद्धम् इति सूत्रस्य व्याख्या कार्यः। 12½

### Group - A

1. अधोलिखितेऽपि केषाभित्रं चतुर्वास्मात्तं दैयत : 7½ × 4

   क) अभ्यासः - टिप्पणीं लिखत।

   ख) आदेशः - टिप्पणीं लिखत।

   ग) आदि-स्मृत्यें सहेता - सूत्रं व्याख्यात।

   घ) उपदेष्टेऽरज्ञानसिके इतं - सूत्रं व्याख्यात।

   ङ) अश्वाभ्यायी - टिप्पणीं लिखत।

   च) सार्वधातुकः - टिप्पणीं लिखत।

   छ) बृहदेशदेव - सूत्रं व्याख्यात।

   ज) हलन्त्यम् - सूत्रं व्याख्यात।
2017

Full Marks - 80
Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer all questions

1. निम्नलिखित पद्धारों में से किन्हीं बें की समस्या व्याख्या कीजिए : 8 x 2

क) यदि वे चलते आधे है इतना,
   तो दो घंटे उसको आ कितना ?
   क्या भारी वह मुझको जितना ?
   पीठ उन्होने फेरी ।
   रे मन, आज परीक्षा तेरी ।

ख) जो गप्पी-बूढ़ी शी भरक में समृति सी छाई,
   दुर्दिन में आँख झुक बनकर वह आज बसका आई ।
   रो-रो-कर सिसक-सिसक कर कहता में करण कहानी
   तुम सुपन नोहते सुनते कहते जाती अनजानी ।।

ग) चाट रहे झुटी पतल बे कभी सड़क पर खड़े हुए ।
   और झपट लेने को उससे कुत्ते भी अड़े हुए ।
ठहरो, अहो मेरे हनुमान ये है अमृत, मैं सौंच दूँगा
अभिमन्यु जैसे हो सकोगे तुम
tुम्हारे दुःख मैं अपने हनुमान ये खींच लूंगा ।

घ) विस्तृत नभ का कोई कोना,
मेरा न कभी अपना होगा,
परिचय इतिहास यही
उमड़ी कल थी मिट आज चली ।

2. निम्नलिखित प्रश्नों में से किन्हीं चार के उत्तर लिखिए : 12½×4

क) ‘पवन-दूतिका’ कविता का भावार्थ स्पष्ट कीजिए ।

ख) ‘ले चल मुझे भुजला’ कविता कहाँ और क्यों जाने की बात करते हैं- स्पष्ट कीजिए ।

ग) पत्थर कविता के आधार पर भिक्षुक की दीन दशा पर प्रकाश दालिए ।

घ) ‘प्रथम रंगिन’ कविता का सारमर्म अपने शब्दों में लिखिए ।

ड) ‘मधुमय देश’ कविता के आधार पर प्रसाद जी के देशाय्रों को स्पष्ट कीजिए ।

3. टिपणी लिखिए (किन्हीं एक) 1 × 6

क) आँसू कविता का उद्देश्य ।

ख) सिराजुल इलाम चेतना ।

ग) ताज कविता का उद्देश्य ।

4. अति संक्षिप्त उत्तर दीजिए : (किन्हीं आठ) ।

क) पवन दूतिका’ प्रसंग में कौन किसे अपना संदेश भिजवाती है ।

ख) भारत भारती’ किसकी रचना रही ।

ग) आँसू किस तरह का कार्य है ।

घ) ‘मधुमय देश’ कविता किसने गाया था ।
[ 2 ]

**Group - B**

2. Define primate? Discuss the origin and radiation of special reference to Ramapithecus period. 9

3. Discuss the distribution and features of Miocene hominoids. 9

4. Elaborate write on the distribution and characteristic features of Australopithecine. 9

5. Give an account of Homo erectus from Europe with an example. 9

6. Briefly discuss the fossil evidence of Archaic Homo Sapiens. 9

7. Write notes on the distribution and feature of the modern humans. 9

8. Write details about hominisation process. 9

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**Group - A**

1. Write short notes on any four of the following. \(7\frac{1}{2} \times 4\)

   a) Miocene hominoids
   
   b) Characteristics of Ramapithecus.
   
   c) Homo Habils
   
   d) Phylogenetic relationship of Australopithecines
   
   e) Homo erectus
   
   f) Homo Sapiens
   
   g) Fossil evidence of Neanderthals
   
   h) Origin of Modern human.
Group - B

2. Define Oceanography and discuss its scope. 9

3. Give a brief account of the bottom relief of the Atlantic Ocean. 9

4. Describe the factors affecting salinity of the ocean water. 9

5. Write the horizontal distribution of temperature of oceans. 9

6. Discuss the subsidence theory regarding the formation of coral reefs. 9

7. Explain the formation of tides. 9

8. Elaborate the currents of Indian ocean during Summer season. 9

Group - A

1. Answer any four of the following: 6 × 4
   a) Major branches of Oceanography
   b) Hypsometric curve
   c) Continental shelf
   d) T-S diagram
   e) Neritic deposits
   f) Barrier reef.
   g) Neap tide
   h) Bumboldt current.
Group - A

1. Answer any four of the following: 6 \times 4
   a) Discuss the important characteristics of teaching.
   b) Explain what is learning.
   c) What are the variables of teaching.
   d) Give five principles of teaching.
   e) Explain child centered approach in teaching.
   f) What is the significance of the maxims concerning teaching.
   g) State the Herbartian steps of designing lesson plan.
   h) What are the different types of teaching theories.

Group - B

2. Define teaching. Discuss the relationship between teaching and learning. 9

3. Discuss the different phases of teaching task. 9

4. Discuss Gagne's heirarchical theory of teaching. 9

5. Describe the different maxims of teaching. 9

6. Explain the Analytic and synthetic methods of teaching with examples. 9

7. Discuss the various steps involved in the problem solving method of teaching. 9

8. Define Teaching task. State the various levels of teaching task. 9
II-UG-Ps y(CC)-IV

2017

Full Marks - 60
Time - 3 Hours

The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Answer any four of the following : 6 × 4
   a) Briefly discuss the multiple intelligences identified by Gardner.
   b) Discuss different cultural issues in testing intelligence.
   c) Discuss the salient features of social cognitive theory of personality.
   d) What do you mean by personality topology ?
   e) Evaluate Maslow's theory of motivation.
   f) Point out the limitations of James-Lange theory of emotion.
   g) Write notes on :
      i) Social Cognition
      ii) Subjective well being.

Group - B

2. Briefly discuss the nature-nurture controversy in intelligence. 9

3. Critically examine Sternberg's triarchic theory of intelligence. 9

4. Discuss the main features of Freud's psychoanalytic theory of personality. 9

5. What is a projective technique ? Discuss the advantages and disadvantages of two projective tests which assess personality. 9

6. Critically evaluate Arousal and Expectancy theories of motivation. 9

7. Elaborate Cannon-Bard theory of emotion. 9

8. How attribution process is helpful in understanding the causes of behaviour. 9

9. Define positive psychology. Discuss the scope and goals of positive psychology. 9
ii) Show that m.g.f. of sum of a number of independent random variables is equal to the product of their respective moment generating functions (m.g.f.)

6. Stating all the conditions clearly prove that poisson distribution is a limiting case of binomial distribution and hence find its mean.

7. i) Define negative binomial distribution and hence find its mean and variance.

   ii) Describe geometric distribution and explain why it is said to lack of memory.

8. i) With usual notation, find p for a binomial variate x, if n = 6 and 9 p (x = 4) = p (x = 2)

   ii) If $x_1$ and $x_2$ are two independent poisson variates with parameters $\lambda_1$ and $\lambda_2$ respectively then show that $x_1 + x_2$ is also a poisson variate hence find mean of $x_1 + x_2$
the college is 0.3. The probabilities of Mr. B and Mr C doing the same are respectively 0.5 and 0.8.

i) What is the probability that there will be co-education in the college.

ii) If there will be co-education in the college, what is the probability that Mr. C is the principal.

e) The joint probability distribution of two random variables X and Y is given as

\[
P(X = 0, Y = 1) = \frac{1}{3}, P(X = 1, Y = -1) = \frac{1}{3} \quad \text{and} \quad P(X = 0, Y = 1) = \frac{1}{3}.
\]

Find marginal distribution of X and Y.

f) Define distribution function of a random variable and state its important properties.

g) state and prove additioin law of mathematical expectation.

h) If X is a bionomial variable with parameters n and p then derive the probability mass function of X.

**Group - B**

Answer any four of the following.

2. i) Define probability by axiomatic approach.

   ii) With suitable examples differentiate between mutually exclusive and independent events.


4. If \( P(A) = p_1, P(B) = p_2 \) and \( P(A \cap B) = p_3 \) then express the following in terms of \( p_1, p_2, p_3 \), \( (p_1, p_2, p_3) > 0 \)

   i) \( P(\overline{A} \cap B) \)

   ii) \( P(A \cap \overline{B}) \)

   iii) \( P(B / A) \)

5. i) Define moment generating function(mgf) and explain why it is called so.
The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Answer any four of the following. 7½ × 4
   a) Distinguish between Cost Accounting and Management Accounting.
   b) Explain the concept of Economic Ordering Quantity.
   c) Distinguish between Time keeping and Time Booking.
   d) Explain the concept of Idle time.
   e) Distinguish between allocation and apportionment of overhead.
   f) What are the main features of job costing? Name four types of business where job costing would be appropriate.
   g) Explain abnormal gain and abnormal loss and state how they should be dealt within process Cost Accounts.

8. From the following particulars calculate:
   a) Total material cost variance
   b) Material price variance
   c) Material usage variance.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Standard</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Price (Rs.)</td>
</tr>
<tr>
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<td>1010</td>
<td>1.00</td>
</tr>
<tr>
<td>B</td>
<td>410</td>
<td>1.50</td>
</tr>
<tr>
<td>C</td>
<td>350</td>
<td>2.00</td>
</tr>
</tbody>
</table>
h) Distinguish between Fixed budget and Flexible budget.

**Group - B**

2. What are the advantages of Cost Accounting. 12½

3. From the following information prepare a cost sheet for the month of January 2017.

   Raw material consumed 91,000
   Direct wages 29,000
   Direct expenses 10,000
   Works overhead 80% of Direct wages
   Administrative overheads 10% of works cost
   Selling and distribution overheads Rs. 2 per unit sold

   Units produced and sold during the year 50,000 units.
   Find the selling price per unit charging 20% profit on sales. 12½

4. Explain the different methods of pricing material issues. 12½

5. "The perpetual inventory system is an integral part of material control". Discuss the statement bringing out clearly the salient features of the system. 12½

6. The profit as per Cost Accounts is Rs. 1,50,000. The following details are ascertained on comparison of cost and financial accounts.

<table>
<thead>
<tr>
<th>Cost Account</th>
<th>Financial Accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Rs)</td>
<td>(Rs)</td>
</tr>
<tr>
<td>a) Opening stock :</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
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</tr>
<tr>
<td>Finished goods</td>
<td>18,000</td>
</tr>
<tr>
<td>b) Closing stocks :</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>12,000</td>
</tr>
<tr>
<td>Finished goods</td>
<td>20,000</td>
</tr>
<tr>
<td>c) Interest charged but not paid Rs. 10,000</td>
<td></td>
</tr>
<tr>
<td>d) Preliminary expenses written off Rs. 500</td>
<td></td>
</tr>
<tr>
<td>e) Goodwill written off Rs. 1,500</td>
<td></td>
</tr>
<tr>
<td>f) Indirect expenses charges in financial accounts Rs. 80,000 but Rs. 75,500 recorded in Cost Accounts.</td>
<td></td>
</tr>
</tbody>
</table>

   Find out the financial profit by preparing a reconciliation statement.

7. As on a particular date, the account of contract undertaken by Biswal & Co., presented the following expenditures.

   Rs.
   Materials purchased 1,30,000
   Materials issued from store 25,000
   Plant purchased 80,000

V-258
7. i) A firm has the total cost (TC) function
   \[ TC = 7q^2 + 5q + 120 \]
   and the demand function
   \[ P = 180 - 0.5q, \]
   find profit maximising output and price. 6½

   ii) Write on 'Necessary' and 'Sufficient' conditions for an extreme value of a function
   \[ u = f(x, y). \] 2½

   iii) \[ R = 30Q - Q^2 \] and \[ C = 20 + 4Q \] where 'R' is total revenue, 'C' is total cost and 'Q' is output. Find equilibrium output of the firm. 3½

8. i) Using Lagrange Multiplier find the value of
   \[ z = xy \]
   subject to \[ x + 2y = 2. \] 4

   ii) Write a note on Bordered Hessian determinant. 3

   iii) Show that \[ y_t = t + c \] is a solution of \[ y_{t+1} - y_t = 1. \]
   Also find a particular solution if \[ y_0 = 2 \] when \[ t = 0. \] 5½

1. Answer any four of the following. 7½ × 4

   a) Provide a solution to the three sector closed input-output model. Point out its assumptions.

   b) Discuss Domar's 'Capital Expansion Model'.

   c) State the conditions of equilibrium in the 'Cobweb' model with different slopes of demand and supply curves.

   d) i) Define Hawkins-Simon Condition.
   ii) Describe Input-Output transaction matrix.

   e) Optimise \[ u = xy^{1/2} \]
   subject to constraint \[ 4x + y = 48 \]

   f) Solve the differential equation:
   \[ y(1-x) - x \frac{dy}{dx} = 0 \]
g) \( y = x^4 - 4x^3 + 16x \), show the points of inflexion and change in the curvature of the curve.

h) i) Find \( \frac{dy}{dx} \) of the function \( x^2y + y - 2x = 0 \)

ii) Find \( \frac{dy}{dx} \) of the function \( y = \frac{x^2 + y}{x + 2} \)

**Group - B**

2. Given:

\[
A = \begin{bmatrix} 0.1 & 0.3 & 0.1 \\ 0 & 0.2 & 0.2 \\ 0 & 0 & 0.3 \end{bmatrix}
\]

final demands are \( F_1 \), \( F_2 \) and \( F_3 \). Find the output levels consistent with the input-output model. What will be the output levels if \( F_1 = 20 \), \( F_2 = 0 \) and \( F_3 = 100 \)?

3. i) Solve the differential equation:

\[(x + y) + (y - x) \frac{dy}{dx} = 0.\]

ii) Write all the derivatives of the function \( y = x^3 - 5x^2 + 7 \) and then find \( f'(1) \) and \( f''(2) \).

4. i) Examine the curve \( y = x^3 - 3x^2 - 9x + 6 \) for convexity and the point of inflexion.

ii) Examine the function \( y = 2x^2 - x^3 \) for its maximum and minimum.

5. i) Find the total differential of \( z = \frac{x}{x + y} \)

ii) Find the First and Second-Order differentials of the function \( u = xy \).

iii) Find \( \frac{dy}{dx} \) of \( 2x^2 + 6xy + y^2 - 18 = 0 \).

6. i) Given \( y = x^5 + 5x^3 + 5 \), find the extreme values of \( y \), if any, where \( x \) is assumed to be a real variable.

ii) Given a demand function \( P = \frac{36}{q - 36} + 12 \), where \( P \) is the price and \( q \) is the quantity, find the maximum revenue \( R = pq \).
The figures in the right-hand margin indicate marks
Answer all questions

1. "All Contracts are Agreements but all Agreements are not Contracts". Discuss the statement explaining the essential elements of a valid contract. 16

OR

a) 'A' made a proposal to 'B' post. B died before the letter reached him. B's son accepted the proposal. Is A bound by the acceptance? 4

b) A an infant obtains a loan from B by falsely representing his age. B seeks to recover the loan from A. Discuss. 4

c) A young widow was forced to adopt a boy under the threat of preventing the body of her husband, who died, from being removed for cremation. Is the adoption valid? 4
d) A owes B Rs 1,000, but the debt is barred by limitation. A gives a letters to B agreeing to pay him Rs 500 on account of the debt. Is it a valid agreement?

4

2. a) What is Bailment? Discuss the rights and duties of bailor.

4 + 12

OR

b) State the ways in which a contract may be said to be discharged.

16

3. a) Discuss the rights of an unpaid seller.

16

OR

b) Define 'Condition' and 'Warranty'. Point out the differences between the two. Under what circumstances can a breach of condition be treated as a breach of warranty.

4 + 6 + 6

4. a) Define a cheque. Discuss its features.

8

b) Distinguish between cheque and Bill of exchange.

8

OR

c) Distinguish between a 'holder' and a 'holder in due course'. Explain the privileges granted to a 'holder in due course' under the Negotiable Instrument Act.

8 + 8

5. a) State the important uses of Consumer Protection Act, 1986 for its consumer.

16

OR

b) What is Memorandum of Association? Discuss its contents.

16
b) Find the differential coefficient of the following w. r. t. x

i) \[ y = \frac{3x+4}{e^x+2} \]

ii) Find \( \frac{dy}{dx} \) of the implicit function, \[ x^2 - y^2 + 3x = 4y. \]

5. Evaluate the integrals

a) \[ \int (2x + 3)^3 \, dx \]

b) \[ \int \sqrt{3x+5} \, dx \]

OR

c) Evaluate, \[ \int \frac{3x+4}{6x+7} \, dx \]

d) Evaluate, \[ \int x^4 (\log_e x)^2 \, dx. \]
2. a) Solve the following equations by Cramer's rule.
   \[2x - 3y + 5z = 11\]
   \[3x + 2y - 4z = -5\]
   \[x + y - 2z = -3\]

   OR

   b) Express:
   \[
   \begin{bmatrix}
   1 & 3 & 5 \\
   -6 & 8 & 3 \\
   -4 & 6 & 5
   \end{bmatrix}
   \]
   as a sum of symmetric and skew symmetric matrices.

3. a) If \( f(x) = \frac{x}{x - 1} \)

   Prove that \( \frac{f(x)}{f(x + 1)} = f(x^2) \)
3. Write notes on any two of the following: $8 \times 2$
   a) Role of Civil Society in developing countries
   b) Radical Feminism
   c) Nature of multiculturalism
   d) What is Political Development.

1. a) What is Civil Society? Examine the classical view of Civil Society. 12
    
    OR

    b) Discuss in brief the origin of Feminism and examine the liberal view of Feminism.

2. a) What do you mean by multiculturalism? Examine the human development and human Rights in the situation of multiculturalism. 12
    
    OR

    b) Discuss the Lucian Pye view of Political Development.
1. Answer any four of the following.
   a) Calculate the resultant by graphical method of two collinear harmonic oscillations having the same frequency but differing in phase. 6
   b) i) Distinguish between longitudinal and transverse waves. 2
        ii) Establish general wave equation for a travelling wave. 4
   c) Derive an expression for velocity of transverse vibrations of stretched string. 6
   d) i) Write a short notes on normal modes of stretched strings. 4
ii) Discuss the properties of wave front.

e) Explain the difference between interference by division of wave front and by division of amplitude giving suitable examples.

f) i) Explain how interference fringes are formed by a thin wedge-shaped film, when examined by normally reflected light.

ii) Find the expression for fringe width

g) i) Write Fresnel-Kirchhoff’s integral formula in diffraction.

ii) Discuss its equivalence to Huygens Fresnel equation.

h) i) Distinguish between holography and photography.

ii) How is hologram produced.

**Group - B**

2. Find the expression for the resultant motion of a particle subjected to two perpendicular harmonic oscillators of the same period but of different amplitudes and phases. Find the paths for different important cases.

3. Define and derive expressions for phase velocity and group velocity. Derive a relation between the two velocities.


5. Describe the principle, construction and working of Michelson interferometer. Compare it with Fabry-Perot interferometer.

6. Discuss the pattern obtained in Fraunhofer diffraction for a circular aperture. How is the resolving power of optical instrument affected by such diffraction.

7. Show that the radii of half period zones of a zone plate are proportional to the square root of natural numbers. Derive an expression for its focal length.

8. Discuss the formation of Newton's rings with necessary theory and diagram. How does it help to measure wavelength of light?
The figures in the right-hand margin indicate marks.

Answer five questions including Q.No. 1 which is compulsory.

Group - A

1. Answer any four of the following.
   a) Distinguish between:
      i) Isothermal and adiabatic process.
      ii) Reversible and irreversible process
      iii) Open and closed system.
   2
   b) What do you mean by isotonic solution.  2

2. a) What are the laws of osmotic pressure? Derive an expression for calculating the osmotic pressure of a solution containing non volatile solute.  3 + 4
   b) What do you mean by isotonic solution.  2

3. a) Discuss the application of Le-Chatelier's principle to the following reactions in equilibrium.
   i) \( \text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g), \Delta H = -22.08 \text{ KCal} \)
   ii) \( 2\text{HI}(g) \rightleftharpoons \text{H}_2(g) + \text{I}_2(g), \Delta H = -X \text{ KCal} \)
   b) Explain the concept of fugacity.  3
   c) The vapour pressure of a solution is always lower than that of the pure solvent. Explain.  2

4. Calculate the entropy change involved in the isothermal reversible expansion of 5 moles of an ideal gas from a volume of 10 liters to a volume of 100 litres at 100K.  3

5. Derive thermodynamically the relation between depression in freezing point of a solution and the molecular mass of the non volatile solute.  9

6. a) Write three different statements of second law of thermodynamics.  3
   b) What is the thermodynamic scale of temperature.  3
   c) Calculate the entropy change involved in the isothermal reversible expansion of 5 moles of an ideal gas from a volume of 10 liters to a volume of 100 litres at 100K.  3

7. Derive thermodynamically the relation between depression in freezing point of a solution and the molecular mass of the non volatile solute.  9

8. a) What are the laws of osmotic pressure? Derive an expression for calculating the osmotic pressure of a solution containing non volatile solute.  3 + 4
   b) What do you mean by isotonic solution.  2

9. a) Discuss the application of Le-Chatelier's principle to the following reactions in equilibrium.
   i) \( \text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g), \Delta H = -22.08 \text{ KCal} \)
   ii) \( 2\text{HI}(g) \rightleftharpoons \text{H}_2(g) + \text{I}_2(g), \Delta H = -X \text{ KCal} \)
   b) Explain the concept of fugacity.  3
   c) The vapour pressure of a solution is always lower than that of the pure solvent. Explain.  2
Prove that the entropy of a system and surrounding increases in an irreversible process but remains constant in a reversible process.  

ii) State third law of thermodynamics.  

What are equilibrium constants $K_p$ and $K_c$? Derive the relation between $K_p$ and $K_c$.  

Define Osmosis and osmotic pressure. What is colligative property? Prove that osmotic pressure a colligative property.  

Group - B  

2. a) Define and explain intensive and extensive properties with examples of each.  

b) For a gas $C_p = 8.58$. Two moles of the gas are expanded adiabatically from an initial temperature of $20^\circ C$ to a final temperature of $–45.4^\circ C$. Calculate the work done.  

c) What is meant by enthalpy of combustion.  

3. a) The heat of combustion of ethyl alcohol is $–330$ KCal. If the heat of formation of $CO_2(g)$ and $H_2O(l)$ be $–94.3$ KCal and $–68.5$ KCal respectively. Calculate the heat of formation of ethyl alcohol.  

b) State and explain the first law of thermodynamics.  

4. a) Derive an expression for entropy change for an ideal gas when the temperature changes from $T_1$ and $T_2$ the volume changes from $V_1$ to $V_2$.  

b) Derive the thermodynamic relation  

i) $\left( \frac{\partial G}{\partial T} \right)_p = -S$  

ii) $\left( \frac{\partial G}{\partial T} \right)_p = V$  

5. Define Gibb's free energy $(G)$ and work function $(A)$. Derive Gibb's Helmholtz equation in terms of internal energy and work function.  

6. a) What is residual entropy? Explain with suitable examples.  

b) How does free energy change explain spontaneity of a reaction.
Group - B

2. Give an account of reproduction in Selaginella.

3. Discuss the morphological nature of sporocarp in Marsilea.

4. Give an account of the life cycle of Equisetum showing alternation of generations.

5. Describe the life history of cycas with economic importance.

6. Discuss the morphology and anatomy of pinus with ecological importance.

7. Discuss the morphology, anatomy and affinities of Lepidodendron.

8. Give an account of morphology, anatomy and affinities of cycadeoidea.

Group - A

1. Write short notes any four of the following: 6 × 4
   a) Marchantia thallus
   b) Sporophyte of Riccia
   c) Geographical time scale.
   d) Apogamy and Apospory
   e) Telome theory
   f) Male gametophyte of cycas
   g) Needle of Pinus.
   h) Stem of Lepidodendron.
2. Describe the physiology of digestion and absorption of protein. 9

3. Give an account of Carbon dioxide transport in the blood. 9

4. Explain the mechanism of Urine formation in man. 9

5. Describe the components of blood and their functions. 9

6. Define cardiac cycle. Discuss the various events of cardiac cycle in man. 9

7. Describe the histology of lung and explain the mechanism of pulmonary ventilation. 9

8. Give an account of Coagulation of blood and add a note on Coagulating factors. 9

2017
Full Marks - 60
Time - 3 Hours
The figures in the right-hand margin indicate marks
Answer five questions including Q.No. 1 which is compulsory.
Gives suitable diagrams wherever necessary.

Group - A

1. Write short notes any four of the following: 6 × 4
   a) Water soluble Vitamins.
   b) Gastro-intestinal hormones.
   c) Buffering action of blood.
   d) Haemoglobin.
   e) Regulation of acid-base balance.
   f) Blood pressure and its regulation.
   g) Electrocardiogram.
   h) Internal structure of human heart.
8. a) Represent the polynomial in the linked list:
   \[ 3x^2yz - 3xy^5 - 9 \]
   
   b) Write the limitations of Static Linear Queue. How it can be overcome? Write the Algorithms for insertion in Circular Queue.

V-263-0.8
f) Evaluate the expression in POSTFIX:
   \((3*(16 + 2)–12/6)\)

g) Discuss Garbage Collection and compaction.

h) Define Data Structure. Categorize it. Write down its operations.

**Group - B**

2. a) Write down PUSH () and POP () algorithm.

   b) Convert the INFIX to PREFIX:
   \((A+B*E* (M*N^P+T) – G + H)\)

3. a) Differentiate Linked List from Array.

   b) Convert the INFIX to POSTFIX:
   \((A+B*E* (M*N^P+T) – G + H)\)


   b) Write algorithms for insertion and deletion of binary search tree.

5. a) Differentiate double linked list from single linked list.

   b) Write algorithms for Insertion and Deletion of Queue.

6. a) Construct the tree where POSTORDER:
   HIDJEBFGCA & INORDER: HDIBJEAFCG

   b) Write short notes on:
   i) De-allocation
   ii) Application of Queues
   iii) Application of Stacks.

7. a) Construct the tree where PREORDER:
   ABDEFCGHJLK & INORDER: DBFEAGCLJHK.

   b) Write down the different algorithms for deletion of double linked list.
g) Mention the statistical books maintained by a company.

h) What are the functions of a Depository participant.

**Group - B**

2. Discuss the characteristics of a company. 12½

3. Discuss the characteristics and functions of a promoter. 12½

4. What are the provisions of law relating to issue of bonus shares. 12½

5. What is Annual General Meeting? State the legal provisions calling of such meeting. 12½

6. What is Memorandum of Association? How is it different from Articles of Association? 12½

7. State the provisions of law relating to appointment and remuneration of Company Auditor. 12½

8. What is Depository? Examine the important features of Depositories Act, 1996. 12½

**Group - A**

1. Answer any **four** of the following: 6 x 4

   a) Write a note on Registrar of companies.

   b) What are the provisions of the Companies Act, relating to Government company.

   c) Write a note on 'buy back' of shares.

   d) Distinguish between transfer and transmission of shares.

   e) Discuss the provisions of law relating to qualification shares of a company director.

   f) Under what circumstances a person can not be appointed as the Director of a company.
g) Mention the statistical books maintained by a company.

h) What are the functions of a Depository participant.

**Group - B**

2. Discuss the characteristics of a company. 12½

3. Discuss the characteristics and functions of a promoter. 12½

4. What are the provisions of law relating to issue of bonus shares. 12½

5. What is Annual General Meeting? State the legal provisions calling of such meeting. 12½

6. What is Memorandum of Association? How is it different from Articles of Association? 12½

7. State the provisions of law relating to appointment and remuneration of Company Auditor. 12½

8. What is depository? Examine the important features of Depositories Act, 1996. 12½
2017

Full Marks - 60

Time - 3 Hours

The figures in the right-hand margin indicate marks

Answer five questions including Q.No. 1

which is compulsory.

Group - A

1. Answer any four of the following : 6 × 4

   a) Solve : \((2x - 4y + 5) \, dy + (x - 2y + 3) \, dx = 0\)

   b) Solve : \(x \left( \frac{dy}{dx} \right) + y = y^2 \log x\)

   c) Solve : \(y = 3px + 4p^3\).

   d) Solve the following initial value problem:

      \(x^2 y'' - 3 xy' + 4 y = 0 \; ; \; y(1) = 1, y'(1) = 5\)

   e) Find the particular integral of

      \((D^3 + 1)y = e^{x} \cos x + \sin 3x\)
f) Find the general solution of the following:
\[(1 + x^2) y'' - 2xy' + 2y = \frac{1-x^2}{x}\]
g) If \(m\) is a positive integer, then prove that
\[J_{-m}(x) = (-1)^m J_m(x)\]
h) Find the Laplace transform of \(t e^{-2t} \sin t\).

Group - B

2. Solve the initial value problem
\[x^2 \frac{dy}{dx} + 2xy - x + 1 = 0, \quad y(1) = 0\]

3. Solve by method of variation of parameter
\[(D^2 - 2D + 5)y = e^x \tan 2x\]

4. Solve:
\[(x^2D^2 -xD + 2)y = x \log x\]

5. Find the power solution of the differential equation
\[x^2 y'' + xy' + (x^2 - 1)y = 0\]

6. Solve:
\[y = px + \frac{a}{p^2}\]

7. Solve:
\[(D^4 + 2D^2 + 1)y = x^2 \cos x\]

8. Use Laplace transform to solve
\[y'' - 2y' - 3y = 0, \quad y(0) = 1, \quad y'(0) = 7\]
Group - B

2. Describe construction and principle of Nicol Prism. Add a note on its uses. 9

3. Describe geochemical classification of elements. 9

4. Give an account of cosmic abundance of elements. 9

5. Describe structure and composition of the atmosphere. 9

6. Write an essay on geochemical cycle. 9

7. Give an account of different types of meteorites. Add a note on their composition. 9

8. What is extinction? Write a note on extinction angle. 9

Group - A

1. Write note on four of the following: 6 × 4
   a) Double Refraction
   b) Optic Axis
   c) Pleochroism
   d) Isotropism and Anisotropism
   e) Interference colour.
   f) Uniaxial Interference figure
   g) Isomorphism and Polymorphism
   h) Atomic substitution.