2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on <u>any five</u> of the following in 2–3 sentences each.

    [2 × 5

    (a) Ecosystem

    (b) Population

    (c) Ecological pyramids

    (d) Consumers

    (e) Niche concept

    (f) Precipitation types of water

    (g) Horizons of soil profile

GROUP - B

*Answer **ALL** questions.*

2. What is ecology ? Write the various components of environment.

    [10

OR

Write notes on the following.   [5 × 2

(a) Autecology

(b) Levels of organisation

3. Give an account of formation, composition and various compo-
    nents of soil.   [10

OR

Write notes on the following.   [5 × 2

(a) Hydrological cycle

(b) Adaptations of plant to fire

4. Define ecological succession. Describe causes and types of suc-
    cession.   [10

OR

Write notes on the following.   [5 × 2

(a) Ecotone and Edge effect

(b) Age pyramids

5. What is Biogeochemical cycle ? Describe Carbon and Nitrogen
    cycles.   [10

OR

Write notes on the following.   [5 × 2

(a) Food webs

(b) Models of energy flow

6. What is Phytogeography ? Write an account of basic principles of
    geographical distribution of plants.   [10

OR

Write notes on the following.   [5 × 2

(a) Endemism

(b) Tundra Biome

2019

Time - 3 hours

Full Marks - 60

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on <u>any five</u> of the following in 2–3 sentences each.

[2 × 5

   (a) Any two important herbaria of India

   (b) Numerical taxonomy

   (c) Homology

   (d) Phylogenetic system of classification

   (e) Parallelism

   (f) Principle of Priority

   (g) Taxonomic evidences from Phytochemistry

GROUP - B

*Answer **ALL** questions.*

2. What is Botanical garden ? Write a brief about Botanical gardens in India and world.   [10

OR

Write notes on the following. [5 × 2

(a) Virtual Herbarium

(b) Functions of Herbarium

3. What is Botanical Nomenclature ? Describe the principles and rules of Internationl Code of Botanical Nomenclature. [10

OR

Write notes on the following. [5 × 2

(a) Species Concept

(b) Taxonomic heirarchy

4. Discuss the Engler and Prantl system of classification. Point out its merits and demerits. [10

OR

Write notes on the following. [5 × 2

(a) APG III classification

(b) Cronquists system of classification

5. What is Cluster analysis ? Discuss in brief the various types of clustering. [10

OR

Write notes on the following. [5 × 2

(a) Biometrics

(b) Cladistics

6. Write an essay on Origin and Evolution of Angiosperms. [10

OR

Write notes on the following. [5 × 2

(a) Clades

(b) Paraphyly

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on <u>any five</u> of the following in 2–3 sentences each.

   [2 × 5

   (a) Contribution of W. A. Jensen

   (b) Structure of dicot seed

   (c) Endosperm

   (d) In vitro pollination

   (e) Microgametogenesis

   (f) Pollen viability

   (g) Types of ovule

   (h) Palynology

GROUP - B

*Answer **ALL** questions.*

2. Write contributions of any two Botanists in Reproductive Biology of Angiosperms.

[10

OR

Write notes on the following.   [5 × 2

(a) NPC system

(b) Storage and germination of pollen

3. Describe the process of Megasporogenesis.   [10

OR

Write notes on the following.   [5 × 2

(a) Endothelium

(b) Organisation and ultrastructure of mature embryo sac

4. Describe the development of dicot embryo.   [10

OR

Write notes on the following.   [5 × 2

(a) Types of Embryogeny

(b) Types of Endosperm

5. What is pollination ? Describe the various types of pollination and its significance.   [10

OR

Write notes on the following.   [5 × 2

(a) Self incompatibility

(b) Fertilization

6. Describe the structure and dispersal mechanisms of seeds.

[10

OR

Write notes on the following.   [5 × 2

(a) Apomixis

(b) Biolistic germline transformation

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on <u>any five</u> of the following.   [2 × 5

    (a) Amino acids

    (b) Glycogenolysis

    (c) Ketogenesis

    (d) Transamination

    (e) Buffer

    (f) Steroids

    (g) Competitive inhibition of enzyme action

GROUP - B

*Answer **ALL** questions.*

2. Describe the structure and properties of proteins.   [10

[2]

OR

Write notes on <u>any two</u> of the following.   [5 × 2

(a) Polysaccharides

(b) Spectroscopy

(c) Chromatography

3. Discuss various steps of glycolysis. Give the end-products and energetics of this pathway.   [10

OR

Write notes on <u>any two</u> of the following.   [5 × 2

(a) Pentose phosphate pathway

(b) Glycogenesis

(c) Citric acid cycle

4. Discuss β-oxidation of fatty acids with even number of carbon atoms.   [10

OR

Write notes on <u>any two</u> of the following.   [5 × 2

(a) Fate of ketone bodies in body

(b) Regulation of ketogenesis

(c) β-oxidation of fatty acids with odd carbon atoms

[3]

5. Write an essay on catabolism of amino acids.   [10

OR

Write notes on <u>any two</u> of the following.   [5 × 2

(a) Urea cycle

(b) Ketogenic amino acids

(c) Oxidative deamination

6. Describe mechanisms of action of enzymes.   [10

OR

Write notes on <u>any two</u> of the following.   [5 × 2

(a) pH

(b) Allosteric enzymes

(c) Michaelis-Menten derivation

OR

Describe about various processes involved in transport of substances across the membrane.

3. Give an account on structure and functions of golgi apparatus.

[10

OR

What is semi-autonomous nature of mitochondria ? Explain chemi-osmotic hypothesis in relation to mitochondria.

4. Give an account on ultrastructure of nucleus and its functions.

[10

OR

Briefly describe about structure of chromosomal DNA and its packaging.

5. What is cell cycle ? Explain mitotic cell cycle in detail.   [10

OR

What are signalling molecules ? Give an account on the mechanism of extracellular signalling.

6. Explain various stages of development of cancer leading to metastasis.

[10

OR

Explain mechanism of intrinsic (mitochondrial) pathway of Apoptosis.

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on <u>any five</u> of the following   [2 × 5

    (a) Plasmodesmata

    (b) Peroxisomes

    (c) Nuclear pore complex

    (d) Apoptosis

    (e) Types of cell signalling

    (f) Prions

    (g) Nucleolus

GROUP - B

*Answer **ALL** questions.*

2. Give a detailed account of a prokaryotic cell and function of its organelles.
[10

2019

Time - 3 hours

Full Marks - 60

Answer ***both groups*** *as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write short notes on <u>any five</u>.   [2 × 5

   (a) Lethal alleles

   (b) Significance of linkage

   (c) Aneuploidy

   (d) Sex-linked characters

   (e) Mitochondrial mutation

   (f) Mutagens

   (g) Pleiotrophy

GROUP - B

*Answer **ALL** questions.*

2. How can you differentiate between incomplete dominance and co-dominance ? Explain these concepts with suitable examples.
   [10

OR

Briefly describe about sex-linked inheritance with suitable examples.

3. Describe cytological basis of crossing over. State significance of crossing over. [10

OR

What do you mean by somatic cell hybridization ? Explain the technical steps of production of somatic hybrids and their applications.

4. What is chromosomal mutation ? Briefly describe about chromosomal mutation and its types. [10

OR

Differentiate between induced and spontaneous mutation. Explain molecular basis of mutation in relation to UV light.

5. Explain the concept of sex-linked, sex-limited and sex-influenced characters with suitable examples. [10

OR

What is polygenic inheritance ? Explain it with suitable examples.

6. What are the criteria for extra-chromosomal inheritance ? Explain antibiotic resistance mutation in the chloroplast of Chlamydomonas. [10

OR

What do you mean by maternal effect in genetics ? Explain it with examples.

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Draw labelled diagrams wherever necessary.

GROUP - A

1. Write notes on <u>any five</u> of the following.   [2 × 5

    (a) Immunity

    (b) Homologous organs

    (c) Significance of variation

    (d) Hypophysation

    (e) Queen bee

    (f) Types of silkworm

    (g) Significance of pheromones

GROUP - B

*Answer **ALL** questions.*

2. Give an account on types of immunity.   [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Types of antibodies

(b) Antigen

(c) Difference between cell-mediated and humoral immunity

3. Write an essay on Lamarckism. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Darwinism

(b) Analogous organs

(c) Origin of life

4. Describe about Modern Synthetic Theory of Evolution. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Variation

(b) Isolation

(c) Speciation

5. Write an essay on rearing of silkworm. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Induced breeding in fishes

(b) Prawn culture

(c) Economic importance of honeybee

6. Give an account on social behaviour of honeybee. [10

OR

Write notes on <u>any two</u> of the following. [5 × 2

(a) Biological clock

(b) Pheromones

(c) Drones

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*

Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.   [2 × 5

    (a) Find the value of $(i)^{53}$.

    (b) Find the least positive integer 'n' for which $\left(\dfrac{2i}{1+i}\right)^n$ is a positive integer.

    (c) Prove that $(2x + ixy^2)$ is not analytic.

    (d) Define isolated singularity.

    (e) Find Laplace transform of e^{-at}.

    (f) Find the Fourier transform of Dirac delta function $\delta(t)$.

    (g) State Convolution theorem.

GROUP - B

*Answer **ALL** questions.*

2. Show that Cauchy-Riemann equations are necessary and sufficient conditions for a complex function to be analytic.   [10

[2]

OR

(a) Use De Moivre's theorem to find all values of $(1 + \sqrt{3i})^{\frac{1}{5}}$. [5

(b) Find the modulus of $(1 + \sin \alpha + i \cos \alpha)$. [5

3. (a) State and prove Cauchy Integral formula. [6

(b) Evaluate $\oint_c \dfrac{dz}{z-a}$, where C is the circle $|z - a| = r$. [4

OR

State and prove Taylor's theorem for a function of complex variable. [2 + 8

4. (a) Find the Fourier transform of Gaussian distribution function,

$f(x) = Ne^{-\alpha x^2}$, where N, α are constants. [6

(b) Find the Fourier transform of $e^{-|t|}$. [4

OR

(a) Find Fourier Cosine transform of [6

$$f(x) = \begin{cases} x, & 0 < x < 1 \\ 2 - x, & 1 < x < 2 \\ 0, & x > 2. \end{cases}$$

(b) Find Fourier Sine transform of [4

$$\dfrac{e^{-ax} - e^{-bx}}{x}$$

[3]

5. Apply Fourier transform to solve one dimensional heat flow equation $\dfrac{\partial u}{\partial t} = c^2 \dfrac{\partial^2 u}{\partial x^2}$. [10

OR

(a) Find inverse Fourier transform of $\dfrac{e^{2iw}}{4 + iw}$. [5

(b) State and prove change of scale property of Fourier transform. [5

6. (a) Find Laplace transform of $\dfrac{\sin 4t}{t}$. [4

(b) Find Laplace transform of $t \sin 3t \cos 2t$. [6

OR

Solve the following equations using Laplace transform. [5 + 5

(a) $y'' + 2y' + 5y = 0$, $y(0) = 2$, $y'(0) = -4$

(b) $\dfrac{d^2x}{dt^2} + 9x = \cos 2t$ if $x(0) = 1$, $x(\frac{\pi}{2}) = -1$

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.   [2 × 5

   (a) Determine shortest wavelength of Lyman series. Given Rydberg constant is 1.09×10^7 m^{-1}.

   (b) Define critical potentials of an atom.

   (c) Write relation between phase velocity and group velocity.

   (d) Write similarities between a liquid drop and an atomic nucleus.

   (e) Why pair production cannot occur in vacuum ?

   (f) Plot graphically, how radioactive substance decays with time.

   (g) Compare de-Broglie wavelength of proton and α-particle moving through same potential difference.

GROUP - B

*Answer **ALL** questions.*

2. Derive Rutherford's formula for scattering of α-particle. [10

OR

Explain Sommerfeld's extension of Bohr's theory of H-atom and like atoms. Show that the introduction of elliptic orbits add no new energy levels. [10

3. What is Compton effect and derive an expression for Compton shift. Determine it for different values of angle of scattering.

[1 + 6 + 3

OR

What do you mean by Gaussian wave packet ? Derive expression for Δx and Δk for such a packet and hence prove that $\Delta x \cdot \Delta k = 4$. [2 + 8

4. Obtain expression for width of a wave packet as function of time. Hence show that the width of wave packet increases with time.

[8 + 2

OR

Write short notes on the following. [5 + 5

(a) Uncertainty and Complementarity

(b) Heisenberg's Uncertainty principle

5. (a) Explain characteristics of nuclear force. [5

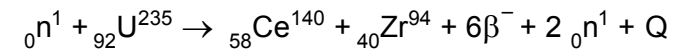(b) Explain N-Z graph for stability of nuclei. [5

OR

Derive semi empirical binding energy formula. Draw the graph for explaining types of energy associated with binding energy. [8 + 2

6. State laws of radioactive decay. Derive radioactive decay formula. Derive expression for half life period and mean life of radioactive substance. [2 + 4 + 2 + 2

OR

(a) Explain β-decay. [5

(b) Find energy released in the following reaction [5

$$_0n^1 + {}_{92}U^{235} \rightarrow {}_{58}Ce^{140} + {}_{40}Zr^{94} + 6\beta^- + 2\ _0n^1 + Q$$

Given   Mass of $_{92}U^{235} = 235.043$ u

Mass of $_0n^1 = 1.008$ u

Mass of $_{58}Ce^{140} = 139.905$ u

Mass of $_{40}Zr^{94} = 93.905$ u

2019

Time - 3 hours

Full Marks - 60

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions. [2 × 5

   (a) Write the relation between mobility and drift velocity of electron.

   (b) What happens to conductivity of Silicon with increase of temperature with required explanation ?

   (c) Explain basic principle of photodiode.

   (d) Derive the relation between α and β of a transistor.

   (e) Why base portion of a transistor is thin ?

   (f) What are the advantages of negative feedback in amplifiers ?

   (g) Draw the circuit diagram of an inverting amplifier using an OP-AMP.

GROUP - B

*Answer **ALL** questions.*

2. Explain with necessary diagrams the mechanism of current flow in a biased semiconductor. [5 + 5

OR

(a) Derive an expression for the barrier potential across a P-N junction. [6

(b) Explain how n-type semiconductor is formed with figure. [4

3. Explain rectification and how P-N junction is used as rectifier. Discuss construction, working and theory of bridge full-wave rectifier. [1 + 2 + 7

OR

What is Zener diode and draw its symbol. With the help of circuit diagram, explain how zener diode is used as voltage regulator. [2 + 8

4. Explain operation of n-p-n and p-n-p transistor in CB mode. Define current gain in CB and CE mode. Differentiate between CB and CE mode. [3 + 3 + 2 + 2

OR

Show with a diagram the different current components in a p-n-p transistor with emitter-base junction forward biased and collector-base junction reverse biased. Explain the origin of different current components in it. [4 + 6

5. How can the CE-mode input and output characteristics of a transistor be determined experimentally. Outline the method of obtaining the h-parameters from these characteristics. [5 + 5

OR

Draw the circuit diagram of a two stage RC coupled CE transistor amplifier. Discuss qualitatively its frequency response characteristics. Derive an exprssion for the mid-frequency voltage gain of this amplifier.
[2 + 3 + 5

6. Describe a Hartley oscillator with neat circuit diagram and its action. [5 + 5

Determine the frequency of oscillation and oscillation condition for a Hartley oscillator.

OR

Draw the schematic diagram and derive the expression for output voltage for [5 + 5

(a) an idel noninverting OP-AMP.

(b) a summing amplifier or adder.

2019

Time - 3 hours

Full Marks - 60

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.   [2 × 5

   (a) Write Clausius-Clapeyron's Latent heat equation and name the symbols used there.

   (b) Write SI unit of coefficient of thermal conductivity.

   (c) Write two properties of electromagnetic waves.

   (d) Find the uncertainty in the velocity of a particle if uncertainty in its position is equal to its de-Broglie wavelength.

   (e) A transistor has emitter current 6 mA and base current 10 μA, find the value of α and β.

   (f) State Brewster's law of polarisation.

   (g) Explain ultraviolet catastrophe of black body radiation.

GROUP - B

*Answer **ALL** questions.*

2. Write Van der Waal's equation of state for real gases. Derive expression for critical constants. Prove that critical coefficient of a gas is $\frac{8}{3}$. [1 + 7 + 2

OR

(a) Define entropy. Prove that change of entropy for a reversible process is zero. [1 + 4

(b) State 2nd law of thermodynamics and explain its mathematical formulation in terms of entropy. [5

3. Describe construction, working and necessary theory of Huygen's eye piece. [10

OR

Discuss the rectilinear flow of heat along a bar of uniform area of cross-section. [10

4. Write down Maxwell's equations of electrodynamics. Using these equations, derive wave equation in terms of electric field and magnetic field vector and hence find speed of wave in vacuum.

[4 + 3 + 2 + 1

OR

Write short notes on any <u>two</u> : [5 × 2

(a) Nuclear force

(b) Mass defect and Binding energy

(c) Frank-Hertz experiment

5. State and prove Ehrenfest's theorem. [10

OR

Describe with necessary theory, Davission-Germer experiment for confirmation of matter waves. [10

6. A particle is confined in one dimensional box of length 'a' with potential given by [10

$$V(x) = 0, \quad 0 < x < a$$
$$= \infty, \quad 0 \leq x \text{ and } x \geq a.$$

Obtain energy eigen values and eigen functions of the particle.

OR

Draw the circuit diagram for p-n-p transistor in CB mode and explain its operation. Define its current gain. Prove that $\alpha = \dfrac{\beta}{\beta + 1}$, where symbols have their usual meaning. [2 + 4 + 2 + 2

2019

Time - 3 hours

Full Marks - 60

Answer **both groups** as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.   [2 × 5

   (a) Calculate the effective atomic number (EAN) of Copper in $[Cu(NH_3)_4]SO_4$.

   (b) Write the IUPAC name of the following co-ordination compounds :

      (i) $[Co(NH_3)_5(ONO)]SO_4$

      (ii) $K_4[Fe(CN)_6]$

   (c) Write the electronic configuration of Fe^{2+} and Sc^{3+} ions.

   (d) Explain why Cu^{2+} compound is blue in colour but Zn^{2+} compound is colourless.

   (e) Write two important ores of Iron.

   (f) Write two consequences of Lanthanide contraction.

(g) Write two biological functions of Ca^{2+} ion.

(h) Define Ionisation Isomerism in complex compound. Give an example.

GROUP - B

*Answer **ALL** questions.*

2. (a) Discuss the factors affecting the stability of complex ion. [6

(b) Write a note on EAN rule. [4

OR

Write short notes on :

(a) Geometrical isomerism in complexes with co-ordination number 4 and 6. [5

(b) Chelate effect [5

3. Discuss the following general characteristics of transition elements. [4 + 3 + 3

(a) Complex formation

(b) Variable oxidation state

(c) Colour compound formation

OR

Give various steps to convert Latimer diagram into Frost diagram. Give one example in support of your answer. [10

4. Write two important ores of Manganese. How is it extracted from Pyrolusite ? [10

OR

Give any four properties and two uses of Vanadium and Chromium. [10

5. (a) Write the electronic configuration of Lanthanides. [4

(b) Describe the following properties of Lanthanides. [3 + 3

(i) Oxidation states

(ii) Colour of Lanthanide ions

OR

(a) Write the difference between Lanthanides and Actinides. [5

(b) Write a note on Lanthanide contraction. [5

6. (a) Describe the biological role of alkali and alkaline earth metal ions with special reference to Mg^{2+} and Na^+ ions. [3 + 3

(b) Discuss Geochemical effect on the distribution of metals. [4

OR

(a) Discuss the application of Iron in bio-system. [6

(b) Write a note on Use of chelating agents in medicine. [4
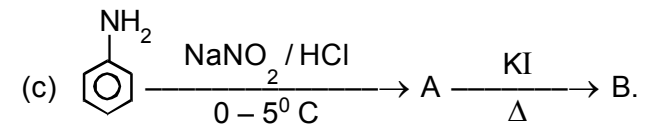
2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.　　　　　[2 × 5

   (a) How is Ethylamine prepared from Nitroethane ? Give equation.

   (b) Explain why Aniline is a weaker base than methylamine.

   (c) $\underset{\overset{}{\text{benzene with } NH_2}}{} \xrightarrow[0-5^0\,C]{NaNO_2\,/\,HCl} A \xrightarrow[\Delta]{KI} B.$

   What are A and B ?

   (d) How will you show that Naphthalene is less aromatic as compared to Benzene ?

   (e) Write the structural formula of Indole.

   (f) Write two medicinal importance of Quinine.

   (g) What is Isoprene rule ?

(h) How do you distinguish between primary and secondary amines by carbylamine reaction ?

GROUP - B

Answer ALL questions.

2. Discuss the separation of a mixture of primary, secondary and tertiary amines by Hinsberg's method. [10

OR

Explain the following reactions with mechanism. [5 × 2

(a) Carbylamine reaction

(b) Mannich reaction

3. (a) How do you synthesise the following compounds from benzene diazonium chloride ? [2 × 3

   (i) Benzene

   (ii) Nitrobenzene

   (iii) Fluorobenzene

   (b) Write the mechanism of Coupling reaction. [4

OR

Elucidate clearly the structure of Anthracene and write its synthesis from o-bromobenzyl bromide. [6 + 4

4. Write short notes on : [5 × 2

   (a) Fischer Indole synthesis

   (b) Hantzsch synthesis

OR

   (a) Elucidate the structure of Isoquinoline. [5

   (b) Write a note on Bischler-Napieralski synthesis for Isoquinoline. [5

5. Discuss the structure elucidation and synthesis of Nicotine. [10

OR

   (a) Write medicinal importance of Morphine and Cocaine. [5

   (b) Write a note on Emde's modification. [5

6. Elucidate the structure of Citral. Discuss its synthesis. [10

OR

Elucidate the structure of vitamin-C. [10

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.   [2 × 5

   (a) Calculate equivalent conductivity of 0.1 N solution which has a resistance of 2.5×10^2 ohms and cell constant is 1.15 cm^{-1}.

   (b) The molar conductivity of $CuSO_4$ solution is $3 \times 10^3 \ \Omega^{-1}.cm^2. mole^{-1}$. Calculate its equivalent conductivity.

   (c) Define Transport Number. How is it related to ionic mobility ?

   (d) $E^0_{Zn^{2+}|Zn} = -0.76$ V and $E^0_{Cu^{2+}|Cu} = +0.34$ V. Calculate E^0_{cell}.

   (e) Write two applications of salt bridge.

   (f) Write the difference between EMF and potential difference.

   (g) Find the pH of the following acid solution

   $Pt \mid H_2 \ (1 \ atm) \mid H^+ \ (aq) \mid\mid H^+ \ (1 \ M) \mid H_2 \ (1 \ atm) \mid Pt$

   The measured EMF of the cell is 0.178 V.

   (h) What is dipole moment ?

GROUP - B

Answer ALL questions.

2. (a) State and explain Kohlrausch's law of independent migration of ion. [8

   (b) Calculate the equivalent conductance at infinite dilution of CH_3COOH from the following data : [2

   $$\Lambda^0_{HCl} = 426.2\ \Omega^{-1}.cm^2.(gm\ eq)^{-1}$$

   $$\Lambda^0_{CH3COONa} = 91\ \Omega^{-1}.cm^2.(gm\ eq)^{-1}$$

   $$\Lambda^0_{NaCl} = 126.5\ \Omega^{-1}.cm^2.(gm\ eq)^{-1}$$

   OR

   Derive Debye-Huckel-Onsager equation. [10

3. Describe how transport number of an ion be determined by Hittorf method when electrodes are not attacked. [10

   OR

   How is conductance measurement applied to determine [5 + 5

   (i) Ionic product of water

   (ii) Solubility product of sparingly soluble salt

4. State and explain Faraday's 1st and 2nd law of electrolysis. [10

   OR

Write notes on : [5 × 2

(a) Reversible cells

(b) Electrochemical series

5. How do you measure equilibrium constant and pH of a solution from EMF ? [5 + 5

   OR

   Discuss briefly the determination of pH of a solution by using Quinhydrone electrode. [10

6. What is concentration cell ? Derive EMF of a concentration cell without transference. [3 + 7

   OR

   How do you measure dipole moment of a polar molecule by temperature method ? [10

OR

Write notes on :   [3 + 3 + 4

(a) Aldol condensation reaction

(b) Wittig reaction

(c) Benzoin condensation reaction

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any five</u> of the following questions.   [2 × 10

(a) Establish the relationship between K_P and K_C.

(b) State Le-Chatelier's principle.

(c) Calculate the pH of 0.001 M NaOH solution.

(d) What happens when ethyl bromide reacts with Sodium ethoxide ? Give reason.

(e) How do you distinguish between 1^0, 2^0 and 3^0-alcohols by Lucas reagent ?

(f) $\overset{OH}{\underset{}{\bigcirc}} \xrightarrow{Zn / \Delta} A \xrightarrow{CH_3Cl / AlCl_3} B.$
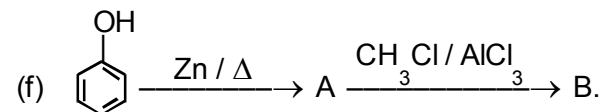
What are A and B ?

(g) How do you prepare phenol from benzene diazonium chloride ?

(h) What happens when acetaldehyde is treated with dil. NaOH solution ?

GROUP - B

*Answer **ALL** questions.*

2. Derive Kirchhoff's equation for the derivation of enthalpy of a reaction with temperature. [10

OR

(a) Derive the relation between free energy change and equilibrium constant in a reversible reaction. [6

(b) Write a note on absolute entropy. [4

3. (a) Discuss the various factors affecting degree if ionisation. [5

(b) Write a note on Ionic product of water. [5

OR

What is hydrolysis of salt ? Derive degree of hydrolysis and pH of NH_4Cl solution. [2 + 4 + 4

4. Briefly discuss the mechanism and stereochemistry of SN_1 and SN_2 reactions. [5 + 5

OR

Write notes on : [5 × 2

(a) Esterification with mechanism

(b) Pinacol-Pinacolone rearrangement with mechanism

5. (a) Discuss Nitration and Sulphonation in benzene with mechanism. [4 + 4

(b) Explain Huckel's rule with example. [2

OR

(a) How do you prepare Chlorobenzene and Bromobenzene from benzene diazonium chloride ? [2 + 2

(b) Explain why Chlorobenzene is less reactive than methyl chloride towards nucleophilic substitution reaction. [4

(c) Complete the equation : [2

$$CH_3-O-C_2H_5 + HI \rightarrow ? + ?$$
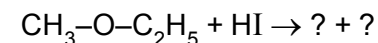
6. (a) How do you prepare phenol from [2 + 2

(i) Cumene

(ii) Benzene diazonium chloride

(b) Write notes on : [3 + 3

(i) Gattermann-Koch reaction

(ii) Houben-Hoesch condensation

(b) Solve $\dfrac{dy}{dx}$ = x + y, y(0) = 1 by Euler's method with h = 0.1.

[5

OR

(c) Solve numerically $\dfrac{dy}{dx}$ = y + 1, y(0) = –1 by modified Euler's

method for $0 \leq x \leq 0.5$ taking h = 0.1. [5

(d) Use Runge Kutta method of order 4 to find the approximate

solution of [5

$$\dfrac{dy}{dx} = x - y + 1, \; y(0) = 1, \; 0 \leq x \leq 0.5. \; h = 0.1.$$

6. (a) Solve the following system of equations by Gauss Jordan

method : [5

$2x_1 + 2x_2 + x_3 = 9$

$x_1 + 3x_2 + 2x_3 = 10$

$2x_1 - x_2 + 2x_3 = 4$

(b) Reduce the following system into an upper triangular matrix

by Gauss elimination method : [5

$2x_1 + x_2 + x_3 = 5$

$4x_1 - x_2 + 3x_3 = 5$

$x_1 + 3x_2 + x_3 = 8$

OR

2019

Time - 3 hours

Full Marks - 60

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Symbols used have their usual meaning.

GROUP - A

1. Answer <u>any five</u> of following. [2 × 5

(a) Show that $f[x_0, x_0, x_0] = \frac{1}{2} f''(x_0)$.

(b) With h =1, express $f(x) = x^3 - 3x^2 + 2x + 1$ in the form f(x) = $a_0 x^{(0)} + a_1 x^{(1)} + a_2 x^{(2)} + a_3 x^{(3)}$ thence find $\Delta f(x)$.

(c) Show that the rate of convergence of Secant method is about 1.6.

(d) Write down the geometrical interpretation of Euler's method.

(e) Show that $\phi(x) = 2^{-x}$ has a unique fixed point in the interval $\frac{1}{3} < x \leq 1$.

(f) Construct Lagrange interpolating polynomial using f(0) = 1, f(–1) = 2, f(1) = 3.

(g) When x = 0.025 and a = 0.02, then find the absolute error, relative error and percentage error.

(h) Find the expression for the number of iterations required by Bisection method to find approximate root with an error less than ε.

GROUP - B

*Answer **ALL** questions choosing*
either {(a), (b)} or {(c), (d)} from each question.

2. (a) Solve sin x = 10(x − 1) numerically by fixed point iteration method. [5

   (b) Find the smallest positive root of $x^3 − 5x + 3 = 0$ using Newton-Raphson method. [5

   OR

   (c) Show that Bisection method is linearly convergent. [5

   (d) Using Secant method, find $\sqrt{2}$ starting with $x_{-1} = 1$ and $x_0 = 2$ correct upto 3 significant figures. [5

3. (a) Show that [5

   $$f[x_1 , x_2 , x_3] = \frac{f(x_1)}{(x_1 − x_2)(x_1 − x_3)} + \frac{f(x_2)}{(x_2 − x_1)(x_2 − x_3)} + \frac{f(x_3)}{(x_3 − x_1)(x_3 − x_2)}$$

(b) Compute $f(x) = e^x$ at x = 0.35, given the table of values. [5

x	0	0.1	0.2	0.3	0.4
e^x	1.0000	1.1052	1.2214	1.3499	1.4918

   OR

(c) Show that for equally spaced nodes with constant spacing h,

   $$f[x_0 , x_1 , ... , x_n] = \frac{\Delta^n f(x_0)}{n! \, h^n} .$$ [5

(d) Using Lagrange's interpolation, find the polynomial of maximum degree determined by (−1, 1), (0, 1), (1, 1), (2, −3). [5

4. (a) Evaluate $\int_{1.00}^{1.30} \sqrt{x} \, dx$ using compound trapezoidal rule. [5

   (b) Evaluate approximately $\int_0^1 xe^{-x}$ by 2-point Gauss Legendre rule. Also find its error. [5

   OR

   (c) Apply Compound Simpson's $\frac{1}{3}$rd rule to evaluate $\int_0^1 e^{x^2} \, dx$ choosing h = 0.25. [5

   (d) Evaluate $\int_0^1 x \sin x \, dx$ by Trapezoidal rule. [5

5. (a) Solve $\frac{dy}{dx} = -xy$, y(1) = 2 at x = 1.1 using Picard's method. [5

(c) Solve the following system of equations by Gauss Jacobi iteration method : [5

$$5x_1 - x_2 + 0.x_3 = 9$$
$$-x_1 + 5x_2 - x_3 = 4$$
$$-x_2 + 5x_3 = -6$$

(d) Solve the following system of equations by Gauss-Seidel method : [5

$$10x_1 - 2x_2 + 6x_3 = 16$$
$$3x_1 + 10x_2 - 5x_3 = 29$$
$$4x_1 - 5x_2 + 10x_3 = -13$$

(b) Show that $f(x) = \dfrac{1}{2^n}$, $\dfrac{1}{2^{n+1}} < n \le \dfrac{1}{2^n}$ $(n = 0, 1, 2, ...)$, $f(0)$ = 0 is integrable on [0, 1] although it has an infinite number of discontinuities and also show that $\int_0^1 f(x)\,dx = \frac{2}{3}$. [6

OR

(c) Let $f \in R[a, b]$. Then prove that [6

$|f| \in R[a, b]$ and

$\left| \int_a^b f(x)\,dx \right| \le \int_a^b |f(x)|\,dx.$

(d) Show that for n > 1, [6

$I_n = \int_0^{\pi/2} \sin^n x\,dx$

$= \frac{\pi}{2} \cdot \frac{1}{2} \cdot \frac{3}{4} \cdots\cdots \frac{n-1}{n}$ (n even)

$= \frac{2}{3} \cdot \frac{4}{5} \cdot \frac{6}{7} \cdots\cdots \frac{n-1}{n}$ (n odd)

4. (a) Show that $\Gamma(p) = \int_0^\infty e^{-t} t^{p-1}\,dt$ converges for each p > 0.

[6

(b) Show that $\int_0^\infty \dfrac{x^2}{(1 + x^2)^2}$ is convergent. [6

OR

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Symbols used have their usual meaning.

GROUP - A

1. Answer <u>any ten</u> of the following. [2 × 10

(a) Find the limit supremum and limit infimum of the series

$x_n = \dfrac{(-1)^n}{n}$.

(b) Discuss the convergence of the series

$\sum_n \dfrac{z^n}{(n + 1)^\alpha}$ $(\alpha \in \mathbb{R})$.

(c) Show that for a > −1,

$\dfrac{1}{n^{a+1}} \sum_{k=1}^{n} k^a \to \dfrac{1}{a + 1}$ as $n \to \infty$.

(d) Show using Riemann sum that

$\int_a^b x^3\,dx = \dfrac{b^4 - a^4}{4}.$

(e) Show that

$$\int_0^1 (2x \sin \tfrac{1}{x} - \cos \tfrac{1}{x}) dx = \sin 1.$$

(f) Evaluate by integration by parts

$$\int_0^\pi x^2 \cos x \, dx.$$

(g) Test the convergence of the integral

$$\int_1^\infty \frac{dx}{x + \log x}.$$

(h) Show that the series $\sum\limits_{k=1}^\infty (xe^{-x})^k$ is uniformly convergent in [0, 2].

(i) Show that the series $\sum\limits_{k=1}^\infty \left(\dfrac{z^k}{k^\alpha}\right)$ is uniformly convergent in [−1, 1] for $\alpha > 1$.

(j) Find the radius of convergence of e^{z^n}.

(k) Let $f \in B[a, b]$ and p be any a partition of [a, b]. Then prove that

$$m(b - a) \le L(f, p) \le U(f, p) \le M(b - a).$$

(l) Show that for $-1 < x \le 1$,

$$\log(1 + x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \dots + (-1)^{n-1} \frac{x^n}{n} + \dots$$

and $\log 2 = 1 - \tfrac{1}{2} + \tfrac{1}{3} - \tfrac{1}{4} + \dots$

(m) Let $f_n(x) = \dfrac{1}{1 + nx}, 0 \le x \le 1.$

Show that $\lim\limits_{n \to \infty} \int_0^1 f_n(x) dx = \int_0^1 \lim\limits_{n \to \infty} f_n(x) dx.$

GROUP - B

*Answer **ALL** questions choosing
either {(a), (b)} or {(c), (d)} from each question.*

2. (a) Let $f \in B[a, b]$. Then prove that $f \in R[a, b]$ iff there exists $\theta \in$ IR such that [6

$$\lim_{\|p\| \to 0} S(f, p, t) = \theta \text{ and in that case } \theta = \int_a^b f(x) \, dx.$$

(b) Show that every monotonic function on [a, b] is integrable in Riemann sense. [6

OR

(c) Prove that as $n \to \infty$ [6

$$\lim_{n \to \infty} \left\{ \left(1 + \tfrac{1}{n}\right) \left(1 + \tfrac{2}{n}\right) \dots \left(1 + \tfrac{n}{n}\right) \right\}^{\frac{1}{n}} = \frac{4}{e}.$$

(d) Let f and $g \in R[a, b]$. Then prove that [6

(i) $f^2 \in R[a, b]$

(ii) $fg \in R[a, b].$

3. (a) Let $f \in B[a, b]$ be continuous over [a, b] except over a finite set. Then prove that f is integrable. [6

6. (a) Let (x_n) and (y_n) are real sequences. Then prove that　　[6

    (i)　lim sup is sub additive and lim inf is super additive.

    (ii)　lim sup is a positive homogeneous function.

(b) Show that $\tan^{-1} x = x - \dfrac{x^3}{3} + \dfrac{x^5}{5} - \dfrac{x^7}{7} + \ldots\ldots\ldots$　　[6

    for $-1 \le x \le 1$ and $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots\ldots$

<div align="center">OR</div>

(c) For every $x \in \mathbb{R}$, $n > 0$ prove that　　[6

    (i)　$\displaystyle\sum_{k=0}^{n} \binom{n}{k} x^k (1-x)^{n-k} = 1$

    (ii)　$\displaystyle\sum_{k=0}^{n} (nx - k^2) \binom{n}{k} x^k (1-x)^{n-k} = nx(1-x) \le \frac{n}{4}$.

(d) State and prove Weirstrass's approximation theorem.　　[6

(c) Show that the Beta function satisfies　　[6

    (i)　$\beta(p, q) = \beta(q, p)$

    (ii)　$p\beta(p, q + 1) = q\beta(p + 1, q), \quad p > 0, q = 0$

(d) If $a > 0$, show that　　[6

$$\int_0^{\infty} e^{-t^2}\, dt = \frac{e^{-a^2}}{2a} \left(1 - \frac{1}{2a^2} + f(a) \right)$$

where $0 < f(a) < \dfrac{3}{4a^4}$.

5. (a) State and prove Dedekind's test of uniform convergence.

    [6

(b) Given $\phi(x) = |x|$, $x \in [-1, 1]$ and $\phi(x + 2) = \phi(x)$.　　[6

Then show that $f(x) = \displaystyle\sum_{n=0}^{\infty} \left(\tfrac{3}{4}\right)^n \phi(4^n x)$ is continuous on R but

not differentiable at any point.

<div align="center">OR</div>

(c) Show that sequence $f_n(x) = x^n$ is uniformly convergent on $[0, k]$, $k > 1$ and only pointwise convergent on $[0, 1]$.　　[6

(d) Let $f_n(x) = |x|$, $x^{1 + \frac{1}{n}}$ $x \in [-1, 1]$. Then show that　　[6

    (i)　$f_n \in D[-1, 1]$

    (ii)　$f_n(x) \to f(x) = |x|$ uniformly on $[-1, 1]$

    (iii)　f is not differentiable.

vectors v_2, v_3, ... , v_n say $v_k \in [v_1, v_2, ... , v_{k-1}]$ for k = 2, 3, ..., n.   [12

OR

Answer <u>any two</u>.   [6 × 2

(i)   Let U be a subspace of a finite dimensional vector space V. Then prove that dim U ≤ dim V.

(ii) If S is a nonempty subset of a vector space V, prove that [[S]] = [S].

(iii) Let W = $\{(x_1, x_2, ... , x_n) \in V_n \mid x_1 = 0\}$. Prove that W is a subspace of V_n.

5. Let T : U → V is a nonsingular linear map. Then prove that T^{-1} : V → U is linear. Prove that the linear map T : V_3 → V_3 defined by $T(e_1) = e_1 + e_2$, $T(e_2) = e_2 + e_3$, $T(e_3) = e_1 + e_2 + e_3$ is nonsingular and find its inverse,   [12

OR

Answer <u>any two</u>.   [6 × 2

(i)   Determine the range, kernel, rank, nullity of T : V_3 → V_3 defined by

$T(x_1, x_2, x_3) = (\frac{1}{2}x_1 + x_2 + x_3, x_1 - \frac{1}{3}x_2, x_3)$.

(ii) Let T : U → V is a linear map. If U = $[u_1, u_2, ... , u_n]$, then prove that
$R(T) = [T(u_1), T(u_2), ... , T(u_n)]$.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Symbols used have their usual meaning.

GROUP - A

1. Answer <u>any ten</u> of following.   [2 × 10

(a) Prove that if a, b ∈ R then

$(a + b)^2 = a^2 + ab + ba + b^2$, $x^2 = xx$.

(b) Show that T : V_3 → V_3 defined by $T(x_1, x_2, x_3) = x_1^2 + x_2^2 + x_3^2$ is not a linear map.

(c) Compute A^3 for the square matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 1 \\ 3 & -1 & 0 \end{bmatrix}$$

(d) Prove that $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ is nonsingular and find its inverse.

(e) If R is a ring, then for all a, b ∈ ℝ, prove that (−a) (−b) = ab. In particular (−1) (−1) = 1.

(f) Determine the eigen value of $\begin{bmatrix} 0 & 3 \\ 2 & -1 \end{bmatrix}$.

(g) Determine A^* for $A = \begin{bmatrix} 1-i & 2-3i & 1+i \\ 2+i & 1+4i & 3-2i \end{bmatrix}$.

(h) If λ is an eigen value of the matrix A, prove that λ^n is an eigen value of A^n.

(i) Test the linearity of $T : V_2 \to V_2$ defined by
$T(x, y) = (2x + 3y, 3x - 4y)$

(j) If R is the set of integers mod 7 under addition and multiplication mod 7, then prove that R is a commutative ring.

(k) In V_2 show that $(3, 7) \in [(1, 2), (0, 1)]$ but does not belong to $[(1, 2), (2, 4)]$.

(l) Prove that the vectors $(1, 0, 1), (1, 1, 0), (1, 1, -1)$ are linearly independent.

(m) Prove that the set $\{(1, 1, 1), (1, -1, 1), (0, 1, 1)\}$ is a basis for V_3.

GROUP - B

*Answer **ALL** questions.*

2. If p is a prime number, prove that J_p the ring of integers mod p is a field. Show that $Q[\sqrt{2}] = \{a + b\sqrt{2} \mid a, b \in Q\}$ is a field.

[12

OR

Answer <u>any two</u>. [6 × 2

(i) Show that $\phi : x \to 5x$ from z_4 to z_{10} is a ring homomorphism.

(ii) Prove that any homomorphism of a field is either an isomorphism or takes each element into 0.

(iii) Determine all the ring homomrphism from z_{12} to z_{30}.

3. If U is an ideal of the ring R, then prove that R/U is a ring and is a homomorphic image of R. [12

OR

Answer <u>any two</u>. [6 × 2

(i) Prove that the intersection of two left ideals of R is a left ideal of R.

(ii) Let R be the ring of integers and U is an ideal of R. $U = (n_0)$ i.e. all multiples of a fixed integer n_0. What value of n_0 leads to maximal ideal ?

(iii) Let U, V are ideals of R.
Let $U + V = \{u + v \mid u \in U, v \in V\}$.
Prove that U + V is also an ideal.

4. Define linear independence and linear dependence. In a vector space V, suppose $\{v_1, v_2, ..., v_n\}$ is an ordered set of vectors with $v_1 \neq 0$. Prove that the set is linearly dependent iff one of the

(ii) Find the inverse of the matrix

$$A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & -1 & 1 \\ 1 & -1 & 2 \end{bmatrix}$$

(iii) Prove that

$$\begin{vmatrix} 0 & z & y \\ z & 0 & x \\ y & x & 0 \end{vmatrix}^2 = \begin{vmatrix} y^2 + z^2 & xy & xz \\ xy & z^2 + x^2 & yz \\ zx & yz & x^2 + y^2 \end{vmatrix}$$

(iii) Let $T : V_4 \to V_3$ be a linear map defined by

$$T(e_1) = (1, 1, 1),\ T(e_2) = (1, -1, 1),$$
$$T(e_3) = (1, 0, 0),\ T(e_4) = (1, 0, 1) .$$

Then verify that $r(T) + n(T) = 4$.

6. Determine a linear transformation $T : V_n \to V_m$ such that $A = (T : B_1 , B_2)$ for a given $m \times n$ matrix A   [12

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

(i) $B_1 = B_2 = \{e_1 , e_2 , e_3\}$

(ii) $B_1 = \{(1, 1, 1), (1, 0, 0), (0, 1, 0)\}$

$B_2 = \{(1, 2, 3), (1, -1, 1), (2, 1, 1)\}$

(iii) $B_1 = \{(1, 2, 3), (1, -1, 1), (2, 1, 1)\}$

$B_2 = \{(1, 1, 1), (1, 0, 0), (0, 1, 0)\}$

OR

Answer <u>any two</u>.   [6 × 2

(i) Determine the eigen value and the corresponding eigen spaces for

$$\begin{bmatrix} 0 & i & i \\ i & 0 & i \\ i & i & 0 \end{bmatrix}$$

OR

Answer <u>any two</u>.   [6 × 2

(a) Invert using matrix inversion method

$$A = \begin{bmatrix} -1 & 1 & 1 \\ 3 & 1 & -1 \\ 2 & 2 & 1 \end{bmatrix}$$

(b) Find eigen value and eigen spaces for

$$A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 1 & 0 \\ 1 & 2 & 1 \end{bmatrix}$$

(c) Prove that

$$\begin{vmatrix} x & y & z \\ y & z & x \\ z & x & y \end{vmatrix}^2 = \begin{vmatrix} 2yz - x^2 & z^2 & y^2 \\ z^2 & 2zx - y^2 & x^2 \\ y^2 & x^2 & 2xy - z^2 \end{vmatrix}$$

5. Define group. Show that the set of all 2 × 2 matrices $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$, a, b, c, d are real numbers and ad – bc ≠ 0 is a nonabelian group.

                                                                            [12

OR

Answer <u>any two</u>.   [6 × 2

(a) Show that there is a one-to-one correspondence between any two right cosets of H in G.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.
Symbols used have their usual meaning.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

(a) Check whether $\{(1, 0, 1), (1, 1, 0), (1, -1, 1), (1, 2, 3)\}$ is LD or LI.

(b) Let $S = \{(1, 2, 1), (1, 1, -1), (4, 5, -2)\}$.
     Show that $(2, -1, -8) \in [S]$.

(c) Prove that $\{(1, 1, 1), (1, -1, 1), (0, 1, 1)\}$ is a basis for V_3.

(d) Show that if an inverse of a matrix A exists, then it is unique.

(e) If λ is an eigen value of the matrix A, prove that λ is also an eigen value of A^T.

(f) If G is group such that $(a \cdot b)^2 = a^2 \cdot b^2 \ \forall \ a, b \in G$. show that G must be abelian.

(g) In S_3 give an example of two elements x, y such that $(x \cdot y)^2 \neq x^2 \cdot y^2$.

(h) Write all the right cosets of H in G where

G = (a) is a cyclic group of order 10,

H = (a^2) subgroup of G generated bu a^2.

(i) Let G is a group, a $\in$ G. Let (a) = {a^i | i =0, ±1, ±2}. Show that (a) is a subgroup of G.

(j) If ϕ is a homomorphism of G into $\overline{G}$ then prove that

$\phi(x^{-1}) = \phi(x)^{-1} \forall x \in$ G.

(k) Comupte $a^{-1}ba$ where

a = (5, 7, 9), b = (1, 2, 3).

(l) If R is a ring, then for all a, b $\in$ R, prove that a . 0 = 0 . a = 0.

(m) If a, b, c, d $\in$ R where R is a ring, evaluate (a + b) (c + d).

GROUP - B

*Answer **ALL** questions.*

2. Let V be any vector space. Then prove that   [12

(i) The set {v} is LD iff v = 0

(ii) The set {v_1 , v_2} is LD if v_1 and v_2 are collinear.

(iii) The set {v_1 , v_2 , v_3} is LD iff v_1 , v_2 , v_3 are coplanar.

OR

Answer any two.   [6 × 2

(a) Find the largest LI subset which span

S_4 = {(1, 1, 0), (0, 1, 1), (1, 0, –1), (1, 1, 1)}.

(b) In an n-dimensional vector space V, prove that any set of n linearly independent vectors is a basis.

(c) Define subspace. Show that if L is the set of vectors of the form (x, 2x, –3x, x) in V_4 then L is a subspace of V_4.

3. Let T : U $\rightarrow$ V is a linear map and U is a finite dimensional vector space. Then prove that   [12

rank + nullity = dimension of domain space.

OR

Answer any two.   [6 × 2

(a) If U and V are finite dimensional vector spaces of same dimension then T : U $\rightarrow$ V is one-one iff it is onto.

(b) Let T : U $\rightarrow$ V is a non-singular linear transformation. Prove that $(T^{-1})^{-1}$ = T.

(c) Prove that the linear map T : $V_3 \rightarrow V_3$ defined by $T(e_1) = e_1 - e_2$, $T(e_2) = 2e_2 + e_3$, $T(e_3) = e_1 + e_2 + e_3$ is neither one-one nor onto.

4. Define row reduced echelon form. Determine the rank of the matrix   [12

$$A = \begin{bmatrix} 1 & 2 & -1 & 0 \\ -1 & 3 & 0 & -4 \\ 2 & 1 & 3 & -2 \\ 1 & 1 & 1 & -1 \end{bmatrix}$$

by reducing it to row reduced echelon form.

(b) If g is a finite group whose order is a prime number p, then show that G is a cyclic group.

(c) If a ∈ G, let us define N(a) = {x ∈ G | xa = ax}, show that N(a) is a subgroup of G.

6. Define ideal. Prove that if U is an ideal of the ring R, then R/U is a ring and is a homomorphic image of R.   [12

OR

Answer <u>any two</u>.   [6 × 2

(a) If F is a field, prove its only ideals are (0) and F itself.

(b) State and prove Pigeonhole principle.

(c) Prove that any field is an integral domain.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

1. Write short notes on <u>any ten</u> of the following.   [2 × 10

   (a)   CU

   (b)   ROM

   (c)   System Software

   (d)   WAN

   (e)   ALU

   (f)   ISP

   (g)   Web pages

   (h)   Compiler

   (i)   Search Engine

   (j)   Internet

(k) Interpreter

(l) Uploading

GROUP - B

*Answer **ALL** questions.*

2. Discuss the important parts of the computer with block diagram.
                                                              [12

OR

Write different types of computer and their functions.

3. What is a number system ? Describe in detail about binary, octal and hexadecimal number system.   [12

OR

What is a Software ? Describe in detail about application software and system software.

4. What is programming language ? Differentiate between high level language and low level language.   [12

OR

What is Operating System ? Explain different types of Operating System and their functions.

5. What is computer network ? Discuss different types of network.
                                                              [12

OR

What is network topology ? Discuss ring, star, hybrid topology in detail.

6. What is Internet ? Explain in detail about the requirement of software and hardware for internet connection.   [12

OR

What is web browser ? Write the steps for downloading and up-loading files.

४। सप्रसङ्गं व्याख्यात ।   (८

श्रेयश्च प्रेयश्च मनुष्यमेतस्तौ सस्परीत्य विविनक्ति धीरः ।
श्रेयो हि धीरोऽभि प्रेयसो वृणीतो प्रेयो मन्दो योगक्षेमाद् वृणीतो ।।

अथवा

आत्मानं रथिनं विद्धि शरीरं रथमेवतु ।
बुद्धिं तु सारथिं बिद्धि मनः प्रग्रहमेव च ।।

UNIT – V

५। गीतायाः पञ्चदशाध्याये संसारस्वरूपं वर्णयत ।   (१६

अथवा

परमात्मतत्त्वं पुरुषोत्तमयोगे कथं संगच्छते विशदयत ।

६। सप्रसङ्गं व्याख्या करणीया ।   (८

ममैवांशो जीवलोके जीवभूतः सनातनः
मनः षष्ठानिन्द्रियाणि प्रकृतिस्थानि करोति ।।

अथवा

उत्क्रामन्तं स्थितं वापि भुञ्जानं वा गुणान्वितं ।
विमूढा नानुपश्यन्ति पश्यन्ति ज्ञानचक्षुषः ।।

2019

Time - 3 hours

Full Marks - 80

*Answer **all** questions.*
Figures in the right hand margin indicate marks.

UNIT – I & II

१। रुद्रदाम्नस्य गिर्नारशिलालेखस्य साहित्यिकमूल्यं प्रकटयत ।   (१६

अथवा

समुद्रगुप्तस्य शिलालेखे चम्पुकाव्यं सङ्गमयत ।

२। चतुर्णां टिप्पणी प्रदेया ।   (४ × ४

आटविकराज्यम्, सन्धिविग्रहम्, गिर्नार,
महाक्षत्रप, यशोधर्मा, सुविशाख, सुराष्ट्र

UNIT – III & IV

३। कठोपनिषदि प्रतिपादितमात्मतत्त्वं विवृणुत ।   (१६

अथवा

कठोपनिषदि वर्णितं रथरूपकं विवेचनीयम् ।

2019

Time - 3 hours

Full Marks - 80

Answer ***all*** questions.

Figures in the right hand margin indicate marks.

UNIT – I

१ । सोदाहरणं सूत्रत्रयं व्याख्या करणीया ।   (८ × ३

(क) ध्रुवमपायेऽपादानम् ।

(ख) जनिकर्तुः प्रकृतिः ।

(ग) आख्यातोपयोगे ।

(घ) वारणार्थानामीप्सीतः ।

(ङ) पराजेरसोढः ।

UNIT – II

२ । सूत्रद्वयं व्याख्या कार्या ।   (८ × २

(क) षष्ठी शेषे ।

(ख) कर्तुकर्मणो कृति ।

(ग) कृत्यानां कर्त्तरि वा ।

(घ) दिवस्तदर्थस्य ।

(ङ) विभाषोपसर्गे ।

UNIT – III

३ । सूत्रद्वयं व्याख्या करणीया ।   (८ × २

(क) आधारोऽधिकरणम् ।

(ख) षष्ठी चानादरे ।

(ग) यतश्च निर्धारणम् ।

(घ) सप्तमी अवच्छेदे ।

(ङ) यस्य च भावेन भावलक्षणम् ।

UNIT – IV

४ । संस्कृतेन अनुवादं कुरु ।   (१२

ଅନ୍ନ ପ୍ରାଣରକ୍ଷକ । ବିନା ଅନ୍ନରେ ପ୍ରାଣୀମାନେ ଜୀବିତ ରହିବା ଅସମ୍ଭବ । ଏଣୁ ଅନ୍ନ ସର୍ବଦା ବନ୍ଦନୀୟ । ତାହାକୁ ନିନ୍ଦା ନ କରି ପ୍ରାପ୍ତ ମାତ୍ରକେ ଭୋଜନ କରିବ । ସମ୍ମୁଖରେ ଅନ୍ନ ଦେଖି ଏହାକୁ ପୂଜନୀୟ ବୋଲି ଭାବି ଯଥେଷ୍ଟ ସମ୍ମାନ କରିବ । ତାହାକୁ ଦେଖି ମନ ପ୍ରସନ୍ନ ରଖିବ । ଖୁସି ମନରେ ଖାଇଲେ ଅନ୍ନ ହଜମ ହୋଇ ଶକ୍ତିବର୍ଦ୍ଧକ ହୁଏ । ଉଚ୍ଛିଷ୍ଟ ଅନ୍ନ କାହାରିକୁ ଦେବ ନାହିଁ । ଖାଇସାରି ମୁହଁ ନ ଧୋଇ କୁଆଡ଼େ ଯିବ ନାହିଁ । ସେହି ଅନ୍ନକୁ ଆୟୁ ବୃଦ୍ଧି ପାଇଁ ପୂର୍ବ ଆଡ଼କୁ ମୁହଁ କରି ଖାଇବ । ଯଶ ପାଇଁ ଦକ୍ଷିଣ ଆଡ଼କୁ

ମୁହଁ କରି ଖାଇବ । ଧନ ପାଇଁ ପଶ୍ଚିମ ଆଡ଼କୁ ମୁହଁ କରି ଖାଇବ । ସତ୍ୟ ପାଇଁ ଉତ୍ତର ଆଡ଼କୁ ମୁହଁ କରି ଖାଇବ ।

UNIT – V

५ । अमरकोषानुसारं सश्लोकं त्रयाणां पर्यायनामानि लिखत ।   (४ × ३

देवता, लक्ष्मीः, ब्रह्मा, सूर्य, गणेश

४ । सप्रसङ्गं व्याख्यात ।　　　　　　　　　　(१ ०

निसर्गत एव अभानुभेद्यमरत्नालोकच्छेद्यमप्रदीपप्रभावपनेयमतिगहनं तमो योवनप्रभवम् ।

अथवा

गुरूपदेश: प्रशमहेतुर्वय: परिणाम इव पलितरूपेण शिरसिजजालममलीकुर्वन् गुणरूपेण तदेव परिणमयति ।

UNIT – IV

५ । संस्कृतभाषया निबन्धमेकं रचयत ।　　　　(२ २

　　(क) साम्प्रतिकसमये संस्कृतपठनस्य आवश्यकता

　　(ख) छात्रजीवनम्

　　(ग) रामायणम्

　　(घ) मम प्रियकवि:

UNIT – V

६ । संस्कृतेन एकस्य भावसंप्रसारणं कुरुत ।　　(१ ०

　　(क) विद्या ददाति विनयम् ।

　　(ख) अहिंसा परमो धर्म: ।

　　(ग) योग: कर्मसु कौशलम् ।

　　(घ) सहसा विदधति न क्रियाम् ।

2019

Time - 3 hours

Full Marks - 80

*Answer **all** questions.*
Figures in the right hand margin indicate marks.

UNIT – I & II

१ । उपहारवर्मण: उत्पत्तिकथां वर्णयत ।　　　　(१ २

　　　　अथवा

दशकुमारचरितस्य प्रथमोच्छ्वासस्य कथासारं लेखनीय: ।

२ । त्रयाणां संक्षिप्तमुत्तरं दीयताम् ।　　　　(४ × ३

　　(क) सोमदत्तस्य संप्राप्ति संक्षेपं वर्णनीया ।

　　(ख) राजहंसस्य कीर्ति: किम्भूतमासीत् ?

　　(ग) उपहारवर्मण: जन्मकथा लेखनीया ।

　　(घ) कथं राजहंसस्य परिवार: वनमगच्छत् ?

UNIT – III

३ । गद्यसम्राट वाणभट्टस्य काव्यप्रतिभां वर्णयत ।　　(१ ४

　　　　अथवा

पठितांशमवलम्ब्य लक्ष्या: चरित्रं चित्रयत ।

P.T.O.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

१ । (क) <u>चतुर्णां</u> सन्धिविच्छेद: कार्या: ।   (१ × ४

प्रत्यासन्ने, वाह्योद्यान, त्वामारूढ,
प्रेक्षमेतत, फलमविकलम्, कथमपि

(ख) <u>द्वयो:</u> पदयो: सविग्रहवाक्यं समासनामानि लिखत ।   (२ × २

कालक्षपम्, छायादानम्, नयनविषयम्, विन्ध्यपादे, अनुकूल:

(ग) <u>त्रयाणां</u> सकारणविभक्तिं निरूपणं कुरुत ।   (२ × ३

त्वयि आसन्ने, स्वाधिकारात्, मेघ:,
कामरूपम्, विधिवशात्, गौरवाय

(घ) <u>त्रयाणां</u> पदानां प्रकृतिं प्रत्ययं च लिखत ।   (२ × ३

प्रवृत्तिं, स्वागतम्, सन्देश:,
छेद:, प्रियमाण, प्रतिहत

GROUP - B

सर्वे प्रश्नाः समाधेयाः ।

२ । मेघदूतस्य पाठ्यांशमनुसृत्य मेघमार्गं निरूपयत ।   (१२

अथवा

मेघदूते उज्जयिन्याः सौन्दर्यं वर्णयत ।

३ । द्वयोः संक्षिप्तमुत्तरं प्रदेयम् ।   (६ × २

   (क) रामगिरि पर्वतस्य स्थितिः निरूपणीया ।

   (ख) कामार्त्ता हि प्रकृति-कृपणा – यथार्थ्यः प्रतिपादयत ।

   (ग) मेघः देवगिरौ किं करिष्यति ?

   (घ) अवलानां विरहावस्थां प्रकटयत ।

४ । सप्रसङ्गं व्याख्या करणीया ।   (१२

अन्तः सारं घन तुलयितुं नानिलः शक्ष्यति त्वां ।
रिक्तः सर्वो भवति हि लघुः पूर्णता गौरवाय ।।

अथवा

इत्यौत्सुक्यादपरिगणयन्गुह्यकस्तं ययाचे ।
कामार्त्ता हि प्रकृति कृपणाश्चेतनाचेतनेषु ।।

५ । कथासाहित्ये पञ्चतन्त्रस्य महत्त्वं वर्णयत ।   (१२

अथवा

संस्कृतसाहित्ये गद्यकाव्यस्य उत्पत्तिं विकाशं च वर्णनीयम् ।

६ । त्रयाणां संक्षिप्तटिप्पणी प्रदेया ।   (४ × ३

खण्डकाव्यम्, गुणाढ, अमरशतकम्,
बृहत्कथा, गीतगोविन्द, सुवन्धुः

2019

Time - 3 hours

Full Marks - 80

Answer ***both groups*** as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

   (a) Define post-modernism.

   (b) Write briefly what 'modernism' is.

   (c) What is 'Stream of Consciousness' ?

   (d) What do you know about non-European cultures ?

   (e) What appalls him when Marlow makes it to the company's outer station ?

   (f) Why is the repair of Marlow's sunken ship delayed ?

   (g) Why does Marlow frighten the natives ?

   (h) What does Marlow find about Kurtz ?

   (i) Why had Peter often described Clarissa 'the perfect ho-stess' ?

(j) Why does Clarissa think that she had been right in not having agreed to marry Peter ?

(k) Why was Clara dissatisfied with Paul ?

(l) What was the feeling of Mrs Morel when she found Paul's love for Miriam was growing intense ?

GROUP - B

*Answer **ALL** questions.*

2. What is the difference between Modernism and Post-modernism ? Discuss in detail in your answer the salient features of both. [12

OR

How has literature been influenced by psychoanalysis and stream of consciousness ?

3. Bring out the significance of the title *Heart of Darkness.* [12

OR

Depict the relation between the colonizer and the colonized in *Heart of Darkness.*

4. "In the novel of D. H. Lawrence, the crux lies in personal relationship." Discuss with special reference to *Sons and Lovers.* [12

OR

Sketch the character of Paul.

5. Do you agree that the novel, *Mrs Dalloway* contains a picture of both the joy and the agony of living ? Give reasons for your answer. [12

OR

Give a sketch of the character of Septimus Warren Smith with special reference to his insanity.

6. *The Hollow Men* represents the spiritual sterility and decay of modern man. Justify. [12

OR

Write the summary of *Sailing to Byzantium.*

OR

Leda's encounter with the swan is filled with both horror and knowledge. Justify.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

   (a) What is 'mimesis' ?

   (b) What do you mean by 'catharsis' ?

   (c) Why did Oedipus blind himself ?

   (d) Why did Oedipus send Creon to Delphi ?

   (e) Who are the two beautiful women that are captured as war prizes ?

   (f) What does the dead companion of Achilles tell him in his dream ?

   (g) Why does Achilles return the corpse of Hector to Priam ?

   (h) Why does Achilles refuse to fight the war ?

   (i) How does Megadorus persuade Euclio to marry his daughter off to him ?

(j) What does *The Pot of Gold* symbolise ?

(k) What is the recommendation of Tiresias to get on in Rome ?

(l) What is the opinion of Darus, Horace's slave on the poet ?

(m) How is Daphne turned into a laurel tree ?

GROUP - B

*Answer **ALL** questions.*

2. What do you know about 'Tragedy' in the classical drama ?   [12

OR

What is 'Epic' ? How is it different from 'Tragedy' ?

3. Give a character-sketch of Achilles.   [12

OR

What are the themes explored by Homer in *The Illiad* ?

4. Sophocles's Oedipus has been called an authentic tragic hero. Why ?   [12

OR

To what extent can the dictum *Character is Destiny* be applied to Oedipus ?

5. Give a character-sketch of Euclio in *The Pot of Gold* by Plautus.   [12

OR

Write the critical summary of *The Pot of Gold.*

6. Horace frequently explores themes usually avoided in high classical poetry. Justify.   [12

OR

What does Horace want to say in his satires ?

OR

Critically analyse *Philomela* Book-VI.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

   (a) What is the role of race and caste in any work of art ?

   (b) Briefly mention how 'gender' influences the writing of wo-
       men ?

   (c) What role does 'sexual politics' play in the creation of a work
       of art ?

   (d) Why does Sylvia Plath say, "Daddy, I have had to kill you" ?

   (e) Why does Emily Dickinson say, "I could not die with you" ?

   (f) What does 'Lady Lazarus think about life and death ?

   (g) Why does Celie lose some of her faith in God ?

   (h) Why does Celie note it that she has never in her life felt you-
       nger ?

(i) What happened to Dopdi Mejhen when she was apprehended ?

(j) Which incident makes Bertha sad ?

(k) What is the core of Wollstonecraft's argument for equality between men and women ?

(l) What is the main characteristic of Women's Writing in India ?

GROUP - B

Answer ALL questions.

2. Write what you know about the Confessional Mode in Women's Writing. [12

OR

What is sexual politics ? How has it affected Women's Writing ?

3. Write a critical analysis of 'Daddy'. [12

OR

What does Emily Dickinson want to say in her poem, *I'm Wife, I've Finished That* ?

4. Give a character sketch of Celie. [12

OR

Critically appreciate *The Color Purple.*

5. Give a sketch of the character of Bertha. [12

OR

Why does the writer end the story, 'Bilss' in a note of uncertainty ?

OR

Examine the indigenous feminism of Dopdi as exemplified in Mahasweta Devi's story *Draupadi.*

6. Bring out the essence of Women's Writing in India. [12

OR

Write a note on the Woman in the Nineteenth Century with reference to Wollstonecraft's *A Vindication of the Rights of Woman.*

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

<u>GROUP - A</u>

1. Write notes on <u>any ten</u> of the following in one or two sentences each.   [2 × 10

    (a) Market period

    (b) Increasing cost industry

    (c) Static analysis

    (d) General equilibrium

    (e) Monopoly

    (f) Second degree price discrimination

    (g) Contract curve

    (h) Signalling

    (i) Entry deterrence

(j)   Monospony

(k)   Labour Union

(l)   Product differentiation

GROUP - B

*Answer **ALL** questions.*

2. Explain the derivation of long-run supply curve in different cost
    conditions.   [12

OR

Write notes on :   [6 × 2

(a)   Perfect competition and economic efficiency

(b)   Tax Incidence

3. Explain the General equilibrium model with two goods.   [12

OR

Explain the marginal conditions of welfare economics.

4. What is Price discrimination ? When is it possible and profitable ?
                                                                  [12

OR

Explain the measures to regulate monopoly.

5. Explain Cournot's model of duopoly.   [12

OR

Explain short-run and long-run equilibrium under monopolistic
competition.

6. Explain the role of trade unions in influencing the wage rate. [12

OR

Explain supply of labour to a firm, an industry and in an economy.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on <u>any ten</u> of the following in one or two sentences
    each.   [2 × 10

    (a) Financial Market

    (b) Moral hazard

    (c) Balance of Payments

    (d) Devaluation

    (e) Natural rate of growth

    (f) Endogenous growth

    (g) Monetary Policy

    (h) Fiscal deficit

    (i) Under employment equilibrium

(j) Rational expectations

(k) Menu cost

(l) Open market operations

GROUP - B

*Answer **ALL** questions.*

2. Describe in brief the financial sector reform in India since 1991.

[12

OR

Write notes on :   [6 × 2

(a) Adverse selection

(b) Capital market

3. "Balance of Payment always balances." Elucidate.   [12

OR

Critically examine the Purchasing Power Parity Theory.

4. Critically examine Solow's growth model.   [12

OR

Discuss John Robinson's model of growth.

5. Define Monetary Policy. Discuss the main instruments of Monetary Policy.   [12

OR

What is balanced budget ? Describe the arguments in favour of and against balanced budget.

6. Explain the Real Business Cycle model and discuss its limitations.   [12

OR

Discuss how Friedman has reformulated the Quantity Theory of Money.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on <u>any ten</u> of the following in one or two sentences each.   [2 × 10

    (a) Public goods

    (b) Maximum Social Advantage

    (c) Externality

    (d) Canon of benefit

    (e) Peacock-Wiseman hypothesis

    (f) Tenable capacity

    (g) Laffen curve

    (h) Deficit Budget

    (i) Pump Priming

(j) Internal debt

(k) External debt

(l) Public debt management

GROUP - B

*Answer **ALL** questions.*

2. Define Public Finance and explain how modern public finance is different from classical public finance. [12

OR

Explain the principle of Maximum Social Advantage.

3. Explain Wagner's Law of increasing state activities. [12

OR

Explain the effects of public expenditure on production and distribution.

4. Explain how incidence of a tax is distributed between buyers and sellers. [12

OR

Write notes on : [6 × 2

(a) Characteristics of a good tax system

(b) Factors affecting tenable capacity

5. Explain the role of budget in influencing production and employment in an economy. [12

OR

Write notes on : [6 × 2

(a) Balanced and Unbalanced budget

(b) Keynes' view on Deficit Budget

6. "External debt is more burdensome than internal debt." Discuss. [12

OR

Explain various methods of redemption of public debt.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on <u>any ten</u> of the following in one or two sentences
   each.   [2 × 10

   (a) Poverty

   (b) Population Policy

   (c) Liberalisation

   (d) Planning Commission

   (e) Land Reforms

   (f) Green Revolution

   (g) Small Scale Industry

   (h) MRTP Act

   (i) Balance of Payments

(j)   FDI

(k)   MNC

(l)   Structural change

GROUP - B

*Answer **ALL** questions.*

2.   Discuss the effects of rapid growth of population on the economic progress of India.   [12

OR

Explain the causes of unemployment in India.

3.   Discuss the main features of Economic Reforms of 1991.   [12

OR

Explain the main objectives of India's Five Year Plans.

4.   Point out various land reform measures adopted in India since independence.   [12

OR

Discuss the problems of agricultural marketing in India.

5.   Discuss the salient features of 1956 Industrial Policy.   [12

OR

Discuss the problems faced by small scale industries in India.

6.   Explain the composition and direction of India's foreign trade.
                                    [12

OR

Examine the merits and demerits of Foreign Direct Investment (FDI) in India.

2019

Time - 3 hours

Full Marks - 80

Answer ***both groups*** *as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write short notes on <u>any ten</u> of the following.   [2 × 10

   (a) Charles II

   (b) Oliver Cromwell

   (c) Galileo

   (d) Earth-centric view

   (e) The mechanical philosophy

   (f) John Kepler

   (g) Factors of production

   (h) Early mercantilism

   (i) Louis XIV and absolutism

   (j) Frederick William

(k) Catherine

(l) Bill of Rights

(m) Paine's common sense

(n) Greenville and the war debt

(o) The Sugar Act of 1764

(p) John Mc Adam

(q) Thomas Jaferson

GROUP - B

*Answer **ALL** questions.*

2. Throw light on the political condition of England and France in Seventeenth C.C.E. [12

OR

Discuss about the causes and effects of the Thirty Years War.

3. Analyse the causes of the English Civil War. [12

OR

Discuss about the causes and effects of the Glorious Revolution of 1688.

4. Assess in brief the major discoveries and achievements of the Scientific Revolution. [12

OR

Write about the contributions of Sir Isaac Newton and Copernicus to the modern science.

5. Write a note on the nature and characteristics of Mercantilism. [12

OR

Write an essay on the colonial expansion of the English East India Company.

6. Discuss the causes of the American War of Independence. [12

OR

Give a list of innovations and industrializations during the Industrial Revolution in Europe.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

1. Write short notes on <u>any ten</u> of the following. [2 × 10

   (a) Akbarnama

   (b) Jiauddhin Barani

   (c) Ibn-Batuta

   (d) Battle of Khanwa

   (e) First Battle of Panipat

   (f) Sher Shah Suri

   (g) Ibadat Khanna

   (h) Birbal

   (i) Mansabdari system

   (j) Din-i-Illahi

(k) Moti Masjid

(l) Trade centres under the Mughals

GROUP - B

*Answer **ALL** questions.*

2. Discuss the role of literature in reconstructing Mughal Indian history. [12

OR

Give an account of the foreign accounts that speak about the history of Mughal Age in India.

3. Describe the problems faced by Humayun during his reign. [12

OR

State about administrative and revenue reforms of Sher Shah.

4. Discuss the factors that prompted Akbar to follow a liberal policy towards the Rajputs. [12

OR

Elaborate the central administrative structure under Akbar.

5. Throw light on the development of trade and commerce in India under the Mughals. [12

OR

Discuss the role of Urban centres in Mughal India.

6. Discuss about the Religious Policy of Akbar. [12

OR

Trace the development of art and architecture in India under the Mughals.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write short notes on <u>any ten</u> of the following.   [2 × 10

    (a) Baburnama

    (b) Amir Khursow

    (c) Roshamala

    (d) Prithviraj Raso

    (e) Badauni

    (f) Dara Sukhu

    (g) Trade centres of Medieval India

    (h) Sarafs and Dalals

    (i) Afzal Khan

    (j) Rajput style of painting

(k) Nagar style of architecture

(l) Temples built by Rajput rulers

GROUP - B

*Answer **ALL** questions.*

2. Make a survey of the Persian and Vernacular literary sources of Mughal period.   [12

OR

How do foreign accounts help in the reconstruction of Mughal Indian history ? Discuss.

3. Discuss about the career and conquest of Babur.   [12

OR

Write in detail about the sycretism Naqshhandi order under the Mughals.

4. Examine the Religious Policy of Aurangzeb.   [12

OR

Give an account of the Agrarian Crisis during the reign of Aurangzeb.

5. Throw light on the development of crafts and technology under the Mughal rule in India.   [12

OR

Trace the growth of market and transport system in Mughal India.

6. Analyse the causes of the decline of Mughal Empire.   [12

OR

Describe the various features of Mughal architecture and painting.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

<u>GROUP - A</u>

1. Write short notes on <u>any ten</u> of the following.   [2 × 10

    (a) Battle of Haldighat

    (b) Diwan-i-Aam

    (c) Mir Kashim

    (d) Dastale

    (e) Black Hole Tragedy

    (f) Tantia Tope

    (g) Government of India Act of 1935

    (h) Cripps Mission

    (i) Atlee Sub-Committee

    (j) Lord Mountbatten

(k) Boundary Commission

(l) Mohmmed Ali Jinah

GROUP - B

*Answer **ALL** questions.*

2. Discuss the role of Babur in lying the foundation of Mughal Empire in India. [12

OR

Analyse the causes of the decline of Mughal Empire.

3. Describe the causes and effects of the Battle of Buxar. [12

OR

Throw light on the British Policy of expansion in India.

4. Discuss about the reforms introduced by Lord Dalhousie in India. [12

OR

Examine the causes of the Revolt of 1857.

5. Make a comparison between the activities of the moderates and the extremists. [12

OR

Give an account of the Civil Disobedience Movement of India.

6. Discuss the role of Subhash Chandra Bose in the freedom movement of India. [12

OR

Elaborate the salient features of Indian Independence Act, 1947.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*

Figures in the right hand margin indicate marks.

<u>GROUP - A</u>

୧ । ଯେକୌଣସି ୧ ୦ଟି ପ୍ରଶ୍ନର ସଂକ୍ଷିପ୍ତ ଉତ୍ତର ଲେଖ ।   (୨ × ୧ ୦

(କ) ସଂସ୍କୃତିର ଏକ ସାଧାରଣ ସଂଜ୍ଞା ଲେଖ ।

(ଖ) ସଂସ୍କୃତି ଓ ଲୋକ ସଂସ୍କୃତି ମଧ୍ୟରେ ପାର୍ଥକ୍ୟ ଦର୍ଶାଅ ।

(ଗ) ମୋଗଲ ତାମ୍ସା କଣ ?

(ଘ) ଲୋକଗଲ୍ପର ମାନବୋଉର ଚରିତ୍ର ।

(ଙ) ଓଡ଼ିଆ ଲୋକଗୀତରେ ରାମାୟଣର ପ୍ରସଙ୍ଗ ।

(ଚ) ସୁଆଙ୍ଗ କଣ ?

(ଛ) ଦୁଇଟି ଲୋକ ଉକ୍ତିର ଉଦାହରଣ ଅର୍ଥ ସହ ଲେଖ ।

(ଜ) ଦଣ୍ଡ ନାଚର ମୁଖ୍ୟ ଦେବତା କିଏ ?

(ଝ) ଓଡ଼ିଶାର ଦକ୍ଷିଣରେ ପ୍ରଚଳିତ ଦୁଇଟି ଲୋକ ନାଟକର ଉଦାହରଣ ଦିଅ ।

(ଞ) ଗୋଟିଏ ଶଗଡ଼ିଆ ଗୀତର ଉଦାହରଣ ଦିଅ ।

(ଟ) ଉତ୍କଳ ଗାଉଁଳୀ ଗୀତର ସଂଗ୍ରାହକ କିଏ ?

(ଠ) ଓଡ଼ିଆ ଡଗ ଡମାଲିରୁ ଦୁଇଟିର ଉଦାହରଣ ଦିଅ ।

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । ଲୋକ ସାହିତ୍ୟ ହିଁ ଶିଷ୍ଟ ସାହିତ୍ୟର ଉସ — ଆଲୋଚନା କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) 'ଲୋକ' ଶବ୍ଦର ବ୍ୟାଖ୍ୟା

(ଖ) ଲୋକଗୀତରେ ନାରୀ ମନସ୍ତତ୍ତ୍ୱ

(ଗ) ସଂସ୍କୃତିର ଉନ୍ମେଷ ଲୋକ ସାହିତ୍ୟ

୩ । ଓଡ଼ିଆ ଲୋକଗୀତରେ ଜଗନ୍ନାଥ ଓ ଜଗନ୍ନାଥ ସଂସ୍କୃତି ସମ୍ପର୍କରେ ଏକ ଆଲେଖ୍ୟ ପ୍ରସ୍ତୁତ କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ଖନା ବଚନ

(ଖ) ଗୋପାଳଙ୍କ ଓଗାଳ

(ଗ) ଓଡ଼ିଆ ସମର ଗୀତିକା

୪ । ଲୋକଗଣ୍ଢରେ ପ୍ରତିଫଳିତ ମାନବିକ ମୂଲ୍ୟବୋଧର ଚିତ୍ର ପ୍ରଦାନ କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ଲୋକଗଣ୍ଢର ଚରିତ୍ର

(ଖ) ଲୋକଗଣ୍ଢର ସାମାଜିକ ଆବେଦନ

(ଗ) ଲୋକଗଣ୍ଢ ଓ ଗଣ୍ଢ

୫ । ପ୍ରବାଦ ଓ ପ୍ରବଚନଗୁଡ଼ିକ ଆମ ଭାଷା ସାହିତ୍ୟର ସମ୍ପଦ — ଆଲୋଚନା କର ।(୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ଲୋକୋକ୍ତି

(ଖ) ଡଗଡମାଲିରେ ମାନବୀୟ ମୂଲ୍ୟବୋଧ

(ଗ) ଗାଉଁଳୀ ନ୍ୟାୟ ବଚନ

୬ । ଓଡ଼ିଆ ଲୋକ ନାଟ୍ୟ ପରମ୍ପରାରେ ଛଉ ନାଚର ଭୂମିକା ଓ ବୈଶିଷ୍ଟ୍ୟ ନିରୂପଣ କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ପାଟ ଭୋକ୍ତା ଓ ପାଟ ଦଣ୍ଡୁଆ

(ଖ) ବିଭିନ୍ନ ପ୍ରକାର ଲୀଳା ନାଟକ

(ଗ) ପାଲାରେ ପ୍ରତିଫଳିତ ଅଧ୍ୟାତ୍ମିକତା

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

୧ । ଯେକୌଣସି ୧୦ଟି ପ୍ରଶ୍ନର ସଂକ୍ଷିପ୍ତ ଉତ୍ତର ଲେଖ ।   (୨ × ୧୦

(କ) କବିତାର ଆଧୁନିକ ପରିଭାଷା କଣ ?

(ଖ) ଉପନ୍ୟାସର ଉପାଦାନ

(ଗ) ଓଡ଼ିଆ ସାହିତ୍ୟର ପ୍ରଥମ ଆମ୍ଜୀବନୀ

(ଘ) ଆଧୁନିକତା କହିଲେ କଣ ବୁଝ ?

(ଙ) ରାଧାନାଥଙ୍କ କବିତାରେ ଆଧୁନିକ ଦୃଷ୍ଟିଭଙ୍ଗୀ କିପରି ପ୍ରତିଫଳିତ ?

(ଚ) ଗଙ୍ଗାଧର ମେହେରଙ୍କ କବିତାର ଆଧୁନିକତା କିପରି ?

(ଛ) ଆଧୁନିକତା ଓ ଉତ୍ତର ଆଧୁନିକତାର କାଳ ନିର୍ଣ୍ଣୟ କର ।

(ଜ) ଆଧୁନିକତା ଓ ଉତ୍ତର ଆଧୁନିକତା ମଧ୍ୟରେ ପ୍ରଭେଦ ଦର୍ଶାଅ ।

(ଝ) ଗୋଟିଏ ସଫଳ ଉତ୍ତର ଆଧୁନିକ ସମୟର କବିତାର ଉଦାହରଣ ଦିଅ ।

(ଞ) ତୁଳନାମ୍କ ସାହିତ୍ୟ କହିଲେ କଣ ବୁଝ ?

(ଟ) ଅନୁବାଦ କେତେ ପ୍ରକାର ?

(ଠ) ସଫଳ ଅନୁବାଦର ବୈଶିଷ୍ଟ୍ୟଗୁଡ଼ିକ ଲେଖ ।

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । କବିତାର ସଂଜ୍ଞା ନିର୍ଦ୍ଦେଶ କରି ଆଧୁନିକ କବିତା ଓ ଉତ୍ତର ଆଧୁନିକ କବିତା ମଧ୍ୟରେ ପ୍ରଭେଦ ଦର୍ଶାଅ ।   (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ଆମ୍ ଜୀବନ ଚରିତ

(ଖ) କବିତାରେ ଚିତ୍ରକଳ୍ପ

(ଗ) ଆଦିବାସୀ ଜନଜୀବନ ଓ ଉପନ୍ୟାସ

୩ । ଉତ୍ତର ଆଧୁନିକ ତତ୍ତ୍ୱର ଲକ୍ଷଣ ସହ ସାହିତ୍ୟରେ ତାର ପ୍ରଭାବ ଆକଳନ କର ।
                                                                  (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ଓଡ଼ିଆ ସାହିତ୍ୟରେ ଆଧୁନିକତାର ଉନ୍ମେଷ

(ଖ) କବିତାରେ ରୋମାଣ୍ଟିକ୍ ଚେତନାର ପ୍ରତିଫଳନ

(ଗ) ପ୍ରତୀକ ଓ ଚିତ୍ରକଳ୍ପର ପ୍ରଭେଦ

୪ । ଓଡ଼ିଆ କାବ୍ୟ ସାହିତ୍ୟର ପ୍ରାୟୋଗିକ ସମୀକ୍ଷା ପରମ୍ପରା ଉପରେ ଆଲୋକପାତ କର ।
                                                                  (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ପ୍ରୟୋଗବାଦୀ ସମାଲୋଚନାର ଲକ୍ଷଣ

(ଖ) ଦାଶରଥୀ ଦାସଙ୍କ ସମୀକ୍ଷା ଦୃଷ୍ଟି

(ଗ) ଶୈଳୀ ତାତ୍ତ୍ୱିକ ସମୀକ୍ଷା କଣ ?

୫ । ତୁଳନାମ୍ବକ ସାହିତ୍ୟର ଆବଶ୍ୟକତା ଓ ସ୍ବତନ୍ତ୍ରତା ଉପରେ ଆଲୋକପାତ କର ।(୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ଫକୀର ମୋହନ ଓ ପ୍ରେମଚନ୍ଦ

(ଖ) ତୁଳନାମ୍ବକ ସାହିତ୍ୟର ଦୁଇଟି ସଂଜ୍ଞା

(ଗ) ତୁଳନାମ୍ବକ ସାହିତ୍ୟର ପ୍ରଭାବ

୬ । ଅନୁବାଦ ଏକ ସ୍ବତନ୍ତ୍ର କଳା – ଓଡ଼ିଆ ଅନୁବାଦ ସାହିତ୍ୟ ଆଧାରରେ ବିଶ୍ଳେଷଣ କର ।
                                                                  (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ଅନୁବାଦର ପରିଭାଷା

(ଖ) ଅନୁବାଦର ପ୍ରକାରଭେଦ

(ଗ) ଓଡ଼ିଆ ସାହିତ୍ୟର ଦୁଇଟି ବିଶିଷ୍ଟ ଅନୁବାଦ ବା ଅନୁକୃତି

2019

Time - 3 hours

Full Marks - 80

Answer *both groups* as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

୧ । ଯେକୌଣସି ୧୦ଟି ପ୍ରଶ୍ନର ସଂକ୍ଷିପ୍ତ ଉତ୍ତର ଲେଖ ।   (୨ × ୧୦

(କ) ଭାଗବତର ଶୈଳୀ ନିରୂପଣ କର ।

(ଖ) ଯଦୁରାଜା ଓ ଅବଧୂତ ସମ୍ବାଦ ଭାଗବତର କେଉଁ ସ୍କନ୍ଧରୁ ଆସିଛି ?

(ଗ) ଭୀମଭୋଇଙ୍କ ଗୁରୁ କିଏ ଥିଲେ ?

(ଘ) ମହିମା ଧର୍ମର ସାଧୁ କାହାର ଉପାସନା କରନ୍ତି ?

(ଙ) ଭୀମଭୋଇଙ୍କ ସ୍ତୁତି ଚିନ୍ତାମଣିର ଭାବଧାରା କଣ ?

(ଚ) "ଛ'ମାଣ ଆଠଗୁଣ୍ଠ"ର ପ୍ରକାଶ କାଳ ସମ୍ପର୍କରେ ଲେଖ ।

(ଛ) ଆଦିବାସୀ ଜୀବନର ବିପର୍ଯ୍ୟୟକୁ ନେଇ ସୁରେନ୍ଦ୍ର ମହାନ୍ତିଙ୍କ ଗୋଟିଏ ଗଳ୍ପର ଉଦାହରଣ ଦିଅ ।

(ଜ) 'ବାବାଜୀ' ନାଟକ ପ୍ରଥମେ କେଉଁଠାରେ ଅଭିନୀତ ହୋଇଥିଲା ?

(ଝ) ମନୋରଞ୍ଜନଙ୍କ 'ଆଗାମୀ' କାହିଁକି ଏକ ପ୍ରତିନିଧ ଶ୍ରେଣୀର ନାଟକ ?

(ଙ) ଚିତ୍ତରଞ୍ଜନ ଦାସଙ୍କ ଦୁଇଟି ପ୍ରବନ୍ଧ ଗ୍ରନ୍ଥର ନାମ ଲେଖ ।

(ଚ) ନଟବର ସାମନ୍ତରାୟଙ୍କ ରାଧାନାଥୀ ସାହିତ୍ୟ ସମ୍ପର୍କରେ ମତାମତ ଉଲ୍ଲେଖ କର ।

(ଠ) ଚିତ୍ତରଞ୍ଜନଙ୍କ ଦାର୍ଶନିକ ଦୃଷ୍ଟି କଣ ?

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । ଭାଗବତରେ ପ୍ରତିଫଳିତ ବୈଷ୍ଣବ ଧର୍ମର ସ୍ୱରୂପ ଓ ତତ୍ତ୍ୱ ସମ୍ପର୍କରେ ଏକ ଆଲେଖ୍ୟ ପ୍ରସ୍ତୁତ କର ।   (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) 'ବୈଦେହୀଶ ବିଳାସ'ରେ ରାମାୟଣର ପ୍ରଭାବ

(ଖ) ଭାଗବତରେ ଗୃହସ୍ଥ ଧର୍ମ

(ଗ) ରୀତି କହିଲେ କଣ ବୁଝ ?

୩ । ଶୂନ୍ୟ ଚେତନା ଓ ମାନବବାଦର ସମନ୍ୱୟ, ଭୀମଭୋଇଙ୍କ କବିତା – ଆଲୋଚନା କର ।   (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ସଚ୍ଚିଦାନନ୍ଦଙ୍କ ବୈପ୍ଲବିକ ଆଭିମୁଖ୍ୟ

(ଖ) ପାଣ୍ଡୁଲିପି

(ଗ) ସଚ୍ଚିଦାନନ୍ଦଙ୍କ ଦୁଇଟି ଗଳ୍ପ ଗ୍ରନ୍ଥର ନାମ ଲେଖ ।

୪ । ଓଡ଼ିଆ କଥା ସାହିତ୍ୟର ଅପ୍ରତିଦ୍ୱନ୍ଦୀ ସ୍ରଷ୍ଟା ସୁରେନ୍ଦ୍ର – ତାଙ୍କ ଉପନ୍ୟାସ ଆଧାରରେ ଆଲୋଚନା କର ।   (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ପ୍ରଥମ ଓଡ଼ିଆ ଗଳ୍ପ

(ଖ) ଫକୀର ମୋହନଙ୍କ ନାରୀ ଚରିତ୍ର

(ଗ) ନୀଳଶୈଳ

୫ । ନବନାଟ୍ୟଧାରାର ଅଗ୍ରଦୂତ ମନୋରଞ୍ଜନ – ପ୍ରମାଣ କର ।   (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ପ୍ରଥମ ଓଡ଼ିଆ ନାଟକ ଓ ତାର ମଞ୍ଚାୟନ

(ଖ) 'ଆଗାମୀ'ର ସଫଳତା

(ଗ) ମନୋରଞ୍ଜନଙ୍କ ଏକାଙ୍କିକା

୬ । ସମାଲୋଚକ ହିଁ ସାହିତ୍ୟର ଶ୍ରେଷ୍ଠ ବିଚାରକ – ନଟବର ସାମନ୍ତରାୟଙ୍କ ସମୀକ୍ଷା ଆଧାରରେ ବିଶ୍ଳେଷଣ କର ।   (୧୨

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨

(କ) ରୋହିତର ଡାଏରୀ

(ଖ) ପ୍ରବନ୍ଧର ପରିଭାଷା

(ଗ) ସମାଲୋଚକର ଧର୍ମ

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

୧ ।   ଯେକୌଣସି ୧୦ଟି ପ୍ରଶ୍ନର ସଂକ୍ଷିପ୍ତ ଉତ୍ତର ଲେଖ ।   (୭ × ୧୦

   (କ) ସୟ୍ୟାଦର ପରିଭାଷା ଲେଖ ।

   (ଖ) ଗଣମାଧ୍ୟମ କଣ ଓ କେତେ ପ୍ରକାର ?

   (ଗ) ଖବରକାଗଜର ଭୂମିକା ସମ୍ପର୍କରେ ସଂକ୍ଷେପରେ ଲେଖ ।

   (ଘ) ବୈଦ୍ୟୁତିକ ଗଣମାଧ୍ୟମ ଓ ମୁଦ୍ରିତ ଗଣମାଧ୍ୟମର ପାର୍ଥକ୍ୟ

   (ଙ) ସୟ୍ୟାଦର ଭାଷା ଅନ୍ୟ ଭାଷାଠାରୁ କିପରି ସ୍ୱତନ୍ତ୍ର ?

   (ଚ) ଗଣମାଧ୍ୟମର ତିନୋଟି ଉପଯୋଗିତା ଉଲ୍ଲେଖ କର ।

   (ଛ) ଗଣମାଧ୍ୟମର ବିକାଶ କେଉଁ ପରିବର୍ତ୍ତନ ଆଣିପାରିଛି ?

   (ଜ) ସୟ୍ୟାଦ ସଂଗ୍ରହର ପଦ୍ଧତିଗୁଡ଼ିକ ଲେଖ ।

   (ଝ) ସାହିତ୍ୟ ଓ ଗଣମାଧ୍ୟମର ସମ୍ପର୍କ କିପରି ?

   (ଞ) 'ଉତ୍କଳ ଦୀପିକା' କେବେ ଓ କାହାଦ୍ୱାରା ପ୍ରକାଶ ପାଇଥିଲା ?

(ଟ) 'ସମ୍ପାଦକଙ୍କୁ ପତ୍ର' ଲେଖିବାର କୌଶଳ ଉଲ୍ଲେଖ କର ।

(ଠ) ଯୋଗାଯୋଗ କ୍ଷେତ୍ରରେ ସାହିତ୍ୟର ଭୂମିକା କିପରି ?

GROUP - B

ସମସ୍ତ ପ୍ରଶ୍ନର ଦୀର୍ଘ ଉତ୍ତର ପ୍ରଦାନ କର ।

୨ । ଗଣମାଧ୍ୟମର ପରିଭାଷା ଦର୍ଶାଇ ଏହାର ସାମାଜିକ ଉପଯୋଗିତା ବିଶ୍ଳେଷଣ କର ।
(୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ଦୂରଦର୍ଶନର ପ୍ରଭାବ

(ଖ) ଗଣମାଧ୍ୟମ ଓ ସାହିତ୍ୟ

(ଗ) ପ୍ରଥମ ଓଡ଼ିଆ ସାହିତ୍ୟ ପତ୍ରିକା

୩ । ସାମାଜିକ ପରିବର୍ତ୍ତନର ସୂତ୍ରଧର ଗଣମାଧ୍ୟମ – ଆଲୋଚନା କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ପୁସ୍ତକ ଓ ପତ୍ରପତ୍ରିକା

(ଖ) ବୈଦ୍ୟୁତିକ ଗଣମାଧ୍ୟମର ଭାଷା

(ଗ) ଓଡ଼ିଶାର ପ୍ରଥମ ଖବରକାଗଜ

୪ । ସମ୍ବାଦର ସ୍ୱରୂପ ଦର୍ଶାଇ ଏହାର ଭାଷା–ଶୈଳୀ ଓ ପ୍ରସ୍ତୁତି ସମ୍ପର୍କରେ ଆଲୋକପାତ କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ସମ୍ପାଦକୀୟ ପ୍ରସ୍ତୁତି

(ଖ) ଗଣମାଧ୍ୟମର ନିରପେକ୍ଷତା

(ଗ) ସମ୍ବାଦର ଭାଷା

୫ । ଯେକୌଣସି ଏକ ଚର୍ଚ୍ଚିତ ସମସ୍ୟା ଉପରେ ଏକ ସମ୍ବାଦ ପ୍ରସ୍ତୁତ କର ।   (୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) "ନିରୁଦ୍ଦିଷ୍ଟ ବ୍ୟକ୍ତି" ସମ୍ପର୍କରେ ସୂଚନାଟିଏ ଲେଖ ।

(ଖ) ଖବରକାଗଜରେ ବିତର୍କ

(ଗ) ସମ୍ବାଦର ଶିରୋନାମା

୬ । ତୁମେ ଦେଖିଥିବା କୌଣସି ଏକ ଐତିହାସିକ ପୀଠ ଉପରେ ଏକ ଫିଚର ପ୍ରସ୍ତୁତ କର ।
(୧୨)

ଅଥବା

ଯେକୌଣସି ଦୁଇଟିର ସଂକ୍ଷିପ୍ତ ଟିପ୍ପଣୀ ଲେଖ ।   (୬ × ୨)

(କ) ଫିଚର କଣ ଓ ଏହା ଅନ୍ୟ ରଚନାଠାରୁ କିପରି ପୃଥକ ?

(ଖ) ସାଧାରଣ ସମ୍ବାଦ ଓ ଫିଚର

(ଗ) ଫିଚର ରଚନାଶୈଳୀ

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

    (a) What is a proposition ?

    (b) Give an example of law of excluded middle.

    (c) Which term is distributed in 'A' proposition ?

    (d) What are the principles of distribution of terms ?

    (e) Give an example of contrary opposition.

    (f) What do you mean by figure ?

    (g) A syllogism consists of _____ propositions .

    (h) What kind of fallacy arises if the middle term is not distrib-
         uted in any of the premises ?

    (i) If one premise be negative, the conclusion must be _____ .

(j) 'BRAMANTIP' is a valid mood of _____ figure.

(k) "The conclusion must be particular" is a special rule of _____ figure.

(l) What is Vyapti ?

(m) What is sesavat inference ?

(n) What do you mean by mood ?

GROUP - B

*Answer **ALL** questions.*

2. Discuss Nyaya method of determining Vyapti. [15

OR

Discuss the nature of Nyaya inference and compare it with Aristotle's syllogism.

3. Explain the distinction between Swarthanumana and Pararthanumana. [15

OR

Write notes any <u>three</u> : [5 × 3

(a) Purvavat inference

(b) Satpraptipaksa

(c) Kevalavyatireki inference

(d) Samanyatodrusta inference

(e) Panchavayavi Nyaya

4. State and explain the opposition of propositions with example. [15

OR

What do you mean by distribution of terms ? Explain the distribution of terms in A, E, I and O propositions.

5. Prove the following : [7½ × 2

(a) No term can be distributed in the conclusion without being distributed in the premises.

(b) If one premise be particular, the conclusion must be particular.

OR

State and prove the special syllogistic rules of second figure. [15

(k) 'Be a person' is the motto of _____ .

(l) 'Act as a member of the kingdom of ends' is the moral maxim of _____ .

GROUP - B

*Answer **ALL** questions.*

2. What is ethics ? Discuss its nature. [15

OR

Explain the relation between ethics and sociology.

3. Distinguish between moral and non-moral actions. [15

OR

What is voluntary action ? Discuss the stages of voluntary action.

4. Discuss Bentham's theory of altruism. [15

OR

What is egoistic hedonism ? Critically examine the features of egoistic hedonism.

5. Briefly discuss Kant's theory of rigorism. [15

OR

Write short notes any <u>two</u> : [7½ × 2

(a) Be a person

(b) Die to live

(c) My station and its duties

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following. [2 × 10

(a) Ethics is a science of _____ .

(b) The word 'norm' means _____ .

(c) Ethics deals with _____ and _____ of human con-duct.

(d) What does the word 'moral' mean ?

(e) Action of idiot is an example of _____ action.

(f) What is universe of desire ?

(g) What do you mean by motive ?

(h) State the forms of ethical hedonism.

(i) Who is the exponent of utilitarianism ?

(j) Factual judgements are _____ in character.

(j) The word 'Religion' is derived from the Latin root _____ .

(k) _____ theory holds that the aim of punishment is to re-form the offender.

(l) 'An eye for an eye' is the principle of _____ theory of pun-ishment.

GROUP - B

*Answer **ALL** questions.*

2. What is social philosophy ? Explain its significance.   [15

OR

Discuss the methods of social philosophy.

3. Briefly discuss the relation between social philosophy and socio-logy.   [15

OR

How is social philosophy related to ethics ? Explain.

4. Critically examine the organic view of the society.   [15

OR

Discuss the distinctive features of family.

5. Explain education as an agency of social control.   [15

OR

Give a full account of retributive theory of punishment.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

(a) Social philosophy is _____ in character.

(b) What is monogamous family ?

(c) What do you mean by polygamy marriage ?

(d) The marriage of a man with a woman belonging to other caste is called _____ marriage.

(e) Political Science is the science of _____ .

(f) Ethics is a _____ science.

(g) Which theory holds that society is a mechanical aggregate of isolated individuals ?

(h) Herbert Spencer is an exponent of _____ theory of soci-ety.

(i) Self-law is a kind of _____ law.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

    (a) What do you mean by authoritarian political system ?

    (b) Write the meaning of political development.

    (c) What do you mean by Proportional Representation ?

    (d) Write two types of political participation.

    (e) Write two types of advantages of political participation.

    (f) What is the composition of Union Legislative Body ?

    (g) Who is considered the political head of the Parliamentary Government ?

    (h) What is the pattern of a federal form of Government ?

    (i) How many sets of Govt. are available in a federation ?

(j)   What type of federation is available in India ?

(k)   What is a hung Parliament ?

(l)   Who exercises control over Council of Ministers ?

(m) Which house of Indian Parliament assumes exclusive power
      Money Bills ?

(n)   What is Zero Hour ?

(o)   What do you mean by nominal executive ?

(p)   Why India is called a quasi federal stste ?

(q)   What is Nationality ?

GROUP - B

Answer ALL questions.

2.   Examine the meaning and agents of political socialization.   [12

OR

Discuss the various factors leading to political development.

3.   Examine the meaning, significance and bases of political partici-
     pation.   [12

OR

Discuss voting behaviour and examine the factors that influence
the voting behaviour in India.

4.   What is Legislature ? Discuss the functions of Legislature.

                                                                   [12

OR

Critically analyse the merits and demerits of Parliamentary form
of Government.

5.   "Federal in form but Unitary in spirit." Critically examine the state-
     ment.   [12

OR

What is Nationalism ? Discuss its implications.

6.   Discuss the regional parties in India.   [12

OR

What do you mean by pressure group ? Describe its merits and
demerits.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

    (a)   What is the relevance of public policy ?

    (b)   Who are the makers of public policy ?

    (c)   What is the meaning of Real Executive ?

    (d)   What is the procedure of removal of the President in India ?

    (e)   Who administers the oath of office to the President of India ?

    (f)   Who presides over the meetings of Lok Sabha in India ?

    (g)   Who certifies a Money Bill in the Lok Sabha ?

    (h)   What is Quorum ?

    (i)   What is a Session ?

    (j)   What is a Budget ?

(k) Who is called the guardian of the Constitution of India ?

(l) What do you mean by E-Governance ?

(m) What do you mean by RTI Act ?

(n) Write two important obligations of state for the successful implementation of Right to Food.

(o) Write two programmes undertaken in India for realising the Right to Education.

GROUP - B

*Answer **ALL** questions.*

2. Explain in brief the inherent weaknesses in India's public policy making. [12

OR

Discuss the duties and responsibilities of a Member of Parliament.

3. Explain the evolution of decentralization process in the urban areas of India. [12

OR

Explain the composition, functions and sources of income of Municipal Corporation.

4. Define the concept of Budget. Explain the role and significance of budget in administration. [12

OR

What is programming budgeting ? Explain the objectives and defects of the programme budgeting.

5. Explain the importance of redressal of grievances in a democracy like India. [12

OR

"The Right to Information – master key to good governance." Explain the statement.

OR

Describe the role of the E-governance as an instrument of the redressal of public grievances.

6. Describe the necessary recomendations to the policy-makers for the successful implementation of the Right to Food. [12

OR

Discuss the issues and initiatives taken to strengthen the implementation of the MNREGA Act.

2019

Time - 3 hours

Full Marks - 80

Answer **both groups** as per instructions.
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

    (a) What do you mean by Globalization ?

    (b) What do you understand by territorial integrity ?

    (c) What do you mean by Global economy ?

    (d) What is the influence of MNCs on developing societies ?

    (e) What do you understand by Rose-revolution ?

    (f) What is the meaning of 'Doctors without Borders' ?

    (g) Express your opinion on worldwide fund for Nature.

    (h) What is Green house effect ?

    (i) What do you mean by non-nuclear states ?

    (j) What is Balance of Power ?

(k) What is C.T.B.T. ?

(l) What are the two major hindrances for disarmament and arms control ?

(m) In which year the National Human Rights Commission was constituted in India ?

GROUP - B

*Answer **ALL** questions.*

2. Define Globalization. Give arguments for and against of Globalization. [12

OR

Describe the causes of the fading territorial sovereignty in the modern globalized world ?

3. Explain the objectives and functions of International Monetary Fund. [12

OR

Explain the objectives and functions of World Trade Organisation.

4. Define Terrorism. Explain in brief the history of the development of terrorism in the world. [12

OR

Describe the major challenges of Nuclear proliferation in the international peace and security.

5. What is climate change ? Explain the causes of the climate change. [12

OR

Explain the features of the Rio + 20 conferences.

6. Define the concept of Human Security. Explain the approaches to human security. [12

OR

Critically analyse the nature and implications of Human Rights.

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Answer <u>any ten</u> of the following.   [2 × 10

   (a) Who proposed the idea of Constituent Assembly for the first time in India ?

   (b) Who is known as the architecture of Indian Constitution ?

   (c) Write four cardinal principles of the Preamble to the Indian Constitution.

   (d) When did the Constitution of India come into force ?

   (e) Why India is regarded as a secular state ?

   (f) What is the composition of Indian Parliament ?

   (g) Who convenes the joint sitting of Parliament in India ?

   (h) What are the special powers of Rajya Sabha ?

   (i) Which house of Indian Parliament assumes exclusive power over money bills ?

(j) From which field the President of India nominates how many members to the Rajya Sabha ?

(k) What are the three types of emergencies and according to which Articles, President of India can promulgate ?

(l) How the Prime Minister of India can be removed from office ?

(m) How the judges of Supreme Court are appointed ?

(n) What do you understand by Advisory Jurisdiction of the Supreme Court ?

(n) What kind of federal state is India ?

GROUP - B

*Answer **ALL** questions.*

2. What is the significance of Preamble to the Constitution of India ?

[12

OR

What are the goals and objectives of the Indian Constitution ?

3. Discuss the role and position of Indian Parliament.   [12

OR

Critically examine the powers and position of India's President.

4. Discuss critically the centralised features of Indian Federation.

[12

OR

Examine the administrative relation between centre and states in India.

5. Explain the powers and functions of Gram Panchayat.   [12

OR

Examine the composition and functions of Zilla Parishad.

6. Explain composition and functions of Election Commission of India. Is the Election Commission an independent body ?   [12

OR

Write a critical note on the electoral reforms in our country.

2019

Time - 3 hours

Full Marks - 80

Answer ***both groups*** *as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on <u>any ten</u> of the following.   [2 × 10

    (a) Excise Duty

    (b) Custom Duty

    (c) VAT

    (d) Zero Rated Sales

    (e) Capital goods

    (f) Difference between Cess and Duty

    (g) Negative list of Service

    (h) Anti-dumping Duty

    (i) Countervailing Duty

    (j) Input tax credit

(k) Baggage

(l) Excisable goods

GROUP - B

Answer ALL questions.

2. What is Indirect Tax ? Briefly explain the importance of Indirect Taxes imposed in India. How is it different from Direct Taxes ?
[12

OR

Discuss the provisions regarding Levy and Collection of Service Tax.

3. What is 'Service Tax' ? Briefly explain the different features of Service Tax. [12

OR

(a) Explain the different types of Assessment procedure related with Service Tax. [6

(b) Explain the different types of penalties imposed on Service Tax. [6

4. Explain the concept of VAT. Discuss the advantages and disadvantages of VAT. [12

OR

What is Input Tax Credit ? Explain the provisions relating to Input Tax Credit under Odisha VAT Act, 2004.

5. What do you mean by Excise Duty ? How is the payment of Excise Duty made ? What is the due date for payment of Excise Duty ? [12

OR

What is CENVAT ? Define capital goods and inputs under CENVAT.

6. What do you mean by Custom Duty ? Explain in detail the customs duties levied under the Custom Act, 1962. [12

OR

Write notes on : [6 × 2

(a) Baggage

(b) Different Exemptions under Custom Law

Calculate – [3 × 4

(a) P/V Ratio

(b) Fixed expenses

(c) Break Even Sales

(d) Sales to earn profit of ₹ 5 lakh.

OR

Write notes on : [6 × 2

(a) Cash Flow Statement

(b) Make or Buy Decision

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*

Figures in the right hand margin indicate marks.

GROUP - A

1. Write short notes on <u>any ten</u> of the following. [2 × 10

(a) Direct Cost

(b) Indirect Cost

(c) Scrap

(d) Wastage

(e) Purchase Requisition

(f) ABC analysis

(g) Minimum level

(h) Job costing

(i) Margin of Safety

(j) Standard Cost

(k) Cost plus contract

GROUP - B

Answer ALL questions.

2. What is Cost Accounting ? Write down its scope and needs.

    [12

    OR

    Briefly discuss Material Control techniques.

3. What is Accounting for Overheads ? Write down its classification and discuss reasons for under and over absorption.   [12

    OR

    The standard time for a job is 60 hours. The hourly rate of wages is ₹ 0.75. The hourly wage rate of worker 'A' is ₹ 0.90 due to his saving time under Rowan Plan. For the same saving in time, calculate the hourly rate of wages of worker 'B' under the Halsey Premium Plan.

4. What do you mean by the term 'normal process loss', 'abnormal process loss' and 'abnormal gain' ? How would you treat them in account ? Give answer with examples.   [12

    OR

    (a) Discuss the reasons for disagreement of cost account and financial account.   [8

    (b) Explain Work in Progress Account.   [4

5. Distinguish between :   [6 × 2

    (a) Zero base Budget and Flexible budget

    (b) Fixed Budget and Flexible Budget

    OR

    From the information below, compute –   [3 × 4

    (a) Material Cost variance

    (b) Material Usage variance

    (c) Material Price variance

    (d) Material Mix variance

Particulars	Standard		Actual	
	Qnty	Price	Qnty	Price
P	40 kgs	₹ 50 per kg	50 kgs	₹ 50 per kg
Q	60 kgs	₹ 40 per kg	50 kgs	₹ 40 per kg

6. The sales turnover and profit during two periods were as follows :

Period	Sales (in lakh ₹)	Profit (in lakh ₹)
2016	20	2
2017	30	4

2019

Time - 3 hours

Full Marks - 80

*Answer **both groups** as per instructions.*
Figures in the right hand margin indicate marks.

GROUP - A

1. Write notes on <u>any ten</u> of the following in one or two sentences each.   [2 × 10

   (a) Under development

   (b) MIxed economy

   (c) Primary sector

   (d) Capitalistic farming

   (e) Economic planning

   (f) Liberalisation

   (g) Infant mortality rate

   (h) Density of population

   (i) Seasonal unemployment

(j)   Public distribution system

(k)   Cottage industry

(l)   WTO

GROUP - B

*Answer **ALL** questions.*

2.   Define Economic Development. Explain various methods of mea-
     suring Economic Development.   [12

OR

What is human development ? Explain various factors affecting
human development.

3.   Explain the features of Indian economy at the time of indepen-
     dence.   [12

OR

Explain the sectoral composition and occupational structure of
Indian economy at the time of independence.

4.   Explain the objectives and strategy of Indian Five Year Plans.
                                                                [12

OR

Explain the features of New Economic Policy of 1991.

5.   Explain the Industrial Policy Resolution of 1991.   [12

OR

Examine the effects of population explosion on economic devel-
opment of India.

6.   Explain the problems faced by small scale and cottage industries
     in India. Suggest the measures taken by government to overcome
     the problems.   [12

OR

Write notes on :   [6 × 2

(a)   Balance of Payments

(b)   Foreign Trade Policy of India