

DAY — **04**

SEAT NUMBER

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2025 VI 28

1100

**J-339****(E)****PHYSICS (54)**

Time : 3 Hrs.

(8 Pages)

Max. Marks : 70

**General Instructions :**

The question paper is divided into four sections :

- (1) **Section A :** Q. No. 1 contains Ten multiple choice type of questions carrying One mark each.  
Q. No. 2 contains Eight very short answer type of questions carrying One mark each.
- (2) **Section B :** Q. No. 3 to Q. No. 14 contain Twelve short answer type of questions carrying Two marks each. (Attempt any Eight).
- (3) **Section C :** Q. No. 15 to Q. No. 26 contain Twelve short answer type of questions carrying Three marks each. (Attempt any Eight).
- (4) **Section D :** Q. No. 27 to Q. No. 31 contain Five long answer type of questions carrying Four marks each. (Attempt any Three).
- (5) Use of the log table is allowed. Use of calculator is **not** allowed.
- (6) Figures to the right indicate full marks.
- (7) For multiple choice type questions, only the first attempt will be considered for evaluation.

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(8) *Physical Constants :*

- (i)  $h = 6.63 \times 10^{-34} \text{ Js}$
- (ii)  $c = 3 \times 10^8 \text{ m/s}$
- (iii)  $\pi = 3.142$
- (iv)  $g = 9.8 \text{ m/s}^2$
- (v)  $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{Nm}^2$
- (vi)  $\mu_0 = 4\pi \times 10^{-7} \text{ Wb/Am}$
- (vii) mass of electron  $m_e = 9.11 \times 10^{-31} \text{ kg}$
- (viii) mass of proton  $m_p = 1.672 \times 10^{-27} \text{ kg}$
- (ix) Stefan's constant,  $\sigma = 5.67 \times 10^{-8} \text{ Jm}^{-2}\text{s}^{-1}\text{k}^{-4}$
- (x) Rydberg's constant,  $R_H = 1.097 \times 10^7 \text{ m}^{-1}$

## SECTION – A

Q. 1. Select and write the correct answers for the following multiple choice type of questions :

[10]

- (i) For which of the following bodies, the principle of perpendicular axes is applicable?
  - (a) Spherical
  - (b) Conical
  - (c) Cylindrical
  - (d) Laminar
- (ii) Which of the following equation represents a simple harmonic progressive wave travelling along the negative X-direction?
  - (a)  $Y = a \sin (kx - \omega t)$
  - (b)  $Y = a \sin (kx + \omega t)$
  - (c)  $Y = a \sin (ky - \omega t)$
  - (d)  $Y = a \sin (ky + \omega t)$

- (iii) In a cyclotron final kinetic energy of a particle revolving in a circular path of radius 'R'<sub>exit</sub> is :
- (a) K.E.  $\propto R_{\text{exit}}$
- (b) K.E.  $\propto R_{\text{exit}}^2$
- (c) K.E.  $\propto \frac{1}{R_{\text{exit}}}$
- (d) K.E.  $\propto \frac{1}{R_{\text{exit}}^2}$
- (iv) For which of the following metals, photoelectric effect is possible for visible radiation?
- (a) Zinc (b) Cadmium
- (c) Magnesium (d) Sodium
- (v) The gyromagnetic ratio of electron is \_\_\_\_\_.
- (a)  $\frac{2m_e}{e}$  (b)  $\frac{2m_e}{e^2}$
- (c)  $\frac{e}{2m_e}$  (d)  $\frac{e^2}{2m_e}$
- (vi) Two capillary tubes of radii 0.3 cm and 0.6 cm are dipped in the same liquid, the ratio of heights to which the liquid will rise in the tubes is \_\_\_\_\_.
- (a) 1 : 2 (b) 2 : 1
- (c) 1 : 4 (d) 4 : 1
- (vii) Kirchhoff's Voltage Law applied to a loop deals with the conservation of \_\_\_\_\_.
- (a) momentum (b) mass
- (c) energy (d) charge

(viii) How many times the intensity of an unpolarized light wave reduces after passing through a polarizer?

(a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$

(c)  $\frac{1}{6}$  (d)  $\frac{1}{8}$

(ix) If pressure of gas contained in a closed vessel is increased by 0.4% when heated by 1°C, its initial temperature must be \_\_\_\_\_.

(a) 200°C (b) 250°C

(c) 300°C (d) 350°C

(x) The wavelength and power of the incident light is 4000 Å and 0.1W respectively. The number of incident photons is \_\_\_\_\_.

(a)  $2.011 \times 10^{17}$  (b)  $3.011 \times 10^{17}$

(c)  $4.011 \times 10^{17}$  (d)  $5.011 \times 10^{17}$

Q. 2. Answer the following questions :

[8]

(i) What is the velocity of a particle performing linear SHM, at extreme position?

(ii) What happens to the ferromagnetic substance when it is heated above Curie temperature?

(iii) What is the coefficient of transmission for athermanous materials?

(iv) In a photodiode, on which property the dark current depends?

- (v) Define mutual inductance.
- (vi) What is magnetization?
- (vii) A metal ring of radius 20 cm is rotating about a transverse axis passing through its centre. What will be its radius of gyration about the same axis?
- (viii) In a hydraulic lift, area of pistons are  $A_1$  and  $A_2$  respectively ( $A_2 \gg A_1$ ). If force  $F_1$  is applied on piston 1, then what is the force exerted on piston 2?

## SECTION – B

Attempt any EIGHT questions of the following :

[16]

- Q. 3. Obtain an expression for moment of inertia of a uniform disc of mass 'M' and radius 'R' rotating about an axis passing through its centre and perpendicular to its plane.
- Q. 4. What is the effect of impurities on surface tension of a liquid?
- Q. 5. Explain the thermodynamics of adiabatic process to obtain adiabatic constant for rigid diatomic molecule of a gas?
- Q. 6. Draw a neat labelled diagram of variation of kinetic energy and potential energy with displacement in S.H.M.
- Q. 7. Assuming an equation of magnetic force due to arbitrarily shaped wire, obtain an expression for force on a closed circuit in a uniform magnetic field.
- Q. 8. Distinguish between diamagnetic and paramagnetic substances.

- Q. 9. State Faraday's laws in electromagnetic induction.
- Q. 10. In a purely resistive circuit a source of e.m.f. having  $e = 140\sin(3142t)$  is connected across a pure resistor. If value of rms current is 1.98A, calculate the value of resistance.
- Q. 11. The differential equation of linear S.H.M. in SI units is  $\frac{d^2x}{dt^2} = -36x$ . Calculate its frequency and periodic time.
- Q. 12. Two tuning forks having frequencies 160 Hz and 170 Hz are sounded together to produce sound waves. The velocity of sound in air is  $326.4 \text{ ms}^{-1}$ . Calculate the difference between wavelengths of these waves.
- Q. 13. What must be the ratio of the slit width to the wavelength for a single slit to have the first diffraction minimum at  $45^\circ$ ?
- Q. 14. A potential gradient of a wire is  $0.5\text{V/m}$ . If the e.m.f. of a cell balances against 216 cm of this potentiometer wire, calculate e.m.f. of the cell.

## SECTION – C

Attempt any EIGHT questions of the following : [24]

- Q. 15. Obtain an expression for torque acting on a rigid body rotating with constant angular acceleration.
- Q. 16. Define the terms –
- (a) Cohesive force
  - (b) Range of molecular force
  - (c) Sphere of influence

- Q. 17. Show that only odd harmonics are present in the vibrations of air column in a pipe closed at one end.
- Q. 18. Obtain an expression for the electric intensity at a point outside a uniformly charged spherical shell.
- Q. 19. With the help of neat labelled circuit diagram explain the use of metre bridge to determine unknown resistance.
- Q. 20. Derive an expression for the magnetic field produced at the centre of a circular arc of a wire carrying current  $I$ .
- Q. 21. Derive the decay law of radioactivity and state SI unit of 'activity.'
- Q. 22. Find the shortest and longest wavelengths in the Lyman series of hydrogen atom.
- Q. 23. The de-Broglie wavelengths associated with an electron and proton are same. Calculate the ratio of their momentum and kinetic energies.
- Q. 24. A parallel plate capacitor is maintained at potential of 400V. If area of plates is  $40 \text{ cm}^2$  and separation between plates is 40 mm, calculate displacement current in  $1\mu\text{s}$ .
- Q. 25. A 120 watt filament lamp loses all its energy by radiation from its surface. The emissivity of the surface is 0.6. The area of the surface is  $3.53 \times 10^{-3} \text{ m}^2$ . Calculate the temperature of the filament.
- Q. 26. A Carnot engine receives 4000J of heat from a reservoir at 500K, does some work, rejects 2000J heat to reservoir at 200K.
- (a) How much work does it do?
- (b) What is its efficiency?

## SECTION – D

Attempt any **THREE** questions of the following :

[12]

- Q. 27. Define isothermal process. Obtain an expression for work done during isothermal process. Draw P–V diagram.
- Q. 28. Using phasor diagram for a series LCR circuit, obtain an expression for impedance. Define admittance.
- Q. 29. Obtain an expression for motional e.m.f. in a rotating bar with constant angular velocity ' $\omega$ ' in uniform magnetic field perpendicular to plane of rotation.

The mutual inductance (M) of the two coils is 1.5H. The self inductances of the coils are 5H and 4H. Calculate the coefficient of coupling between the coils.

- Q. 30. Define logic gate and explain why NOT gate is called an inverter.

The transistor is in the common emitter configuration. Its DC current gain is 50. If collector current is 3mA, calculate the base current.

- Q. 31. State the four conditions for obtaining well defined and steady interference pattern.

Light incident at angle  $52.5^\circ$  on a bucket filled with water be completely polarised after reflection. Calculate the refractive index of the water.



DAY — **10**

SEAT NUMBER

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2025 VII 05

1100

**J-410**

(E)

## BIOLOGY (56)

Time : 3 Hrs.

(8 Pages)

Max. Marks : 70

### General Instructions :

*The question paper is divided into four sections.*

(1) **Section A :** *Q. No. 1 contains Ten multiple choice type of questions carrying one mark each. Evaluation will be done for the first attempt only.*

*Q. No. 2 Contains Eight very short answer type of questions carrying one mark each.*

(2) **Section B :** *Q. No. 3 to 14 are short answer type of questions carrying two marks each. (Attempt any Eight)*

(3) **Section C :** *Q. No. 15 to 26 are short answer type of questions carrying three marks each. (Attempt any Eight)*

(4) **Section D :** *Q. No. 27 to 31 are long answer type of questions carrying four marks each. (Attempt any Three)*

(5) *Begin the answer of each section on a new page.*

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## SECTION – A

Q. 1. Select and write the correct answer for the following multiple choice type of questions : [10]

- (i) The number of base pairs present around a histone octamer of nucleosome is \_\_\_\_ .
- (a) 200 (b) 146  
(c) 54 (d) 20
- (ii) Which of the following is NOT a sensory nerve?
- (a) I (b) II  
(c) III (d) VIII
- (iii) Which of the following biofertilizers is used by farmers to increase the yield of rice crop?
- (a) Azotobacter (b) Azospirillum  
(c) Bacillus (d) Azolla
- (iv) Connecting link between amphibians and reptiles is \_\_\_\_ .
- (a) Archaeopteryx (b) Australopithecus  
(c) Seymouria (d) Ichthyosaurus
- (v) The type of gene interaction deviating from Mendel's findings of 3 : 1 to 1 : 2 is \_\_\_\_ .
- (a) Incomplete dominance  
(b) Codominance  
(c) Multiple alleles  
(d) Pleiotropy

- (vi) Identify initiation codon of mRNA from the following.
- (a) UAA (b) AUG  
(c) UAG (d) UGA
- (vii) Identify the type of association between orchid growing as an epiphyte on branch of mango tree.
- (a) Parasitism (b) Amensalism  
(c) Commensalism (d) Mutualism
- (viii) Which of the following substances protects pollen grains from chemicals?
- (a) Pectin (b) Hemicellulose  
(c) Cellulose (d) Sporopollenin
- (ix) The part of antibody which binds with the specific antigen to form antigen-antibody complex is \_\_\_\_.
- (a) Paratopes (b) Isotopes  
(c) Epitopes (d) Octamer
- (x) Which genes are used for improvement of oil content and oil quality in plants?
- (a) Phytase gene (b) Arabidopsis gene  
(c) Holandric gene (d) Oncogene

**Q. 2. Answer the following questions :**

**[8]**

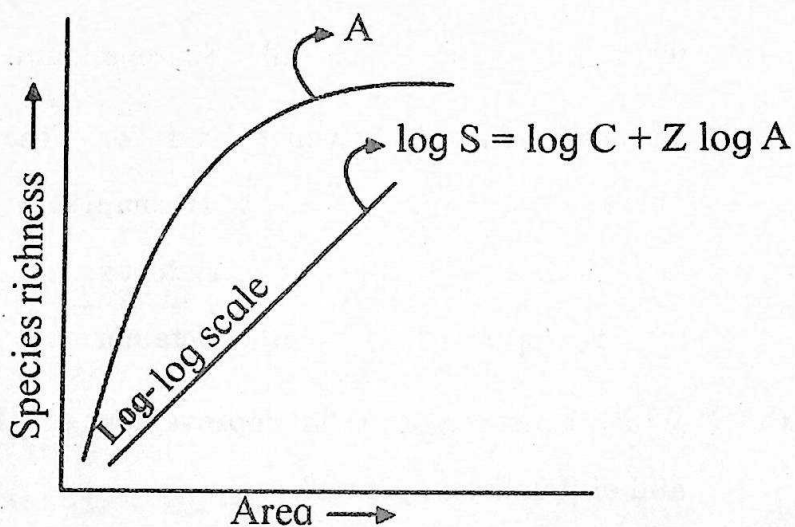
- (i) Give term for "The total genetic information encoded in sum total of genes in a Mendelian population."

- (ii) Name the process in which swelling of hydrophilic colloids occur due to adsorption of water.
- (iii) Give the term for the condition in which the number of WBCs in blood decreases below normal.
- (iv) What is the term, when nucleotides on DNA strands shows the following sequence of base pairs.

3'.....CTT AAG.....5'

5'.....GAA TTC .....3'

- (v) Identify 'A' from the graph given below showing species area relationship :



- (vi) Name the disorder in which deficiency of ADH leads to reduced water reabsorption and increase in urine output.
- (vii) Name the permanent birth control method in which the fallopian tube is tied and cut.

- (viii) Name the long term storage places of carbon in the form of rocks and fossil fuels which are away from carbon cycle.

## SECTION – B

Attempt any EIGHT of the following questions :

[16]

- Q. 3. Give any two reasons why breathing through nose is beneficial than through mouth.
- Q. 4. Mention any two molecular evidences of evolution.
- Q. 5. Enlist any four uses of gene therapy.
- Q. 6. Define the terms :
- (a) Explant
  - (b) Callus
- Q. 7. Identify the disorders showing following symptoms :
- (a) Constriction of bronchioles, mucus build up in bronchioles, periodic wheezing, difficulty in breathing.
  - (b) Inflammation of sinuses and mucous discharge.
- Q. 8. Define- AGR and RGR regarding plant growth.
- Q. 9. Draw a neat diagram of structure of root hair showing vacuole, mitochondria and nucleus.
- Q. 10. Enlist the types of chromosomes on the basis of position of centromere.

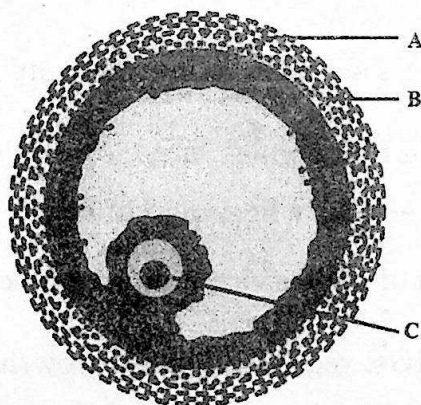
- Q. 11. Mention any four drawbacks of Darwinism.
- Q. 12. Write appropriate equations to represent Ammonification.
- Q. 13. Give any two functions of Medulla oblongata.
- Q. 14. Differentiate between Inspiration and Expiration with respect to position of diaphragm and working of intercostal muscles.

## SECTION – C

Attempt any EIGHT of the following questions :

[24]

- Q. 15. What is adolescence? Mention any four characteristics of 15 to 17 years age group.
- Q. 16. Identify A, B and C from the given diagram of Graafian follicle and mention their significance :



- Q. 17. (a) Which part of CNS produces CSF?  
 (b) Give any four functions of CSF.

- Q. 18. Write the name and position of any three valves in human heart.
- Q. 19. Describe any three chemical defence mechanisms in plants against herbivores in population interaction.
- Q. 20. Mention any six symptoms of disorder caused by trisomy of 21<sup>st</sup> chromosome.
- Q. 21. Describe the development of male gametophyte from microspore. Draw a neat labelled diagram of male gametophyte.
- Q. 22. Define decomposition. Explain any four steps of decomposition in correct sequence.
- Q. 23. Give deficiency symptoms of following elements in plants :
- Potassium ( $K^+$ )
  - Magnesium ( $Mg^{++}$ )
  - Boron ( $BO^{-3}$ )
- Q. 24. Give scientific names of sugarcane varieties native of North and South India. Name the centre in India which has developed sugarcane varieties containing high sugar.
- Q. 25. With appropriate terms, complete the following chart and rewrite it :

Sr.No.	Disorder/Diseases Health Condition	Recombinant Protein (s)
(i)	Parturition	_____
(ii)	Emphysema	_____
(iii)	_____	Hepatitis B vaccine

- Q. 26. Mention any two major types of air pollutants. Add a note on their ill effects on human health.

## SECTION – D

Attempt any THREE of the following questions :

[12]

- Q. 27. Define endosperm. Describe types of endosperm.
- Q. 28. With the help of a neat labelled diagram, describe the structure of human sperm.
- Q. 29. Describe the transcription and processing of hnRNA to mRNA in Eukaryotes.
- Q. 30. What is transpiration? Draw well labelled diagram showing structure of stomatal apparatus in dicotyledons? Mention any three advantages of transpiration.
- Q. 31. Name any four hormones secreted by adenohypophysis and give their significance.



DAY — **08**

SEAT NUMBER

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2025 VII 03

1100

**J-384**

(E)

**MATHEMATICS & STATISTICS (40)  
(ARTS & SCIENCE)**

Time : 3 Hrs.

(8 Pages)

Max. Marks : 80

**General instructions :**

The question paper is divided into **FOUR** sections.

- (1) **Section A :** Q. 1 contains **Eight** multiple choice type questions carrying **Two** marks each.  
Q. 2 contains **Four** very short answer type questions carrying **One** mark each.
- (2) **Section B :** Q. 3 to Q. 14 contain **Twelve** short answer type questions, each carrying **Two** marks.  
(Attempt any **Eight**)
- (3) **Section C :** Q. 15 to Q. 26 contain **Twelve** short answer type questions, each carrying **Three** marks.  
(Attempt any **Eight**)
- (4) **Section D :** Q. 27 to Q. 34 contain **Eight** long answer type questions, each carrying **Four** marks.  
(Attempt any **Five**)
- (5) Use of log table is allowed. Use of calculator is not allowed.
- (6) Figures to the right indicate full marks.
- (7) Use of graph paper is not necessary. Only rough sketch of graph is expected.

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- (8) For each multiple choice type of questions, only the first attempt will be considered for evaluation.
- (9) Start answer to each section on a new page.

## SECTION - A

**Q. 1.** Select and write the correct answer of the following multiple choice type of questions : [16]

- (i) The inverse of statement pattern  $(p \vee q) \rightarrow (p \wedge q)$  is \_\_\_\_\_
- (a)  $(p \wedge q) \rightarrow (p \vee q)$   
 (b)  $\sim(p \vee q) \rightarrow (p \wedge q)$   
 (c)  $(\sim p \wedge \sim q) \rightarrow (\sim p \vee \sim q)$   
 (d)  $(\sim p \vee \sim q) \rightarrow (\sim p \wedge \sim q)$  (2)
- (ii) In  $\triangle ABC$ , if  $a = 2$ ,  $b = 3$  and  $\sin A = \frac{2}{3}$ , then  $\angle B =$  \_\_\_\_\_
- (a)  $\frac{\pi}{2}$  (b)  $\frac{\pi}{3}$   
 (c)  $\frac{\pi}{4}$  (d)  $\frac{\pi}{6}$  (2)
- (iii) If  $\overline{AB} = 2\hat{i} - 4\hat{j} + 7\hat{k}$  and initial point  $A \equiv (1, 5, 0)$  then terminal point  $B$  is \_\_\_\_\_
- (a)  $(1, 3, 7)$  (b)  $(7, 3, 1)$   
 (c)  $(1, 7, 3)$  (d)  $(3, 1, 7)$  (2)
- (iv) The angle between the lines  
 $\vec{r} = (\hat{i} + 2\hat{j} + 3\hat{k}) + \lambda(2\hat{i} - 2\hat{j} + \hat{k})$  and  
 $\vec{r} = (\hat{i} + 2\hat{j} + 3\hat{k}) + \mu(\hat{i} + 2\hat{j} + 2\hat{k})$  is \_\_\_\_\_
- (a)  $\frac{\pi}{4}$  (b)  $\frac{\pi}{2}$   
 (c)  $\frac{\pi}{3}$  (d)  $0$  (2)

(v) If  $y$  is a function of  $x$  and  $\log(x+y) = xy$  then the value of

$\left(\frac{dy}{dx}\right)$  at  $x=0$  is \_\_\_\_\_

(a) 1

(b) -1

(c) 2

(d) 0

(2)

(vi) If the displacement of a particle at time  $t$  is given by  $S = 2t^3 - 5t^2 + 4t - 3$ , then its acceleration at time  $t = 1$  is \_\_\_\_\_

(a) 2

(b) 8

(c) 10

(d) 14

(2)

(vii) The solution of the D.E.

$\sec^2 x \cdot \tan y dx + \sec^2 y \cdot \tan x dy = 0$  is \_\_\_\_\_

(a)  $\tan x \cdot \cot y = c$

(b)  $\cot x - \cot y = c$

(c)  $\tan x \cdot \tan y = c$

(d)  $\cot x - \tan y = c$

(2)

(viii) If  $X$  is waiting time in minutes for a bus and its p.d.f. is

given by  $f(x) = \frac{1}{5}$ , for  $0 \leq x \leq 5$ ,

$= 0$ , otherwise

then the probability that waiting time is between 1 and

3 is \_\_\_\_\_

(a)  $\frac{1}{5}$

(b)  $\frac{2}{5}$

(c)  $\frac{3}{5}$

(d)  $\frac{4}{5}$

(2)

Q. 2. Answer the following questions :

[4]

- (i) Find the general solution of  $\tan \theta = 0$ . (1)
- (ii) Find the magnitude of the vector  $\vec{a} = 3\hat{i} + \hat{j} + 7\hat{k}$  (1)
- (iii) Find  $\frac{dy}{dx}$ , if  $y = \sin(\log x)$ . (1)
- (iv) Evaluate :  $\int \frac{1}{\sqrt{x}} dx$ . (1)

## SECTION - B

Attempt any EIGHT of the following questions :

[16]

- Q. 3. Using truth table, prove that  $\sim p \wedge q \equiv (p \vee q) \wedge \sim p$  (2)
- Q. 4. Find the cofactors of the elements of the matrix  $\begin{bmatrix} 2 & -3 \\ 3 & 5 \end{bmatrix}$  (2)
- Q. 5. Find the polar coordinates of the point whose cartesian coordinates are  $(-\sqrt{2}, -\sqrt{2})$ . (2)
- Q. 6. In  $\Delta ABC$ , if  $a = 2$ ,  $b = 3$ ,  $c = 4$ , then prove that the triangle is obtuse angled. (2)
- Q. 7. If  $\vec{a} = 3\hat{i} - \hat{j} + 2\hat{k}$ ,  $\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$ , then find  $|\vec{a} \times \vec{b}|$  (2)
- Q. 8. Find the cartesian equation of the plane passing through the point  $A(-1, 2, 3)$ , the direction ratios of whose normal are 0, 2, 5. (2)
- Q. 9. Find  $\frac{dy}{dx}$ , if  $x\sqrt{x} + y\sqrt{y} = a\sqrt{a}$ . (2)
- Q. 10. Show that the tangent to the curve  $y = x^3 - 6x^2 + x + 3$  at the point  $(0, 3)$  is parallel to the line  $y = x + 5$ . (2)

- Q. 11. Check whether the conditions of Rolle's theorem are satisfied by the function  $f(x) = x^2 - 4x + 3, x \in [1, 3]$  (2)
- Q. 12. Evaluate :  $\int \frac{dx}{x+x^{-10}}$  (2)
- Q. 13. Evaluate :  $\int_0^{-1} e^{-x} dx$  (2)
- Q. 14. If  $X \sim B(n, p)$  and  $E(X) = 6, Var(X) = 4.2$ , then find  $n$  and  $p$ . (2)

## SECTION - C

Attempt any EIGHT of the following questions : [24]

- Q. 15. In  $\Delta ABC$ , prove that  $a^2 = b^2 + c^2 - 2bc \cos A$  (3)
- Q. 16. Find the combined equation of pair of lines passing through (2, 3) and perpendicular to the lines  $3x + 2y - 1 = 0$  and  $x - 3y + 2 = 0$ . (3)
- Q. 17. Show that the acute angle  $\theta$  between the lines represented by  $ax^2 + 2hxy + by^2 = 0$  is given by,
- $$\tan \theta = \left| \frac{2\sqrt{h^2 - ab}}{a+b} \right| \quad (3)$$
- Q. 18. Using vector method, prove that the medians of a triangle are concurrent. (3)
- Q. 19. Find the vector equation of the plane passing through the point  $A(-1, 2, -5)$  and parallel to the vectors  $4\hat{i} - \hat{j} + 3\hat{k}$  and  $\hat{i} + \hat{j} - \hat{k}$ . (3)

Q. 20. Find the shortest distance between the lines,  $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$   
and  $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$ . (3)

Q. 21. Water is being poured at the rate of  $27 \text{ m}^3/\text{sec}$  into a cylindrical vessel of base radius 3 m. Find the rate at which the water level is rising. (3)

Q. 22. Evaluate :  $\int \frac{\sin(x+a)}{\cos(x-b)} dx$  (3)

Q. 23. Solve the D.E.

$$\frac{dy}{dx} + \frac{y}{x} = x^3 - 3 \quad (3)$$

Q. 24. Obtain the differential equation by eliminating the arbitrary constants from  $y = c_1 \cos(\log x) + c_2 \sin(\log x)$ . (3)

Q. 25. The probability distribution of  $X$  is as follows :

$x$	0	1	2	3	4
$P[X=x]$	0.1	$k$	$2k$	$2k$	$k$

Find (i)  $k$ , (ii)  $P(X < 2)$ , (iii)  $P[1 \leq X < 4]$  (3)

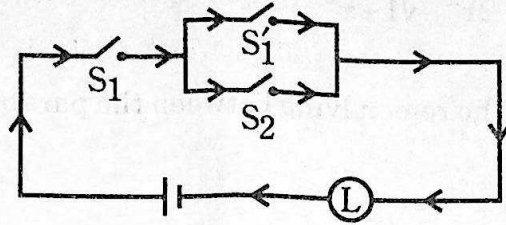
Q. 26. In a multiple choice examination with three possible answers for each of the five questions, what is the probability that a candidate would get four correct answers just by guessing? (3)

# SECTION – D

Attempt any FIVE of the following questions :

[20]

- Q. 27. Give an alternative equivalent simple circuit for the following switching circuit :



(4)

- Q. 28. The sum of three numbers is 2. If twice of the second number is added to the sum of first and third number we get 0. Adding five times the first number to twice the sum of second and third number we get 7. Find the numbers using matrix method.

(4)

- Q. 29. Using properties of scalar triple product, prove that

$$[\bar{a} + \bar{b} \quad \bar{b} + \bar{c} \quad \bar{c} + \bar{a}] = 2[\bar{a} \quad \bar{b} \quad \bar{c}]$$

(4)

- Q. 30. Solve the following L.P.P. using graphical method :

Maximize,  $z = 9x + 13y$

Subject to,  $2x + 3y \leq 18,$

$$2x + y \leq 10$$

$$x \geq 0, y \geq 0$$

(4)

- Q. 31. If  $x = f(t)$  and  $y = g(t)$  are differentiable functions of  $t$ , so that  $y$

is a function of  $x$  and  $\frac{dx}{dt} \neq 0$ , then prove that

$$\frac{dy}{dx} = \frac{\left(\frac{dy}{dt}\right)}{\left(\frac{dx}{dt}\right)}$$

Hence find  $\frac{dy}{dx}$ , if  $y = at^2$  and  $x = 2at$ .

(4)

Q. 32. Prove that:  $\int \sqrt{a^2 - x^2} \cdot dx = \frac{x}{2} \cdot \sqrt{a^2 - x^2} + \frac{a^2}{2} \cdot \sin^{-1} \left( \frac{x}{a} \right) + c$  (4)

Q. 33. Evaluate:  $\int_0^{\frac{1}{2}} \frac{dx}{(1-2x^2) \cdot \sqrt{1-x^2}}$  (4)

Q. 34. Find the area of the region lying between the parabolas  $y^2 = 4x$  and  $x^2 = 4y$ . (4)



DAY — **06**

SEAT NUMBER

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2025 VII 01

1100

**J-371****(E)****CHEMISTRY (55)**

Time : 3 Hrs.

( 8 Pages)

Max. Marks : 70

*General Instructions :*

*The question paper is divided into four sections.*

- (1) *Section A : Q. No. 1 contains Ten multiple choice type of questions carrying One mark each. Only the first attempt will be considered for evaluation. Q. No. 2 contains Eight very short answer type of questions carrying One mark each.*
- (2) *Section B : Q. No. 3 to Q. No. 14 are Twelve short answer type -I questions carrying Two marks each. (Attempt any Eight)*
- (3) *Section C : Q. No. 15 to Q. No. 26 are Twelve short answer type -II questions carrying Three marks each. (Attempt any Eight)*
- (4) *Section D : Q. No. 27 to Q. No. 31 are Five long answer type of questions carrying Four marks each. (Attempt any Three)*
- (5) *Use of log table is allowed. Use of calculator is not allowed.*
- (6) *Figures to the right indicate full marks.*

(7) Given data :

(i)  $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$

(ii) At. Wt. of Oxygen = 16

(iii)  $N_A = 6.022 \times 10^{23}$

(iv)  $1F = 96500^\circ\text{C}$

## SECTION - A

Q. 1. Select and write the correct answer for the following multiple choice type of questions :

[10]

(i) Coordination number of atoms in bcc crystal lattice is \_\_\_\_\_.

(a) 2

(b) 4

(c) 6

(d) 8

(ii) The unit of Henry's Law constant is \_\_\_\_\_.

(a)  $\text{mol L}^{-1} \text{ bar}^{-1}$

(b)  $\text{mol}^{-1} \text{ L bar}^{-1}$

(c)  $\text{mol L}^{-1} \text{ bar}$

(d)  $\text{mol}^{-1} \text{ L}^{-1} \text{ bar}^{-1}$

(iii) pH of human blood is \_\_\_\_\_.

(a) 6.9

(b) 7.0

(c) 7.4

(d) 8.1

(iv) Ideal gas expands isothermally from  $20\text{dm}^3$  to  $25\text{dm}^3$  at constant pressure of 1.5 bar ; then work done in  $\text{dm}^3 \text{ bar}$  will be \_\_\_\_\_.

(a) -1.5

(b) -5

(c) -7.00

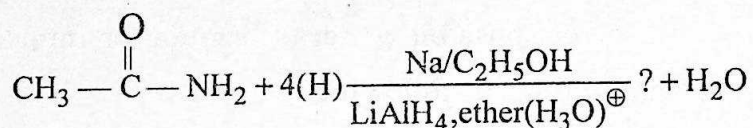
(d) -7.5

- (v) Correct statement about electrolysis of aqueous NaCl is \_\_\_\_\_.
- (a)  $H_2$  gas liberated at cathode
  - (b)  $Cl_2$  gas liberated at cathode
  - (c)  $H_2$  gas liberated at anode
  - (d)  $O_2$  gas liberated at anode
- (vi) Rate constant of reaction is  $\text{mole dm}^{-3} \text{sec}^{-1}$ , the order of reaction will be \_\_\_\_\_.
- (a) Zero
  - (b) One
  - (c) 1.5
  - (d) 2
- (vii) The correct possible general formula for interhalogen compound in the following is –
- (a)  $XX_2$
  - (b)  $XX_3$
  - (c)  $XX_4$
  - (d)  $XX_6$
- (viii) All radioactive elements are present in which of the following \_\_\_\_\_.
- (a) 3d series
  - (b) 4d series
  - (c) Actinoid series
  - (d) Lanthanoid series
- (ix) The metal used in preparation of Grignard reagent is \_\_\_\_\_.
- (a) Al
  - (b) Mg
  - (c) Na
  - (d) Fe
- (x) Which among the following is dicarboxylic acid –
- (a) Acetic acid
  - (b) Phthalic acid
  - (c) Caproic acid
  - (d) Citric acid

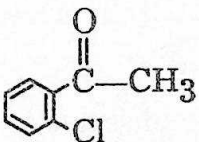
Q. 2. Answer the following questions :

[8]

- (i) Write formula to calculate percent (%) atom economy of particular reaction.
- (ii) Write name of monomer used to form nylon-6 polymer.
- (iii) Write the total number of chiral carbon atoms present in glucose.
- (iv) Complete the following reaction

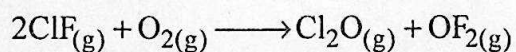


- (v) Write name of reagent used to convert phenol to Benzene.

- (vi) Write IUPAC name for 

- (vii) Write oxidation state of 'Fe' in  $[\text{Fe}(\text{CN})_6]^{4\ominus}$  complex ion.

- (viii) When 6.0g of  $\text{O}_2$  reacts with ClF as per



The enthalpy change is 38.55 kJ. Calculate the standard enthalpy of the reaction.

# SECTION - B

Attempt any EIGHT of the following questions :

[16]

- Q. 3. When gold crystallizes, it forms face-centered cubic cells. The unit cell edge length is  $4 \times 10^{-8}$  cm. Calculate the density of gold. Molar mass of gold is  $197 \text{ g mol}^{-1}$ .
- Q. 4. Define the following terms :
- (a) Isotonic solution
  - (b) Colligative properties
- Q. 5. A solution has hydrogen ion concentration 0.01M. Calculate pOH of the same solution.
- Q. 6. Derive the relation between  $\Delta H$  and  $\Delta U$  for gaseous phase reaction.
- Q. 7. What is Salt bridge? Write the functions of salt bridge.
- Q. 8. Distinguish between order and molecularity of a reaction.
- Q. 9. Explain anomalous behaviour of Fluorine with respect to
- (i) Oxyacid
  - (ii) Nature of hydrides
  - (iii) Electronegativity
  - (iv) Electron gain enthalpy
- Q. 10. Balance the following chemical reactions.
- (i)  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{KI} + \text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 +$   
 $\text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O} + \text{I}_2$
- (ii)  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 + \text{H}_2\text{S} \longrightarrow \text{K}_2\text{SO}_4 +$   
 $\text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O} + 3\text{S}$

- Q. 11. Write IUPAC names of following co-ordination ion / compound.
- $[\text{Cu}(\text{NH}_3)_4]^{2\oplus}$
  - $\text{Na}_3[\text{AlF}_6]$
- Q. 12. Complete the following reactions –
- $\text{CH}_3 - \text{CH} = \text{CH}_2 + \text{HBr} \longrightarrow ?$
  - $\text{C}_2\text{H}_5\text{OH} + \text{SOCl}_2 \xrightarrow{\Delta} ?$
- Q. 13. Write chemical reactions for the preparation of phenol from isopropyl benzene.
- Q. 14. Write a note on Haloform reaction.

## SECTION - C

Attempt any EIGHT of the following questions :

[24]

- Q. 15. A mixture of benzene and toluene contains 30% by mass of toluene. At  $30^\circ\text{C}$ , vapour pressure of pure toluene is 36.7 mmHg and that of pure benzene is 118.2 mmHg. Assuming that the two liquids form ideal solution, calculate partial pressure of each constituent in the above solution at  $30^\circ\text{C}$ .
- Q. 16. Define :
- Buffer solution
  - Solubility product
  - Common ion effect
- Q. 17. Calculate maximum work done when 32 g of oxygen expanded isothermally and reversibly from pressure 2 bar to 1 bar at 298 K.
- Q. 18. What is zero order reaction? Derive integrated rate law equation for zero order reaction.

- Q. 19. (a) Write structures of :  
(i) Chlorous acid  
(ii) Perchloric acid  
(b) Write uses of Helium
- Q. 20. (a) What is Lanthanoid contraction?  
(b) Compounds of 'd' block elements are coloured in solid state as well as in an aqueous state. Explain.
- Q. 21. (a) Write the representation of sodium hexacyanoferrate (III)  
(b) Write type of hybridization and magnetic behaviour of the following –  
(i)  $[\text{Co}(\text{NH}_3)_6]^{3\oplus}$   
(ii)  $[\text{NiCl}_4]^{2\ominus}$
- Q. 22. Convert – (Indicate by reaction)  
(a) Acetic acid to ethyl acetate  
(b) Acetaldehyde to acetaldoxime  
(c) Acetone to propane
- Q. 23. (a) What is the action of following on ethylamine –  
(i) Hinsberg reagent  
(ii) Nitrous acid  
(b) Write increasing order of basicity for  $\text{CH}_3\text{NH}_2$ ,  $(\text{CH}_3)_2\text{NH}$  and  $(\text{CH}_3)_3\text{N}$
- Q. 24. (a) What are monosaccharides?  
(b) Draw Zwitter ion structure of  $\alpha$  amino acid.  
(c) Write name of components of the nucleotide monomers.
- Q. 25. (a) Write chemical reaction for preparation of Teflon.  
(b) Write structure of monomer of natural rubber.  
(c) Give two uses of high density polyethene [HDP].

- Q. 26. Explain the following terms :
- Sustainable development
  - Nanomaterial
  - Name the gamma isomer of BHC.

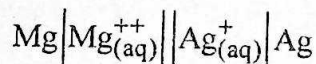
## SECTION - D

Attempt any THREE of the following questions :

[12]

- Q. 27.
  - Distinguish between crystalline and amorphous solids.
  - Explain bleaching action of chlorine in the presence of moisture.

- Q. 28.
  - Draw neat and labelled diagram of standard hydrogen electrode.
  - Calculate e.m.f. of the following cell.



If  $E_{\text{Mg}}^0 = -2.37\text{Volt}$  and  $E_{\text{Ag}}^0 = 0.8\text{Volt}$ .

- Q. 29.
  - State whether the following reaction is spontaneous or non spontaneous if  $\Delta H = 50 \text{ kJ}$  and  $\Delta S = -130 \text{ JK}^{-1}$  at  $250\text{K}$ .
  - Explain optical activity in 2-chlorobutane.
  - Write full name of DDT.
- Q. 30.
  - Define Co-ordination number.
  - Write note on Reimer-Tieman reaction.
  - Write structural formula for methyl vinyl ether.
- Q. 31.
  - Explain Aldol condensation reaction of ethanal.
  - Write four properties of interstitial compounds of transition elements.



DAY - **14**

SEAT NUMBER

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2025

VII

10

1100

**V - 144**

(E)

**COMPUTER SCIENCE**

**PAPER - I (D-9)**

**Time : 3 Hours**

**4 Pages**

**Max. Marks : 50**

- Instructions :*
- (1) All questions are compulsory.
  - (2) Figures to the right indicate full marks.
  - (3) Use of any type of calculator not allowed.
  - (4) Draw a neat diagram wherever necessary.

1. Select the correct option form the following and rewrite sentences :

- (a) Wastage of memory space within the partition is called as \_\_\_\_\_. 1
- (i) Internal fragmentation
  - (ii) External fragmentation
  - (iii) Compaction
  - (iv) None of these
- (b) \_\_\_\_\_ is the only non-linear data structure . 1
- (i) Array
  - (ii) Stack
  - (iii) Tree
  - (iv) Linked List
- (c) Object oriented programming uses \_\_\_\_\_ approach of programming. 1
- (i) Linear
  - (ii) Non-linear
  - (iii) Top-down
  - (iv) Bottom-up

- (d) In HTML, for green colour RGB code is \_\_\_\_\_ 1
- (i) # 000000
- (ii) # FF0000
- (iii) # 00FF00
- (iv) # 0000FF
- (B) Answer **any two** of the following :
- (a) Explain Running, Ready and Blocked Process. States in process management. 3
- (b) What is Inserting ? Write an algorithm for inserting an element into a linear array. 3
- (c) Explain with example : 3  
<UL> and <OL> tags in HTML
2. (A) Answer **any two** of the following :
- (a) Explain the following concept related to object oriented programming : 3
- (i) Class
- (ii) Inheritance
- (iii) Polymorphism
- (b) What is Record ? How it differs form Linear Array ? 3
- (c) Explain in short the function of Menu Bar and Scroll Bar Component of GUI. 3
- (B) Answer **any one** of the following :
- (a) Explain context switching at a process level in multiprogramming system with example. 4
- (b) What is Inheritance ? Explain any three type of inheritance with suitable diagram. 4
3. (A) Answer **any two** of the following :
- (a) Discuss Virus detection, removal and prevention phylosophies. 3
- (b) Write the Binary search Algoririthm with suitable example. 3
- (c) Write any six features of object oriented programming. 3

- (B) Answer **any one** of the following :
- (a) What is Binary Tree ? Draw the tree structure for the following expression : 4  

$$Y = (A + B) / [(C * D + E)]$$
- (b) Explain how records are represented in memory using array with suitable examples of four records and four fields. 4
4. (A) Answer **any two** of the following :
- (a) Explain in short the three main areas in which the operating system divide its services. 3
- (b) Explain in short the three special characteristics of a static data member in a class. 3
- (c) Explain 'Call by value' and 'Call buy reference' with suitable example. 3
- (B) Answer **any one** of the following :
- (a) What is Linked List ? Explain a linked list with suitable example having six nodes with properly labeled diagram. 4
- (b) State any eight basic rules for virtual function that satisfy the compiler requirement. 4
5. Answer **any two** of the following :
- (a) Write a C++ program to find the smallest of five given integers using min() faction to return the smallest of five given integers. 5
- (b) Implement a circle lass. Each object of this class will represent a circle accepting its radius value as of float. Evaluate an area() function which will calculate the area of circle. 5
- (c) Write the HTML code for the following table : 5
- |       |        | Year     |          |           |
|-------|--------|----------|----------|-----------|
|       |        | 1999     | 2000     | 2001      |
| Sales | Units  | 300      | 750      | 1200      |
|       | Income | Rs. 3000 | Rs. 7500 | Rs. 12000 |
- OR**
5. (a) Write a C++ program to input 'n' elements in an one dimensional array and input one another number and check whether this number is present in the array or not. 5
- (b) Write an OOP in C++ to find area of triangle 5  
 (hint =  $a = \frac{1}{2} * b * h$ )

(c) Write HTML code for the following output :

5

- Science
    - Physics
    - Chemistry
    - Maths
    - Computer Science
  - Arts
    - English
    - Marathi
    - Hindi
    - IT
  - Commerce
    - Accounts
    - Auditing
    - Costing
    - IT
-

DAY - **16**

SEAT NUMBER

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2025

VII

12

1100

**V - 178**

(E)

**COMPUTER SCIENCE**

**PAPER - II (D-9)**

**Time : 3 Hours**

**4 Pages**

**Max. Marks : 50**

*Instructions : (1) All questions are compulsory.*

*(2) Figures to the right indicate full marks.*

*(3) Use of any type of calculator is not allowed.*

*(4) Draw neat diagrams, wherever necessary.*

1. (A) Select the correct alternative and rewrite the following :

4

(a) From the following options below \_\_\_\_\_ is not vectored interrupt.

(i) Trap

(ii) RST 7.5

(iii) RST 6.5

(iv) INTR

(b) After execution of XTHL instruction in 8085 Microprocessor stack pointer is \_\_\_\_\_.

(i) increased by 2

(ii) decreased by 2

(iii) remains same

(iv) increased by 1

(c) The RAM size of 8049 microcontroller is \_\_\_\_\_.

(i) 64 bytes

(ii) 128 bytes

(iii) 256 bytes

(iv) 512 bytes

(d) If the network is to be extended beyond pre defined cable limit \_\_\_\_\_ is used.

- (i) Modem
- (ii) Repeater
- (iii) Hub
- (iv) Router

(B) Answer **any two** of the following :

6

- (a) What is Microprocessor ? Write any four functions performed by Microprocessor.
- (b) Write purpose of following pins of 8085 Microprocessor :
  - (i) HOLD
  - (ii) INTR
  - (iii) ALE
- (c) Define Microcontroller. State any four advantages of same over Microprocessor based system.

2. (A) Answer **any two** of the following :

6

- (a) Considering following points explain the instruction INX rp :
  - (i) Addressing mode
  - (ii) Flags affected
  - (iii) Meaning of instruction
- (b) What do you mean by one byte, two byte, three byte instruction in 8085 Microprocessor ? Give one example for each.
- (c) Define following characteristic of transmission media :
  - (i) Band width
  - (ii) Band usage
  - (iii) Attenuation

(B) Answer **any one** of the following :

4

- (a) Explain the following term with respect to block diagram of Microcomputers system :
  - (i) Key board interface
  - (ii) ROM
  - (iii) RAM
  - (iv) Display interface
- (b) Draw labelled diagram MODEM. Define Asynchronous and Synchronous Modem.

3. (A) Answer **any two** of the following : 6
- (a) Define BUS Topology. Draw labelled diagram. State any two advantages.
  - (b) Differentiate between STP and UTP.
  - (c) State the function of following registers in 8085 Microprocessor :
    - (i) Accumulator
    - (ii) Stack Pointer
    - (iii) Program Counter
- (B) Answer **any one** of the following : 4
- (a) What is access method in networking ? Define contention, token passing and polling access method.
  - (b) How Accumulator is different than general purpose register in 8085 Microprocessor ? (State any four points)
4. (A) Answer **any two** of the following : 6
- (a) Define Hardware Interrupt. Write branching addresses of vectored hardware interrupt with their priority.
  - (b) Write RAM and ROM sizes of following Microcontrollers :
    - (i) 8048
    - (ii) 8051
    - (iii) 8052
  - (c) Compare any three attributes of 80286 and pentium microprocessor.
- (B) Answer **any one** of the following : 4
- (a) If accumulator contains the data ABH and register B contains 54H. What will be the contents of accumulator in hexadecimal after execution of each of the instructions dependently (Stepwise i.e. one after another)
    - (i) ANA B
    - (ii) CMA
    - (iii) CMP B
    - (iv) ANI 00H
  - (b) Draw labelled diagram of programming model related with 80286 Microprocessor with register set.

5. Answer any two of the following :

10

- (a) Write an Assembly Language program to divide the data at location 9900H by the data stored at location 9901H. Store the quotient and remainder in 9902H and 9903H memory locations respectively.
- (b) Write an Assembly Language Program to count the number of times data 9DH is found in block of memory locations starting from 8901H. Length of the block is stored in memory location 8900H. Store the result in memory location 8000H.
- (c) A 16 bit number beginning with lower order byte is stored from memory location 7000H. Write a Assembly Language Program to find its two's (2's) compliment and store the result beginning with lower order byte from memory location 7500H.

OR

5. Answer any two of the following :

10

- (a) Write an Assembly Language Program to find one's (1's) compliment of a number stored at memory location D000H without using CMA instruction and store result at memory location D001H.
  - (b) Write an Assembly Language Program to check whether fourth and fifth bits of a hexadecimal number stored in memory location D900H is logical one then store 00H else FFH of memory location D901H.
  - (c) Write an Assembly Language Program to copy a block of data stored in memory location from D100H to D10FH in new memory location starting of E100H.
-

DAY - 14

SEAT NUMBER

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2025

VII

10

1100

V - 143

(E)

**ELECTRONICS  
PAPER - I (C-2)**

**Time : 3 Hours**

**4 Pages**

**Max. Marks : 50**

- Instructions :*
- (1) All questions are compulsory.
  - (2) Figures to the right indicate full marks.
  - (3) Draw neat labelled diagrams wherever necessary.
  - (4) Use of logarithmic table is allowed.

1. (A) Select correct alternatives from the following sub-question and rewrite the complete sentences :
- (a) In function generator for the generation of triangular wave \_\_\_\_\_ circuit is used. 1
- (i) Integrator
  - (ii) Schmitt Trigger
  - (iii) Resistance diode wave shaping
  - (iv) Differentiator
- (b) In SMPS \_\_\_\_\_ feedback is used. 1
- (i) Positive
  - (ii) Negative
  - (iii) Positive and Negative
  - (iv) No
- (c) Capacitive transducer is \_\_\_\_\_ transducer. 1
- (i) Displacement
  - (ii) Self generative
  - (iii) Negative resistance
  - (iv) Light

- (d) Fibre Optic Cable carries \_\_\_\_\_ . 1
- (i) Electric signal
  - (ii) Light signal
  - (iii) Side bands
  - (iv) Video signals
- (B) Attempt **any two** of the following :
- (a) A 9-0-9 volt transformer is connected to a full wave rectifier circuit with load resistance  $120\Omega$ . 3
 

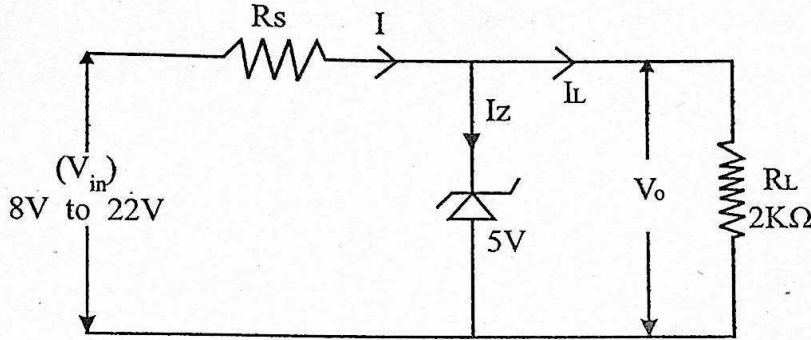
Calculate :

    - (i) Peak value of voltage
    - (ii) Average DC Voltage
    - (iii) Load current
  - (b) Derive an expression for output voltage of non-inverting amplifier using Op-Amp with circuit diagram. 3
  - (c) Compare AM with FM. (Any 3 points) 3
2. (A) Attempt **any two** of the following :
- (a) Explain electrostatic focussing system of CRT with neat diagram. 3
  - (b) Derive an expression for output voltage of Op-Amp as inverting adder with the help of circuit diagram. 3
  - (c) State advantages of fibre optic cable over normal cable. 3
- (B) Attempt **any one** of the following :
- (a) Explain transistorized series voltage regulator with neat circuit diagram. 4
  - (b) Draw the block diagram of Op-Amp and explain the function of each block. 4
3. (A) Attempt **any two** of the following :
- (a) Explain the working of piezoelectric transducer. State its applications. 3
  - (b) Explain with circuit diagram the working of buffer using Op-Amp. State its use. 3
  - (c) Explain LAN, MAN and WAN in computer network with one application of each. 3

(B) Attempt any one of the following :

(a) Draw labelled diagram of Cathode Ray Tube and explain its working. 4

(b) In a Zener voltage regulator circuit input voltage varies from 8V to 22V find the minimum and maximum Zener current if Zener voltage is 5V; series resistance is  $200\Omega$  and  $R_L$  is  $2K\Omega$ . Find the power rating of zener diode. 4



4. (A) Attempt any two of the following :

(a) Explain the working of Capacitive Transducer. 3

(b) State any six applications of Satellite Communication. 3

(c) Explain the use of IC 555 as FSK generator. 3

(B) Attempt any one of the following :

(a) How Op-Amp can be used as Subtractor ? Explain with neat circuit diagram. 4

(b) Draw the block diagram of regulated power supply and briefly explain the function of each block. 4

5. (A) Attempt any two of the following :

(a) Draw the circuit diagram of time base generator and explain its working. 3

(b) Compare RC coupled and differential amplifier. 3

(c) Explain how sidebands are produced in amplitude modulation. Draw frequency domain display of AM signal. 3

(B) Attempt any one of the following :

(a) Draw the circuit of bridge rectifier with an inductor filter at the output. Explain the working. Draw the waveform. 4

(b) Draw and explain the block diagram of FSK modem. 4

OR

5. (A) Attempt **any two** of the following :
- (a) State passive transducer and explain thermistor. 3
  - (b) Define : 3
    - (i) Modulation Index
    - (ii) Deviation Ratio
    - (iii) Carrier swing in frequency modulation.
  - (c) Draw pin diagram of IC 741. State the specifications of IC 741. 3
- (B) Attempt **any one** of the following :
- (a) Explain the use of CRO for measurement of frequency and phase using lissajous figures. 4
  - (b) Explain the following types of voltage comparators using Op-Amp : 4
    - (i) Zero reference – Inverting
    - (ii) Zero reference – Non-Inverting
    - (iii) Non-Zero reference – Inverting
    - (iv) Non-Zero reference – Non-Inverting
-

DAY - 16

SEAT NUMBER

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2025 VII 12

1100

V-177

(E)

**ELECTRONICS  
PAPER - II (C-2)**

**Time : 3 Hours**

**4 Pages**

**Max. Marks : 50**

- Instructions :*
- (1) All questions are compulsory.
  - (2) Figures to the right indicate full marks.
  - (3) Draw neat labelled diagram.
  - (4) Use of logarithmic table is allowed.

1. (A) Select correct alternatives from the following sub-questions and rewrite the complete sentences :

- (a)  $A \oplus A$  is equal to \_\_\_\_\_. 1
- (i) A
  - (ii) 0
  - (iii) 1
  - (iv)  $\overline{A}$
- (b) Figure of merit is expressed in \_\_\_\_\_. 1
- (i) Picojoules
  - (ii) Nanoseconds
  - (iii) Milliwatts
  - (iv) Volt
- (c) 1:32 demultiplexer can be designed with \_\_\_\_\_ select lines. 1
- (i) 2
  - (ii) 5
  - (iii) 16
  - (iv) 32

- (d) In counter type A/D converter \_\_\_\_\_ reference voltage is used. 1
- (i) Sinusoidal
  - (ii) Stair case
  - (iii) Saw-tooth
  - (iv) Square wave
- (B) Attempt **any two** of the following :
- (a) Explain method of conversion of binary number to decimal number. 3  
Perform  $\therefore (1101 \cdot 101)_2 = ( )_{10}$
  - (b) Explain the working of TTL inverter (Not Gate). 3
  - (c) Design a 8:1 Multiplexer using two 4:1 Multiplexer ICS. 3
2. (A) Attempt **any two** of the following :
- (a) Why NAND gate is called as universal building block ? Construct OR, NOT Gate using NAND gate. 3
  - (b) Draw the logic diagram of R-S flip-flop using NOR gates and explain its working. 3
  - (c) Draw block diagram and explain working of simultaneous A/D Converter. 3
- (B) Attempt **any one** of the following :
- (a) Define radix of a number system. Explain decimal to hexadecimal conversion with suitable example containing integer and fractional part. 4
  - (b) Explain the working of BCD to 7 segment decoder/drivers using IC-7447. 4
3. (A) Attempt **any two** of the following :
- (a) State any six characteristics of digital IC. 3
  - (b) Compare Multiplexer and Demultiplexer. 3
  - (c) State any four input devices used in a computer, explain any one of them. 3
- (B) Attempt **any one** of the following :
- (a) Draw a circuit diagram of 4-bit binary adder/subtractor and explain it's working. 4
  - (b) Draw J-K master-slave flip-flop with NAND gates. Explain it with truth table. 4

4. (A) Attempt **any two** of the following :
- (a) Differentiate between Inclusive and Exclusive OR gates. 3
  - (b) Which type of Multiplexer will be required to implement the following expression ? Draw the necessary block diagram. 3  

$$F(A, B, C) = \sum m (0, 2, 4, 6)$$
  - (c) Draw the logic diagram, symbol and write truth table of D flip-flop. 3
- (B) Attempt **any one** of the following :
- (a) Explain 1's complement method of binary subtraction. Perform the following using 1's complement method. 4
    - (i)  $(1101)_2 - (111)_2$
    - (ii)  $(10)_2 - (101)_2$
  - (b) Explain the working of counter types A/D Converter. 4
5. (A) Attempt **any two** of the following :
- (a) Draw basic circuit of TTL NAND gate and explain its working. 3
  - (b) Draw logic diagram of 1:4 Demultiplexer and explain its working with its truth table. 3
  - (c) How many flip-flops are required to construct each of the following counters ? 3
    - (i) Mod - 3
    - (ii) Mod - 9
    - (iii) Mod - 16
- (B) Attempt **any one** of the following :
- (a) Explain BCD code. State its advantage and disadvantage. 4
  - (b) Explain in Brief : 4
    - (i) RAM
    - (ii) ROM
    - (iii) PROM
    - (iv) EPROM

**OR**

5. (A) Attempt **any two** of the following :
- (a) Draw the logic diagram using gates for following Boolean equation : 3  
$$Y = \overline{A}B + A\overline{B} + \overline{A}\overline{B}\overline{C}$$
  - (b) Explain BCD to decimal decoder using gates. 3
  - (c) Explain the working of 4-bit shift right register with neat diagram and output waveform. 3
- (B) Attempt **any one** of the following :
- (a) Draw the block diagram of Mod-16 ripple counter and explain it's working with truth table. 4
  - (b) In 4-bit R-2R ladder D/A converter find : 4
    - (i) Full scale output voltage.
    - (ii) Analog output voltage for 1011 and 1100
- Given : Logic 0 = 0V, logic 1 = 10V
-

DAY — **01**

SEAT NUMBER

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2025

VI

24

1100

**J-311****(E)****ENGLISH (01)**

Time : 3 Hrs.

(16 Pages)

Max. Marks : 80

**Important instructions :**

- (1) Each activity has to be answered in a full sentence/s. One word answers will not be given complete credit. Just the correct activity number written in case of options will not be given credit.
- (2) Web diagrams, flow charts, tables, etc. are to be presented exactly as they are with answers.
- (3) In point 2 above, just words without the presentation of the activity format/design, will not be given credit. Use of colour pencils/pens etc. is not allowed. (Only blue/black pens are allowed.)
- (4) Multiple answers to the same activity will be treated as wrong and will not be given any credit.
- (5) Maintain the sequence of the Sections/Question Nos./Activities throughout the activity sheet.

## SECTION - I : PROSE

(Reading for Comprehension, Language Study,  
Summary and Mind Mapping)

Q. 1. (A) Read the extract and complete the activities given below : (12) [16]

Shaaz Jung is a wildlife photographer, cinematographer, big cat tracker, man-animal conflict resolution seeker and lodge owner - all rolled into one. When he's away from the jungles of Nagarhole, officially called The Rajiv Gandhi National Park, he's leading photography safaris in Africa or showcasing his work at Art Galleries in capital cities and speaking to those interested in conserving the planet's riches.

Shaaz recalls with great clarity the incident that ultimately leads to his answering the call of the felines over a career dedicated to finance. "It was somewhere around sunset. We were at a junction. The deer were calling," he says, "we went around a blind turn," he continues, "and up ahead on the path was this old leopard. You could tell he was past his prime. The jungle had taken a toll on him. He only had three canines. His eyes were sagging. Close to this leopard was another very young, good looking male who was soon to come into his prime. It was clear that there was going to be a fight. Unfortunately, the sun was setting, and we had to leave. But the next morning, I went back to the spot. Sitting on a high rock was that young leopard. Blood was dripping from a gash across his face. He sat there like he was, 'king of the jungle.' I knew right then that he had taken over, that it was the beginning of a new journey for him. And for me."

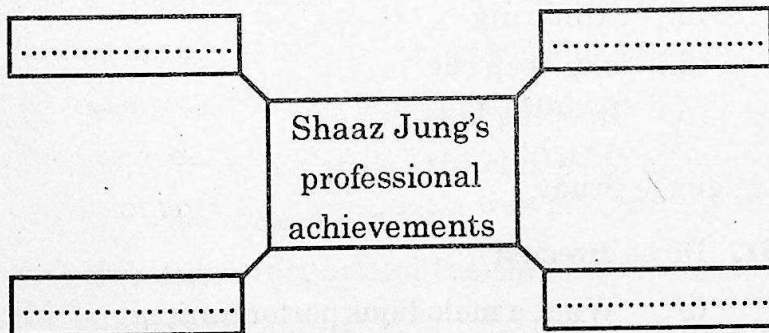
Photographs of that leopard, the victor, Scarface, as Shaaz named him, not only made Shaaz famous among

India's wildlife community, but also led to Shaaz's enviable reputation as a chronicler of the wild. "Through my journey of photographing Scarface, I have discovered other leopards, his mates and discovered his nemeses-tigers. I also discovered the current protagonist of my work-Saya-while tracking Scarface. This is the world's first black panther, the behaviour of which is being documented so intimately on camera, by tracking its movements. So far all the research on the animal has been done through camera traps." Through many months of toil, Shaaz has managed to collect precious footage, including that of the animal mating, to piece together the incredible landscape of a black panther's life.

A1. Read and rewrite the following sentences and state whether they are True or False : (2)

- (a) Jungles of Nagarhole is called the Rajiv Gandhi National Park.
- (b) Nearly at sunset, Shaaz was at a Junction.
- (c) Shaaz had collected precious footage very easily.
- (d) By tracking black panther's movements, its behaviour is documented.

A2. Complete the following web-diagram mentioning any four of Shaaz Jung's professional achievements : (2)



**A3. Give reasons :** (2)

The writer says, "It was like looking at the past and the present" because \_\_\_\_\_

**A4. 'Wildlife photography is a thrilling hobby.' Write your views to justify the statement.** (2)

**A5. Do as directed :** (2)

(1) You could tell he was past his prime.

(Choose the correct option where 'be able to' is used from the options given below and rewrite)

- (a) You are able to tell he was past his prime.
- (b) You will be able to tell he was past his prime.
- (c) You weren't able to tell he was past his prime.
- (d) You were able to tell he was past his prime.

(2) The Jungle had taken a toll on him.

(Choose the correct Passive voice from the given options and rewrite.)

- (a) A toll on him had been taken by the jungle.
- (b) A toll on him had taken by the jungle.
- (c) A toll on him has been taken by the jungle.
- (d) A toll on him was being taken by the jungle.

**A6. Find out the synonyms of the following from the extract:** (2)

- (i) closely
- (ii) exhibiting
- (iii) long deep cut
- (iv) drooping lags

**(B) Language Study :** (4)

**B1. Do as directed :** (3)

(i) "What a melodious performance it is!" Mr. Swami said to his daughter. (1)

(Choose the correct alternative showing the Indirect narration of the given sentence.)

- (a) Mr. Swami said to his daughter that it was a very melodious performance.
- (b) Mr. Swami exclaimed that it was a very melodious performance.
- (c) Mr. Swami told to his daughter that it is a very melodious performance.
- (d) Mr. Swami surprised to his daughter that it was a very melodious performance.

(ii) The commander rapidly passed on the instructions. (1)

(Choose the correct – 'Wh' question from the given options to get the underlined word as the answer.)

- (a) How did the commander pass on the instructions?
- (b) Who passed the instructions on the commander?
- (c) What does the commander pass on the instructions?
- (d) How does the commander pass on the instructions?

(iii) You must attend the classes. You can qualify for the examination. (1)

(Choose the correct alternative to transform the sentence into a compound sentence.)

- (a) You must attend the classes so as to qualify for the examination.
- (b) You must attend the classes but qualify for the examination.

- (c) You must qualify for the examination and attend the classes.
- (d) You must attend the classes and qualify for the examination.

**B2.** Spot the error and rewrite the correct sentence : (1)

Dr. Dixit has being practising for twenty years in this city.

**Q. 2. (A)** Read the extract and complete the activities given below : (12) [18]

The moon is our inseparable companion in space. It is nearer to the earth than any other heavenly body. It is, in fact, a satellite of the earth.

Although it is called a satellite, it is much bigger than many of the satellites of other planets. Therefore, it is sometimes called the earth's sister planet and sometimes, the earth and the moon are together called a double planet.

The moon orbits the earth at a distance varying from 3,53,000 kilometers to 4,05,500 kilometers at a speed of 3,680 kilometers per hour. It takes 27 days, 7 hours, 11 minutes and 5 seconds for one complete revolution. But this duration varies, because the moon, like all the planets, is constantly under the gravitational influences of other planets, the earth and the sun.

The moon is also turning on its axis all the time just as the earth is. The length of the time the moon takes to rotate once is about the same as the time it takes to orbit once round the earth. The result of this is that from the earth we always see the same side of the moon. The unseen face is called the far side.

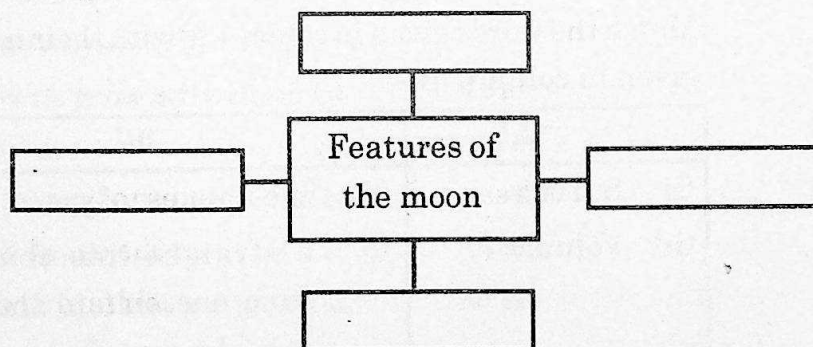
It seems to us that the moon rises in the east and sets in the west, just as the sun and the stars do. This rising and setting, however, are due only to the rotation of the earth. It is the earth turning round and round on its axis that causes the appearance of rising and setting.

The moon is light in weight and small in volume as compared to the earth. It has only one fiftieth (150<sup>th</sup>) of the earth's volume and one eightieth (180<sup>th</sup>) of its mass. Its diameter is only one-fourth that of the earth, being 3,456 kilometers. Its surface area does not exceed 7.5 percent of the earth's surface area, that is, it is only about the area of Africa and Europe put together.

A1. Find out two correct statements from the given options and rewrite them : (2)

- (a) The moon is light in weight and small in volume.
- (b) The moon is a smaller satellite compared to many other satellites of other planets.
- (c) The moon does not turn on its axis at all just as the earth does.
- (d) The moon takes 27 days, 7 hours, 11 minutes and 5 seconds for one complete revolution.

A2. Complete the web diagram given below: (2)



- A3.** Explain the reason for the variation in the duration for the moon's single complete revolution from the extract. (2)
- A4.** Describe 'Moon' - as a satellite in your own words. (2)
- A5.** Language study : (2)

- (i) The moon is nearer to the earth than any other heavenly bodies.

(Identify and rewrite the correct positive degree form of the above sentence from the given options.)

- (a) The moon is nearer to the earth than any other heavenly bodies.
- (b) Very few heavenly bodies are as near to the earth as the moon.
- (c) No other heavenly body is as near to the earth as the moon.
- (d) The moon is the nearest to the earth of all heavenly bodies.

- (ii) The unseen face is called the far side.

(Identify and rewrite the correct transformation of the above sentence beginning with, 'we.....')

- (a) We called the far side as unseen face.
- (b) We called the unseen face as far side.
- (c) We call the unseen face as far side.
- (d) We calls the unseen face as far side.

- A6.** Vocabulary : (2)

Match the words given in column 'A' with their meanings given in column 'B' -

'A'	'B'
(i) Surface	(a) the amount of space.
(ii) Volume	(b) a straight line that goes from one side to the other side of a circle.

(iii) Diameter	(c) Curved path taken by a planet as it moves around another planet.
(iv) Orbit	(d) Top or flat part of thing.

(B) Summarising :

(3)

Write a 'Summary' of the above extract by using the following points –

Space companion — revolution — gravity — features.

(C) Mind Mapping :

(3)

Prepare a mind map on the topic 'Benefits of English Language.' Frame/design using your ideas/thoughts/concepts to illustrate.

## SECTION - II : POETRY

(Poetry and Appreciation)

Q. 3. (A) Read the extract and complete the activities given below : (10) [14]

The river has a soul.

It knows, stretching past the town,  
from the first drop of rain to dry earth  
and mist on the mountaintops,  
the river knows  
the immortality of water.

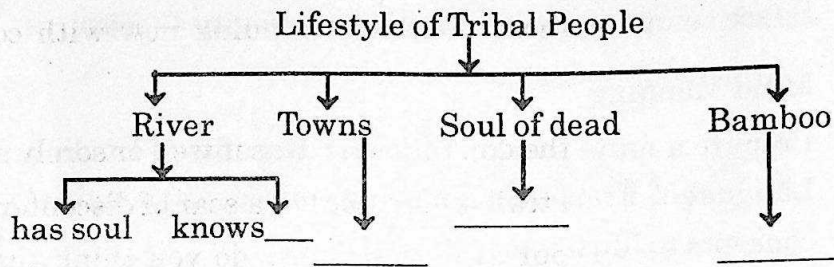
A shrine of happy pictures  
marks the days of childhood.  
Small towns grow with anxiety  
for the future.

The dead are placed pointing west.  
When the soul rises  
it will walk into the golden east,  
into the house of the sun.

In the cool bamboo,  
restored in sunlight,  
life matters, like this.

In small towns by the river  
we all want to walk with the gods.

- A1. Complete the tree diagram about the lifestyle of tribal people : (2)



- A2. Give reasons. (2)

The dead are placed pointing west because

- (i) \_\_\_\_\_  
(ii) \_\_\_\_\_

- A3. Express your views on the importance of forests in about 2/3 lines. (2)

- A4. Find out and explain the figure of speech used in the following lines : (2)

When the soul rises  
It will walk into the golden east  
into the house of the sun

- A5. Compose 2/4 lines or a stanza on 'Childhood memories.' (2)

- (B) Appreciation : (4)

Read the extract and write the appreciation of the poem given below :

Did you give a cheerful greeting to the friend who came along?  
Or a churlish sort of "Howdy" and then vanish in the throng?

Were you selfish pure and simple as you rushed along  
the way,  
Or is someone mighty grateful for a deed you did today?  
Can you say tonight, in parting with the days that's  
slipping fast,  
That you helped a single brother of the many that you passed?  
Is a single heart rejoicing over what you did or said;  
Does a man whose hopes were fading now with courage  
look ahead?  
Did you waste the day, or lose it, was it well or sorely spent?  
Did you leave a trail of kindness or a scar of discontent?  
As you close your eyes in slumber do you think that God  
would say,  
You have earned one more tomorrow by the work you  
did today?

### SECTION - III

(Writing Skills)

Q. 4. Complete the activities as per the instructions given below : [16]

(A) Attempt 'Any One' of the following activities : (4)

(i) Drafting a virtual message :

Miss Lata wishes her classmate, Shubham, to bring his DSLR camera to college. She calls him but he is out for jogging. His father, Mr. Swami answers her phone call before leaving for his office.

Draft a virtual message in about 50 words by Mr. Swami for Shubham.

OR

(ii) Statement of purpose :

Imagine, you have successfully completed your Higher Secondary Education (HSC) and wish to pursue your degree in, 'Interior Designing' in a reputed university in India or Abroad.

Prepare a 'Statement of Purpose' in about 150 words which will help you to get an admission in your dream university.

OR

(iii) Group Discussion :

Imagine, your Jr. College has participated in a 'Tree plantation programme.' Write a group discussion in the form of dialogues associated with this tree plantation programme among 3/4 student participants.

(B) Attempt 'Any One' from the following activities :

(4)

(i) E-mail :

Draft an e-mail as the incharge of the students' council to a celebrity singer requesting him/her to grace the 'patriotic group song competition' in your college as a judge.

OR

(ii) Report Writing :

Your Jr. College celebrated "Teachers' Day" recently. Write a report on the happenings of this day in about 150 words.

OR

(iii) Interview :

Imagine, you have to conduct an interview of a 'sports

personality' with the help of the format given below, draft questions on the given fields.

(Do not change the sequence of the questions)

Name of the interviewee :	
Field / Reputation :	
Date / Venue / Time :	
Duration of Interview :	
Questions based on :	Questions :
(1) Love for sports	
(2) Challenges	
(3) Preparation	
(4) Teachers / Guide	
(5) Hardwork	
(6) Achievements	
(7) Goals	
(8) Vision	

(C) Attempt 'Any One' of the following activities :

(4)

(i) Speech :

Imagine, you have to deliver a speech in the college on "Travelling is the best experience."

Draft a speech in about 150 words on the above topic.

OR

(ii) Compering :

Imagine, you are one of the members of the cultural committee of your college and you are given the

responsibility of a 'compere' at a cultural programme.

You may take help of the given points.

- Welcome - lighting of the lamp
- Introduction
- Felicitation
- Cultural programme
- Presidential address
- Vote of thanks

Draft the whole programme script to decide the flow of the programme.

OR

(iii) Expansion of Idea :

Expand the following idea with the help of the points given below (100/150 words).

'Argument is the worst kind of communication.'

Points :

- Real values of life
- Creates conflict
- Spreads negativity
- Waste of time and energy

(D) Attempt 'Any One' of the following activities :

(4)

(i) Review :

You have recently watched a documentary film. Write a review on the same with the help of the following points:

- Title of the film
- Subject / Story / Plot
- Presentation / Photography / Music
- Message

OR

(ii) Blog :

Write a 'Blog' in a proper format on 'Essentials of a diet plan' with the help of the following points: (100 - 150 words)

- Diet contents / Ingredients
- Diet schedule
- Stick up to the plan
- Measuring result and feedback

OR

(iii) Appeal :

Prepare an appeal on the topic, "Relishing Reading Habit" with the help of the following points (100 - 150 words):

- Building vocabulary
- Enhancing word power / rich language
- Facing the world with courage
- Confidence building

## SECTION - IV

(LITERARY GENRE - NOVEL)

Q. 5. (A) Complete the activities given below as per the instructions : (4) [16]

(i) Match the columns :

(2)

'A'	'B'
(1) Realistic Novel	(a) Mystery, horror
(2) Historical Novel	(b) An eccentric or disreputable protagonist
(3) Gothic Novel	(c) Set on a past period
(4) Picaresque Novel	(d) The effect of realism

- (ii) Choose the correct alternatives and rewrite the sentences: (2)
- (a) \_\_\_\_\_ was one of the major trio writers in Indian English.  
(Vikram Seth, R.K. Narayan, Amitav Ghosh)
- (b) \_\_\_\_\_ is an immigrant author.  
(Salman Rushdie, Manohar Malgaonkar, Anita Desai)
- (c) The phrase 'Stream of consciousness' was coined by \_\_\_\_\_.  
(Harper Lee, Walter Scott, William James)
- (d) E. M. Forster is well known for his \_\_\_\_\_.  
(Novels, Essays, Stories)

(B) Answer in about 50 words to the questions given below : (4)

- (i) Write about Miss Phillips from the point of view of his students in 'To Sir, with Love.' (2)
- (ii) Explain the way the purpose of half-yearly report programme is fulfilled in 'To Sir, with Love.' (2)

(C) Answer in about 50 words to the questions given below : (4)

- (i) 'Time' is treated as a character in 'Around the World in Eighty Days.' (2)
- (ii) Give the reasons for apologies made by Detective Fix in 'Around the World in Eighty Days.' (2)

(D) Answer in about 50 words to the questions given below: (4)

- (i) 'Describe the horse-driven journey upto Major Sholto's residence in your own words in 'The Sign of Four.' (2)
- (ii) Write in short about the introductory meeting of Sherlock Holmes and Mary Morstan in 'The Sign of Four.' (2)



DAY — 02

SEAT NUMBER

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2025	VI	25	1100	<b>J-312</b>	(H)
<b>HINDI (04)</b>					
Time : 3 Hrs.		(16 Pages)		Max. Marks : 80	

### कृतिपत्रिका

कृतिपत्रिका के लिए सूचनाएँ :

- (१) सूचना के अनुसार गद्य, पद्य, विशेष अध्ययन तथा व्यावहारिक हिंदी की कृतियों में आवश्यकता के अनुसार आकृतियों में ही उत्तर लिखना अपेक्षित है।
- (२) सभी आकृतियों के लिए पेन का ही उपयोग कीजिए।
- (३) सभी आकृतियों में उत्तर पेन से ही लिखना आवश्यक है।
- (४) व्याकरण विभाग में पूछी गई कृतियों के उत्तरों के लिए आकृतियों की आवश्यकता नहीं है।

### विभाग - १. गद्य (अंक-२०)

कृति १ (अ) निम्नलिखित गद्यांश पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए : (६)

प्रभात का समय था, आसमान से बरसती हुई प्रकाश की किरणें संसार पर नवीन जीवन की वर्षा कर रही थीं। बारह घंटों के लगातार संग्राम के बाद प्रकाश ने अँधेरे पर विजय पाई थी। इस खुशी में फूल झूम रहे थे, पक्षी मीठे गीत गा रहे थे, पेड़ों की शाखाएँ खेलती थीं और पत्ते तालियाँ बजाते थे। चारों

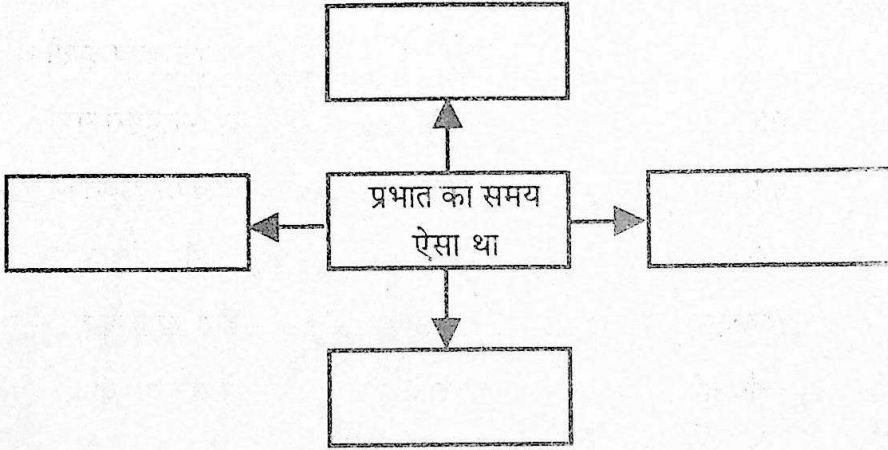
तरफ खुशियाँ झूमती थीं। चारों तरफ गीत गूँजते थे। इतने में साधुओं की एक मंडली शहर के अंदर दाखिल हुई। उनका खयाल था - मन बड़ा चंचल है। अगर इसे काम न हो, तो इधर-उधर भटकने लगता है और अपने स्वामी को विनाश की खाई में गिराकर नष्ट कर डालता है। इसे भक्ति की जंजीरों से जकड़ देना चाहिए। साधु गाते थे -

सुमर-सुमर भगवान को,  
मूर्ख मत खाली छोड़ इस मन को।

जब संसार को त्याग चुके थे, उन्हें सुर-ताल की क्या परवाह थी। कोई ऊँचे स्वर में गाता था, कोई मुँह में गुनगुनाता था। और लोग क्या कहते हैं, इन्हें इसकी जरा भी चिंता न थी। ये अपने राग में मगन थे कि सिपाहियों ने आकर घेर लिया और हथकड़ियाँ लगाकर अकबर बादशाह के दरबार को ले चले।

(१) संजाल पूर्ण कीजिए :

(२)



(२) निम्नलिखित शब्दों के लिए गद्यांश में आए हुए समानार्थी शब्द ढूँढ़कर लिखिए।

(२)

- (१) सुबह — [ ]
- (२) गगन — [ ]
- (३) बारिश — [ ]
- (४) आनंद — [ ]

(३) 'संगीत जीवन को आनंदमय बनाता है' इस कथन पर अपने विचार ४० से ५० शब्दों में लिखिए। (२)

(आ) निम्नलिखित गद्यांश को पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए। (६)

मैं पढ़-लिखकर नौकरी करने लगा। मौसी से भेंट-मुलाकात कम हो गई। दिलीप का एडमिशन जब एम्स में हुआ था तो मौसा की पोस्टिंग दिल्ली में ही थी। उसने मेडिकल की पढ़ाई भी पूरे ऐश-ओ-आराम के साथ की थी। आगे की पढ़ाई के लिए वह लंदन चला गया। एक बार जो वह लंदन गया तो वहीं का होकर रह गया। जब तक विवाह नहीं हुआ था तब तक तो आना-जाना प्रायः लगा रहता था। विवाह के बाद उसकी व्यस्तता बढ़ती गई तो आना-जाना भी कम हो गया। मौसी भी कभी-कभी लंदन आती-जाती रहती थीं।

मौसी जब कभी अपनी ससुराल आती थीं तो नैहर भी अवश्य आती थीं। एक बार गाँव में अकाल पड़ा था। वह अकाल दूसरे वर्ष भी दुहरा गया। पूरे इलाके में हाहाकार मचा था। मौसी उन लोगों की हालत देखकर द्रवित हो गईं। उसने अपनी ससुराल से सारा जमा अन्न मँगवाया और बाजार से भी आवश्यकतानुसार क्रय करवाया। तीसरे ही दिन से भंडारा खुल गया। मौसी अपने गाँव की ही नहीं बल्कि पूरे इलाके की आदर्श बेटा बन गई थीं।

(१) उत्तर लिखिए : (२)

- |                            |   |       |
|----------------------------|---|-------|
| (१) दिलीप का एडमिशन        | — | _____ |
| (२) मौसा की पोस्टिंग       | — | _____ |
| (३) आगे की पढ़ाई के लिए वह | — | _____ |
| (४) गाँव में पड़ा था       | — | _____ |

(२) गद्यांश में आए हुए शब्द-युग्म ढूँढ़कर लिखिए। (२)

(१) -----

(२) -----

(३) -----

(४) -----

(३) 'माँ का प्रेम' इस विषय पर अपने विचार ४० से ५० शब्दों में लिखिए। (२)

(इ) निम्नलिखित प्रश्नों के उत्तर ८० से १०० शब्दों में लिखिए (कोई दो): (६)

(१) निराला जी की चारित्रिक विशेषताएँ लिखिए।

(२) पाप के चार हथियार निबंध का उद्देश्य स्पष्ट कीजिए।

(३) 'उड़ो बेटा, उड़ो! पर धरती पर निगाह रखकर' इस पंक्ति में निहित सुगंधा की माँ के विचार स्पष्ट कीजिए।

(ई) निम्नलिखित प्रश्नों के मात्र एक वाक्य में उत्तर लिखिए (कोई दो): (२)

(१) हिंदी के कुछ आलोचकों द्वारा महादेवी वर्मा को दी गई उपाधि —

(२) लेखक कन्हैयालाल मिश्र 'प्रभाकर' जी की भाषाशैली—

(३) आशारानी व्होरा जी की रचनाएँ —

(४) डॉ. कृष्णकुमार मिश्र जी की किन्हीं दो रचनाओं के नाम लिखिए —

### विभाग - २. पद्य (अंक-२०)

कृति २ (अ) निम्नलिखित पद्यांश पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए : (६)

प्रीति की राह पर चले आओ,  
नीति की राह पर चले आओ।  
वह तुम्हारी ही नहीं, सबकी है,  
गीति की राह पर चले आओ।

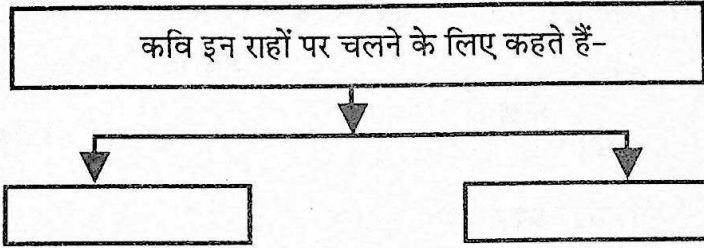
साथ निकलेंगे आज नर-नारी,  
 लेंगे काँटों का ताज नर-नारी ।  
 दोनों संगी हैं और सहचर हैं,  
 अब रचेंगे समाज नर-नारी ।

वर्तमान बोला, अतीत अच्छा था,  
 प्राण के पथ का मीत अच्छा था ।  
 गीत मेरा भविष्य गाएगा,  
 यों अतीत का भी गीत अच्छा था ।

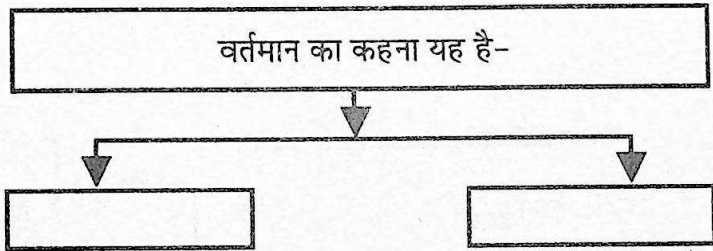
(१) कृति पूर्ण कीजिए :

(२)

(i)



(ii)



(२) निम्नलिखित शब्दों के वचन बदलकर लिखिए :

(२)

नारी	—	[ ]
नीतियाँ	—	[ ]
राह	—	[ ]
काँटे	—	[ ]

(३) 'धरती से जुड़ा रहकर ही मनुष्य अपने लक्ष्य को प्राप्त कर सकता है,' इस पर अपने विचार ४० से ५० शब्दों में लिखिए ।

(२)

( आ ) निम्नलिखित पद्यांश पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए :

( ६ )

आइल बसंत के फूल रे, सुनु रे सखिया ।

सरसों सरसाइल

अलसी अलसाइल

धरती हरसाइल

कली-कली मुसुकाइल बन के फूल रे, सुनु रे सखिया ॥

आइल.....

खेत बन रँग गइल

तन मन रँग गइल

अइसन मन भइल

जइसे इंद्रधनुष के फूल रे, सुनु रे सखिया ॥

आइल.....

अँखिया कजराइल

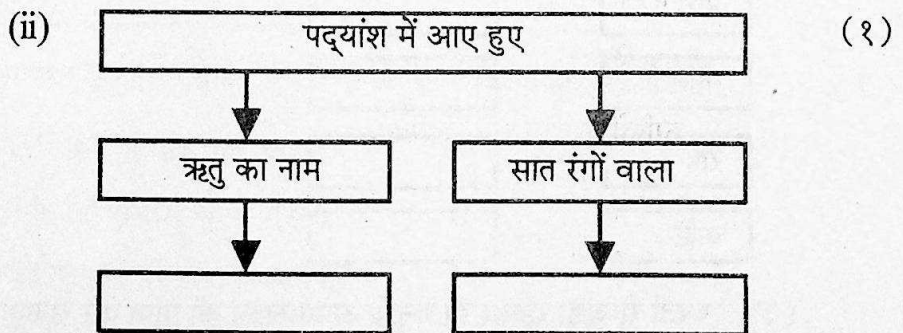
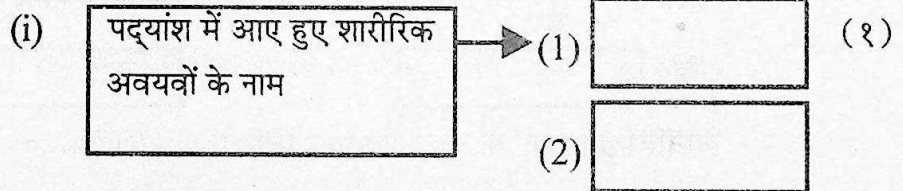
सपना मुसुकाइल

कंठ राग भराइल

बगिया फूलल यौबन फूल रे, सुनु रे सखिया ॥

आइल.....

( १ ) आकृति पूर्ण कीजिए :



(२) सहसंबंध लिखिए।

(२)

- (१) सरसों — हरसाइल  
(२) अलसी — सरसाइल  
(३) धरती — मुसुकाइल  
(४) कली-कली — अलसाइल

(३) 'प्राकृतिक सौंदर्य का महत्त्व' इस विषय पर अपने विचार ४० से ५० शब्दों में लिखिए।

(२)

(इ) निम्नलिखित मुद्दों के आधार पर 'वृंद के दोहे' कविता का रसास्वादन कीजिए :

(६)

(१) रचनाकार का नाम —

(१)

(२) पसंद की पंक्तियाँ —

(१)

(३) पसंद आने के कारण —

(२)

(४) कविता की केंद्रीय कल्पना —

(२)

अथवा

'पेड़ हौसला है' इस कथन के आधार पर कविता का रसास्वादन कीजिए।

(ई) निम्नलिखित प्रश्नों के केवल एक वाक्य में उत्तर लिखिए (कोई दो) :

(२)

(१) कवि डॉ. जगदीश गुप्त जी की दो रचनाओं के नाम लिखिए —

(२) गुरूनानक जी की रचना का नाम लिखिए —

(३) कैलाश सेंगर जी की प्रसिद्ध रचनाओं के नाम लिखिए —

(४) लोकगीतों के दो प्रकार लिखिए —

**विभाग - ३. विशेष अध्ययन ( अंक-१० )**

कृति ३ ( अ ) निम्नलिखित काव्य पंक्तियाँ पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए : ( ६ )

अपनी जमुना में  
जहाँ घंटों अपने को निहारा करती थी मैं  
वहाँ अब शस्त्रों से लदी हुई  
अगणित नौकाओं की पंक्ति रोज-रोज कहाँ जाती है?

( ६ )

धारा में बह-बहकर आते हुए टूटे रथ  
जर्जर पताकाएँ किसकी हैं?  
हारी हुई सेनाएँ, जीती हुई सेनाएँ  
नभ को कँपाते हुए युद्ध घोष, क्रंदन-स्वर,  
भागे हुए सैनिकों से सुनी हुई  
अकल्पनीय अमानुषिक घटनाएँ युद्ध की  
क्या ये सब सार्थक हैं?  
चारों दिशाओं से  
उत्तर को उड़-उड़कर जाते हुए  
गृध्रों को क्या तुम बुलाते हो

( १ ) उत्तर लिखिए :

( २ )

युद्ध का परिणाम

( १ )

( २ )

( ३ )

( ४ )

(२) उचित मिलान कीजिए।

(२)

- |     |        |   |        |
|-----|--------|---|--------|
| (१) | शस्त्र | — | ध्वज   |
| (२) | पताका  | — | हथियार |
| (३) | जमुना  | — | असंख्य |
| (४) | अगणित  | — | नदी    |

(३) 'युद्ध की भीषणता' इस विषय पर अपने विचार ४० से ५० शब्दों में लिखिए।

(२)

(आ) निम्नलिखित में से किसी एक प्रश्न का उत्तर लगभग ८० से १०० शब्दों में लिखिए :

(४)

- (१) राधा की दृष्टि से जीवन की सार्थकता लिखिए।  
(२) 'कनुप्रिया' की वेदना को अपने शब्दों में स्पष्ट कीजिए।

**विभाग - ४. व्यावहारिक हिंदी, अपठित गद्यांश एवं पारिभाषिक शब्दावली ( अंक-२० )**

कृति ४ (अ) निम्नलिखित का उत्तर लगभग १०० से १२० शब्दों में लिखिए :

(६)

'चन्द्रयान -३' इस पर फीचर लेखन कीजिए।

अथवा

निम्नलिखित परिच्छेद पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए :

जीववैज्ञानिकों द्वारा लंबे समय तक किए गए अध्ययनों से ज्ञात हुआ है कि जमीन और पानी के सभी जीव अलग-अलग उद्देश्यों की पूर्ति के लिए प्रकाश उत्पन्न करते हैं। यहाँ यह स्पष्ट कर देना आवश्यक है कि एक जीव द्वारा उत्पन्न किया गया प्रकाश दूसरे जीव द्वारा उत्पन्न किए गए प्रकाश से पूरी तरह भिन्न होता है अर्थात् सभी जीव अलग-अलग तरह का प्रकाश उत्पन्न करते हैं।

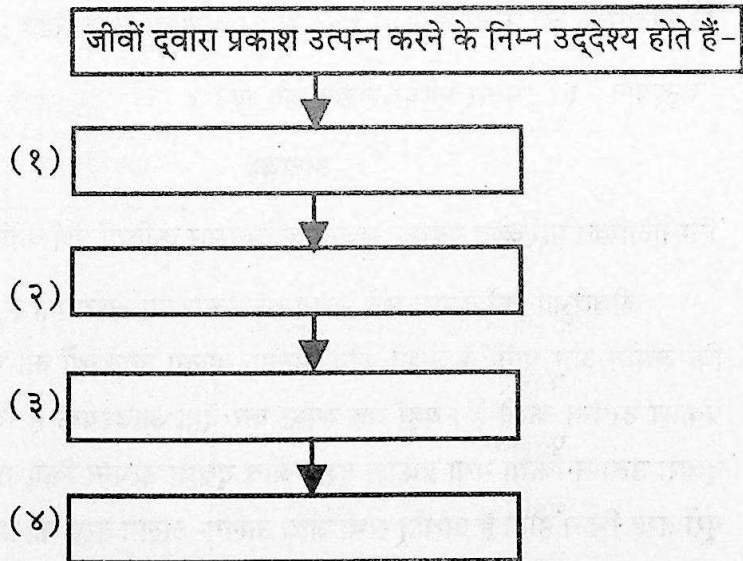
प्रकाश उत्पन्न करने वाले जीवों द्वारा प्रकाश उत्पन्न करने के निम्न उद्देश्य होते हैं: -

- साथी की खोज और संकेतों का आदान-प्रदान।
- शिकार की खोज और शिकार को आकर्षित करना।
- कामाफ्लास (camouflage) उत्पन्न करना।
- आत्मरक्षा

गहरे सागरों के अनेक जीव शिकार की खोज के लिए अपने शरीर से प्रकाश उत्पन्न करते हैं। एंगलर ऐसी ही मछली है। सागरों और महासागरों के बहुत-से जीव विशेष रूप से मछलियाँ कामाफ्लास के लिए प्रकाश उत्पन्न करती हैं। कामाफ्लास किसी जीव की वह स्थिति होती है, जिसमें वह अपने परिवेश से इतना घुल-मिल जाता है कि सरलता से दिखाई नहीं देता। इससे उसे शिकार करने और सुरक्षित रहने में सुविधा होती है।

(१) प्रवाहतालिका पूर्ण कीजिए :

(२)



(२) उपर्युक्त गद्यांश में आए हुए विलोम शब्द ढूँढ़कर लिखिए:- (२)

- |     |         |   |                      |
|-----|---------|---|----------------------|
| (१) | अधिकार  | — | <input type="text"/> |
| (२) | अज्ञात  | — | <input type="text"/> |
| (३) | कठिनता  | — | <input type="text"/> |
| (४) | असुविधा | — | <input type="text"/> |

(३) 'मानव की उन्नति में विज्ञान का महत्त्व' इस विषय पर अपने विचार ४० से ५० शब्दों में लिखिए। (२)

(आ) निम्नलिखित में से किसी एक का उत्तर लगभग ८० से १०० शब्दों में लिखिए : (४)

- (१) सूत्र संचालन के विविध प्रकारों पर प्रकाश डालिए।  
(२) ब्लॉग लेखन के लिए आवश्यक गुणों पर प्रकाश डालिए।

अथवा

सही विकल्प चुनकर वाक्य फिर से लिखिए :

- (१) 'पल्लवन' में भाव विस्तार के साथ \_\_\_\_\_ का स्थान भी महत्त्वपूर्ण होता है। (१)
- (१) लेखन  
(२) भाषण  
(३) चिंतन  
(४) वाचन
- (२) स्नेहा की पत्रकारिता और विशेष रूप में \_\_\_\_\_ लेखन में बहुत रुचि थी। (१)
- (१) फीचर  
(२) पल्लवन  
(३) ब्लॉग  
(४) निबंध

(३) कार्यक्रम कोई भी हो, मंच की \_\_\_\_\_ बनी रहे।

(१)

(१) व्यवस्था

(२) गरिमा

(३) महिमा

(४) प्रतिमा

(४) ब्लॉग लेखन में \_\_\_\_\_ भाषा का प्रयोग होना चाहिए।

(१)

(१) ग्रामीण

(२) बोली

(३) मानक

(४) मिश्र

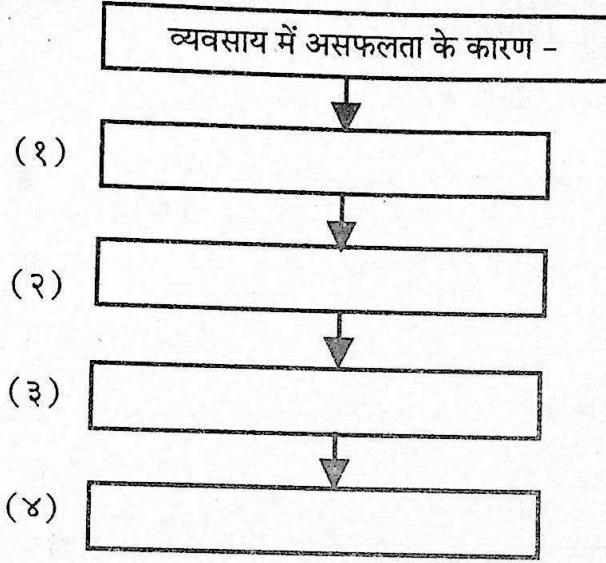
(इ) निम्नलिखित अपठित गद्यांश पढ़कर सूचना के अनुसार कृतियाँ पूर्ण कीजिए : (६)

हमें किसी व्यवसाय के चुनने अथवा छोड़ने में चंचलता अथवा जल्दी नहीं करनी चाहिए। कभी-कभी जब मनुष्य अपने व्यवसाय में हजार प्रयत्न करने पर भी सफल नहीं होता तब उसे व्यवसाय बदलकर दूसरा चुनने की आवश्यकता अवश्य होती है। परंतु इससे यह भी सिद्ध होता है कि उसने व्यवसाय को चुनने में बड़ी गलती की। ऐसी गलतियाँ कई कारणों से - बुरी संगति, अचानक घटना, माता-पिता की बुद्धिहीनता अथवा अधूरी शिक्षा के कारण बहुधा हुआ करती हैं। परंतु युवावस्था में मन बहुत चंचल रहता है। किसी काम को खूब सोच-समझकर करना चाहिए। प्रायः ऐसा भी देखा जाता है कि अनेक युवक उस कार्य को करते हैं जिसमें वे कभी सफल नहीं हो सकते और कुछ युवक भ्रमवश उस व्यवसाय को छोड़ बैठते हैं जिसमें थोड़े ही अधिक परिश्रम से वे सफलीभूत हो जाते। ध्यान रखने की बात है कि जो व्यवसाय किसी भी दृष्टि से जितना ही अधिक अच्छा होगा, उसमें सफलता प्राप्त करने के लिए उतना ही अधिक समय और परिश्रम भी लगेगा। हाँ, जिस राह से हम

जा रहे हैं उस राह में यदि सिंह मिल जाए तो हमारा यह सोचना बिलकुल स्वाभाविक होगा कि उस रास्ते के सिवा संसार में अन्य किसी रास्ते में सिंह आ ही नहीं सकता, परंतु बिना परिश्रम के कुछ भी नहीं मिल सकता। इसलिए बाधाओं का सामना करते हुए अपने एक बार के चुने हुए व्यवसाय में दृढ़तापूर्वक लगे रहना श्रेयस्कर है। बहुत-से युवक अपनी योग्यता की डींग हाँके बिना संतुष्ट नहीं होते।

(१) तालिका पूर्ण कीजिए :

(२)



(२) उपर्युक्त गद्यांश के आधार पर निम्नलिखित शब्दों के प्रत्यययुक्त शब्द ढूँढकर लिखिए :

(२)

(१) चंचल

(२) आवश्यक

(३) सफल

(४) योग्य

(३) “व्यवसाय के प्रति युवाओं का दृष्टिकोण” इस विषय पर अपने विचार ४० से ५० शब्दों में लिखिए।

(२)

(ई) निम्नलिखित में से किन्हीं चार पारिभाषिक शब्दों के लिए हिंदी शब्द लिखिए :

(४)

- (१) Judge —
- (२) Invalid —
- (३) Bank Statement —
- (४) Balance Sheet —
- (५) Friction —
- (६) Antiseptics —
- (७) Graphic Table —
- (८) Auxiliary Memory —

**विभाग - ५. व्याकरण (अंक-१०)**

कृति ५ (अ) निम्नलिखित वाक्यों का कोष्ठक में दी गई सूचनाओं के अनुसार काल परिवर्तन कीजिए (कोई दो):

- (१) संयोग से तभी उन्हें कहीं से तीन सौ रुपये मिल गए थे।  
(सामान्य भूतकाल)
- (२) मैं आपकी हर आज्ञा का सिर और सिर के साथ दिल झुकाकर पालन करता हूँ।  
(सामान्य भविष्यकाल)
- (३) नये मूल्यों के निर्माण का दम-खम अभी उसमें नहीं था।  
(पूर्ण वर्तमानकाल)
- (४) मन बहुत दुखी होता है।  
(अपूर्ण भूतकाल)

(आ) निम्नलिखित पंक्तियों में उद्धृत अलंकार पहचान कर उनके नाम लिखिए (कोई दो):

(२)

- (१) चरण-सरोज पखारन लगा।

(२) राधा-वदन चंद सो सुंदर ।

(३) हनुमंत की पूँछ में लग न पाई आग ।

लंका सगरी जल गई, गए निशाचर भाग ॥

(४) एक म्यान में दो तलवारें, कभी नहीं रह सकती हैं ।

किसी और पर प्रेम पति का, नारियाँ नहीं सह सकती हैं ।

( इ ) निम्नलिखित पंक्तियों में उद्धृत रस पहचान कर उनके नाम लिखिए (कोई दो): (२)

(१) सुडुक, सुडुक घाव से पिल्लू (मवाद) निकाल रहा है,

नासिका से श्वेत पदार्थ निकाल रहा है ।

(२) एक अचंभा देखा रे भाई ।

ठाढ़ा सिंह चरावै गाई ।

पहले पूत पाछे माई ।

चेला के गुरु लागे पाई ॥

(३) कहत, नटत, रीझत, खिझत, मिलत, खिलत, लजियात ।

भरे भौन में करत हैं, नैननु ही सौं बात ॥

(४) तू दयालु दीन हौं, तू दानि हौं भिखारि ।

हौं प्रसिद्ध पातकी, तू पाप पुंजहारि ॥

( ई ) निम्नलिखित मुहावरों के अर्थ लिखकर उचित वाक्यों में प्रयोग कीजिए (कोई दो): (२)

(१) विवश होना ।

(२) धरती पर निगाह रखना ।

(३) मरने की फुरसत न होना ।

(४) वीरगति को प्राप्त होना ।

(उ) निम्नलिखित वाक्यों को शुद्ध करके वाक्य फिर से लिखिए (कोई दो): (२)

(१) दो रोटियाँ माँगकर खा लिया।

(२) मन बड़ी चंचल हैं।

(३) वर्तमान युग वीज्ञान और प्रौद्योगिकी की युग है।

(४) मौसी फिर उसी कुरसी पर आकर बैठ गया।

