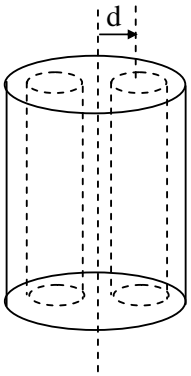
PHYSICS PAPER–1 SET - C

SECTION – I

Straight Objective Type

*This section contains 9 multiple choice questions numbered 1 to 9. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

1. A long cylindrical conductor of radius R contains current of uniform density J. Two small holes of radius r (<< R/2) are drilled symmetrically throughout the length of the cylinder. The axes of the holes are parallel to the axis of cylinder and at distance d from it in the same plane. Magnetic field on the axis of one of the hole will be



a) $\frac{\mu_0 J}{2}d$ b) $\frac{\mu_0 J}{2}\left(d-\frac{r}{2}\right)$ c) $\frac{\mu_0 J}{2}\left(d-\frac{r^2}{2d}\right)$ d) None of the above

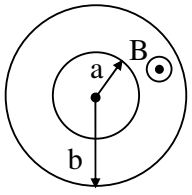
2. The electric field is a region (relative permittivity = 1) varies with distance "r" from origin according to relation $E = Ar^2\hat{r}$, where A is a positive constant. The volume charge density in the region is proportional to

a) r b) r^2 c) $\frac{1}{r}$ d) $\frac{1}{r^2}$

3. A cubical box of side 1 m contains an ideal gas at pressure 100 N/m^2. If $\sum v_x^2 = \sum v_y^2 = \sum v_z^2 = 10^{28}\ m^2/s^2$, where v_x, v_y and v_z are the x, y and z components, respectively, of the gas molecule, then the mass of each gas molecule is

a) 10^{-20} g b) 10^{-23} g c) 10^{-18} g d) 10^{-26} g

4. Magnetic field B exists in the space between two coaxial cylinders of radius "a" and "b" respectively. An electron of charge "–e" and mass "m" starts out from outer surface of inner cylinder with an initial velocity v_0 in the radial direction. The maximum value of magnetic field upto which electron will not hit the surface of outer cylinder is



a) $\frac{mv_0}{2eb}$ b) $\frac{2mv_0 b}{e(b^2-a^2)}$ c) $\frac{2mv_0}{e\sqrt{b^2-a^2}}$ d) $\frac{2mv_0}{e(b-a)}$

5. If the extension of the spring in Fig.1 is x_1 and in Fig.2 is x_2, the systems being in constant acceleration, then

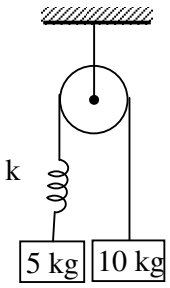


Fig. 1

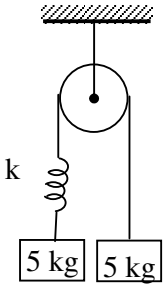
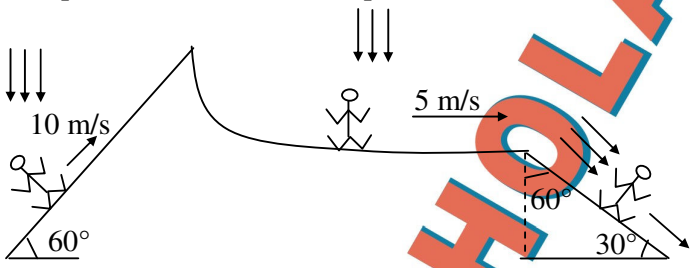


Fig. 2

a) $x_2 = 0, x_1 = -ve$ b) $x_1 > x_2 > 0$ c) $x_1 < x_2$ d) $x_1 = x_2$

6. In the figure, the man is moving on the track and rain appeared to him as shown by arrows. Find the actual speed of the rain in metre per second

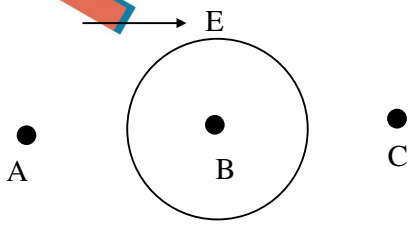


a) $10\sqrt{3}$ b) $\frac{10}{\sqrt{3}}$ c) $5\sqrt{3}$ d) $\frac{5}{\sqrt{3}}$

7. An aribitrary shaped conductor carrying a current I is placed in a uniform external magnetic field $\vec{B}$. If ℓ is the length of the conductor then magnetic force acting on it is

a) $I\left(\vec{l}\times\vec{B}\right)$ b) $I\int\left(d\vec{l}\times\vec{B}\right)$ c) $I\left(\int d\vec{l}\right)\times\left(\vec{B}\right)$ d) Both b and c

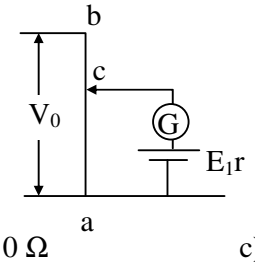
8. In a uniform electric field E, a dielectric (dielectric constant $\neq$ 1) in the form of a sphere is introduced. How will the intensity of the field at points A, B and C change?



a) Field at A will increase b) Field at B will increase

c) Field at c will decrease d) Field at all points will remain same

9. A constant potential difference is maintained across the wire ab of length ℓ. A battery is connected with galvanometer as shown in the figure. The galvanometer shows no deflection when the length ac is 3ℓ/4. A resistance 4 Ω is now connected across the battery (in parallel) such that the galvanometer shows no deflection when length ac is ℓ/8. The internal resistance of the battery is



a) 2 Ω b) 10 Ω c) 20 Ω d) 8 Ω

SECTION – II

Assertion – Reason Type

*This section contains 4 questions numbered 10 to 13. Each question contains STATEMENT – 1 (Assertion) and STATEMENT – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.*

10. Assertion (A) : For a given time interval, average velocity is single valued while average speed can have many values.
    Reason (R) : Velocity is a vector quantity and speed is a scalar quantity.
11. Assertion (A) : A body can have acceleration even if its velocity is zero at a given instant of time.
    Reason (R) : A body is momentarily at rest when it reverses it's direction of motion.
12. Assertion (A) : The relative velocity between any two bodies is equal to sum of the velocities of two bodies.
    Reason (R) : Some times, relative velocity between two bodies is equal to difference in magnitude of velocities of the two.
13. Assertion (A) : The maximum height of a projectile is always 25% of the maximum range.
    Reason (R) : It could even be made 50%.

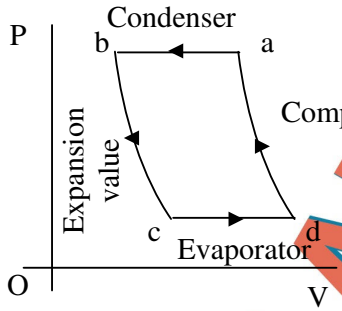
SECTION – III

Linked Comprehension Type

*This section contains 2 paragraphs P_{14-16} and P_{17-19}. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.*

Comprehensive – I

A refrigerator operates on the cycle shown in the figure. The compression (d→a) and expansion (b→c) steps are adiabatic. The temperature, pressure and volume of coolant in each of the four states a, b, c and d are given in the table below.



State	T(°C)	P(kPa)	V(m^3)	U(kJ)	% that is liquid
a	80	2305	0.0682	1969	0
b	80	2305	0.00946	1171	100
c	5	363	0.2202	1005	54
d	5	363	0.4513	1657	5

14. In each cycle, how much work is done by the motor that operates the compressor?
a) -1.97×10^5 J b) 1.97×10^5 J c) 16.69×10^5 J d) -16.69×10^5 J

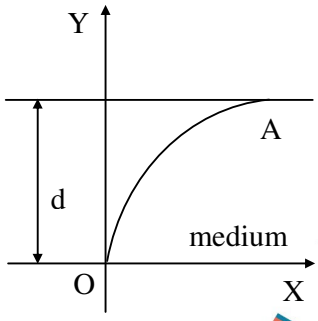
15. In each cycle, how much heat is exhausted from the coolant into the air outside the refrigerator while the coolant is in the condenser?
a) 9.33×10^5 J b) 93.3×10^5 J c) 933×10^5 J d) 6.63×10^5 J

16. In each cycle, how much heat is taken from inside the refrigerator into the coolant while the coolant is in the evaporator?
a) 73.6×10^5 J b) 7.36×10^5 J c) -73.6×10^5 J d) 3.67×10^5 J

Comprehensive – II

A long rectangular slab of transparent medium of thickness d is placed on a table with length parallel to the x–axis and width parallel to the y–axis. A ray of light is traveling along y–axis at origin. The refractive index μ of the medium varies as $\mu = \frac{\mu_0}{1-(x/r)}$, where μ_0 and r (>1) are constants. The refractive index of air is 1.

$\left[\mu_0 = \frac{3}{2}, r = 200 \text{ m}, d = 2 \text{ m}\right]$



17. Indicate the subsequent path of the ray in air:
    a) It will bend towards y–axis
    b) It will bend towards x–axis
    c) It will bend first towards x–axis then y–axis.
    d) None of these

18. The refractive index of the medium at A:
    a) 0.517
    b) 1.517
    c) 2.517
    d) None of these

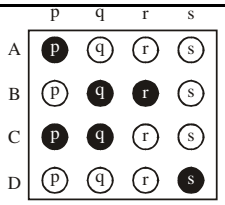
19. The x–coordinate of the point A, where the ray intersects the upper surface of the slab–air boundary will be
    a) 0.259 m
    b) 1.259 m
    c) 2.259 m
    d) None of these

SECTION – IV

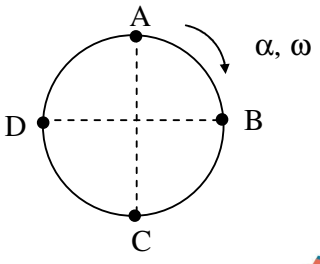
Matrix–Match Type

*This section contains 3 questions. Each question contains statements given in two column which have to be matched. Statements (A, B, C, D) in **Column I** have to be matched with statements (p, q, r, s) in **Column II**. The answers to these questions have to be appropriately bubbles as illustrated in the following example.*

If the correct matches are A–p, A–s, B–q, B–r, C–p, C–q and D–s, then the correctly bubbled 4 × 4 matrix should be as follows :

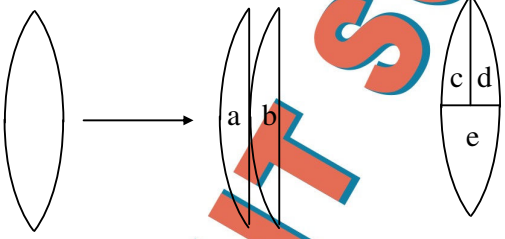


20. A disc of radius R is rolling with angular velocity ω, angular acceleration α and linear acceleration a along x–direction. There are 4 points A, B, C and D on the disc as shown



Column –1		Column–2	
a)	Acceleration of point A	p)	$\sqrt{(a+\omega^2R)^2+(\alpha R)^2}$
b)	Acceleration of point B	q)	$\sqrt{(a+\alpha R)^2+(\omega^2R)^2}$
c)	Acceleration of point C	r)	$\sqrt{(a-\alpha R)^2+(\omega^2R)^2}$
d)	Acceleration of point D	s)	$\sqrt{(a-\omega^2R)^2+(\alpha R)^2}$

21. A convex lens of focal length f_0 and power P_0 is cut into three different shapes as shown below in figure 1, 2, 3 and 4.



Original lens Fig. 1

Fig. 2

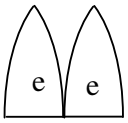


Fig.3

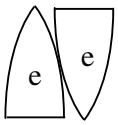


Fig. 4

Column –1		Column–2	
a)	Focal length of a	p)	Fig. 3
b)	Focal length of Fig.4	q)	$0.5\ P_0$
c)	Power of c	r)	∞
d)	Power = $2 \times P_0$	s)	$2f_0$

22.

Column –1 ($\mu_1 \neq \mu_2$)		**Column–2**	
a)	A spherical ball of R.I. μ_1 is placed inside a medium of R.I. μ_2.	p)	As a mirror
b)	A convex lens of R.I. μ_1 is placed in a medium of R.I. μ_2.	q)	Diverging
c)	A concave lens of R.I. μ_1 is placed in a medium of R.I. μ_2.	r)	Converging
d)	A concave lens of R.I. μ_1 is combined to convex lens of R.I. μ_2.	s)	Neither diverging nor converging

CHEMISTRY FOT AITS PAPER – I SET - C

SECTION – I

Straight Objective Type

*This section contains 9 multiple choice questions numbered 23 to 31. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

23. The correct order of rate of reactivity for SN^2 with H_2O $\bar{O}CH_3, \bar{O}H, \& CH_3COO^-$ is

a) $\bar{O}H > O\bar{C}H_3 > CH_3CO\bar{O} > H_2O$ b) $H_2O > \bar{O}H > \bar{O}CH_3 > CH_3CO\bar{O}$

c) $\bar{O}CH_3 > \bar{O}H > CH_3CO\bar{O} > H_2O$ d)

24. An equilibrium mixture of N_2, H_2 and NH_3 in a 3.0 litre vessel contains 0.15 mole of N_2 0.6 moles of H_2 and 0.3 mole of NH_3. Assuming the temperature and volume of the vessel remain unchanged, how many moles of N_2 must be introduced into the vessel to double the equilibrium conc of NH_3

a) 38.4 b) 27.6 c) 42.8 d) 56.8

25. Which of the following are angular shaped

(i) $Sncl_2$ (ii) H_2O (iii) Icl_2^+ (iv) Icl_2^-

a) I, II, III b) I, III, IV c) II, III, IV d) I, II, III, IV

26. If the energy of electron in the 1st orbit of He^+ is -871.6×10^{-20} J, then the energy of the electron in the 1st orbit of Hydrogen would be

a) -871.6×10^{-20} J b) -435×10^{-20} J c) -217.9×10^{-20} J d) -108.9×10^{-20} J

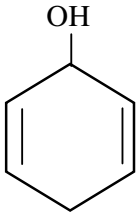
27. The degree of hardness of water containing 12 mg of $MgSO_4$ per Kg of water is

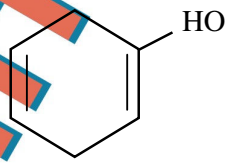
a) 24 ppm b) 10 ppm c) 12 ppm d) 15 ppm

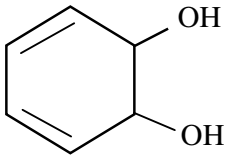
28. The no. of ion pairs present per unit cell of Nacl is

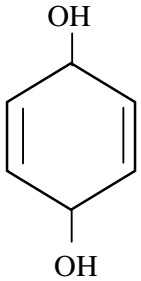
a) 1 b)2 c) 3 d) 4

29. $\text{Phenol} \xrightarrow[\text{EtOH}]{\text{Na}/NH_3(l)} \text{'A'}$. 'A' is

a) 

b) 

c) 

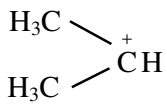
d) 

30. If $Fecl_3$ aq solution is added to a solution of $K_4\left[Fe(CN)_6\right]$, a Prussian blue coloured complex is formed. The complex is

a) Iron (III) hexacyano ferrate (II) b) Iron (III) hexacyano ferrate (III)

c) Iron (II) hexacyano ferrate (III) d) Iron (II) hexacyano ferrate (II)

31. Which of the following cannot exhibit hyperconjugation?

a) $(CH_3)_3\overset{+}{C}CH_2$ b) $CH-CH=CH_2$ c) $CH_3-\overset{+}{C}H_2$ d) 

SECTION – II

Assertion – Reason Type

This section contains 4 questions numbered 32 to 35. Each question contains STATEMENT-1 (Assertion) and STATEMENT-2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which ONLY ONE is correct.

32. **Assertion (A) :** The colour of acidified $KMnO_4$ discharges slowly in the beginning when titrated against Oxalic acid, but fastens after some time
Reason (R) : The auto catalyst Mn^{2+} formed is less in the initial stages and its concentration increases as the titration progresses.

33. **Assertion (A) :** The conductivity of un electrolytic solution is greater than pure solvent
Reason (R) : Conductivity of electrolytic solution is due to the movement of ions.

34. **Assertion (A) :** The Value of equilibrium constant (Kc) gives us an idea about the extent to which a reaction proceeds.
Reason (R) : The value of Kc is independent of the stoichiometry of the reactants and products at the point of equilibrium

35. **Assertion (A) :** Both SO_2 and CO_2 turns lime water milky
Reason (R) : CO_2 is a odourless gas while SO_2 is a gas with burning sulphur odour

SECTION – III

Linked Comprehension Type

*This section contains 2 paragraphs C_{36-38} and C_{39-41}. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.*

Passage – I :

A white amorphous powder (A) when heated gives a colourless, odourless gas (B) (which turns lime water milky) and a white residue(c). 'C' on heating turns to yellow and on cooling changes to white again. 'A' on reaction with dilute Hcl liberates 'B' and another compound 'D'. 'C' when treated with Nao H$_{(aq)}$ forms a white ppt, which dissolves in excess of NaOH forming a soluble compound 'E'.

36. In the soluble compound 'E' the metal exists in the form of
a) Cation b)Anion c) Neutral atom d) As a part of anion

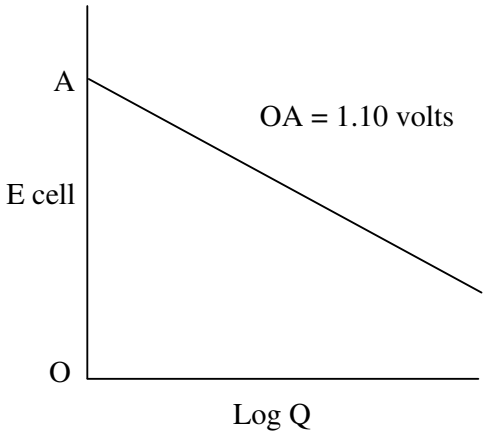
37. The nature of white precipitate formed when 'C' is treated with NaoH is
a) Acidic b) Basic c) Amphoteric d) Neutral

38. Compound 'C' is white when cold and yellow in hot due to
a) Charge balance b) Schotky defect
c) Frenkel defect d) Anion excess defect

$C_{39\,.\,41}$: Paragraph for Question Nos. 39 to 41

Passage – II

For the reaction $Zn_{(s)} + Cu^{2}_{(aq)}\ f\ \ cu_{(s)}Zn^{2+}_{(aq)}$. The reaction quotient $(Q) = \frac{[Zn^{2+}]}{[cu^{2+}]}$. Variation of E cell with Q is given by



39. If C_1 is the concentration of cu^{2+} and C_2 for Zn^{2+} the free energy change (ΔG) at a given temperature is a function of

a) $\text{In } C_1 \times C_2$ b) $\text{In } \frac{C_2}{C_1}$ c) $\text{In } C_1$ d) $\text{In } C_2$

40. The ΔG for the process will be –ve if

a) $\frac{[Cu^{2+}]}{[Zn^{2+}]} = 10^2$ b) $\frac{[Zn^{2+}]}{[Cu^{2+}]} = 10^3$ c) $\frac{[Zn^{2+}]}{[Cu^{2+}]} = 10$ d) $\frac{[Zn^{2+}]}{[Cu^{2+}]} = 10^5$

41. When E cell is 1.1591 volts. It implies

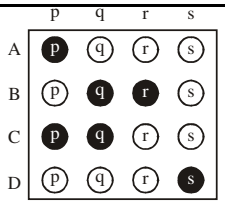
a) $\frac{[Cu^{2+}]}{[Zn^{2+}]} = 0.01$ b) $\frac{[Zn^{2+}]}{[Cu^{2+}]} = 0.01$ c) $\frac{[Zn^{2+}]}{[Cu^{2+}]} = 0.1$ d) $\frac{[Zn^{2+}]}{[Cu^{2+}]} = 1$

SECTION – IV

Matrix-Match Type

This section contains 3 questions. Each question contains statements given in two column which have to be matched. Statements (A, B, C, D) in ***Column I*** *have to be matched with statements (p, q, r, s) in* ***Column II****. The answers to these questions have to be appropriately bubbles as illustrated in the following example.*

If the correct matches are A–p, A–s, B–q, B–r, C–p, C–q and D–s, then the correctly bubbled 4 × 4 matrix should be as follows :



42.

List - I	**List – II**
a) Hydroboration - Oxidation	p) Converts But-1-ene to Butan-2-ol
b) Oxymercuration - Demercuration	q) Converts But-1-ene to Butan-1-ol
c) Hoffmann's elimination	r) Converts carbonyl compounds to alkanes
d) Wolf-Kishner reduction	s) Less substituted alkene is formed

43.

List - I	**List – II**
a) Tyndall effect	p) Avogadro's number
b) Brownian movement	q) Sky is blue
c) Electrophoresis	r) Coagulation of colloids
d) Hardy schulze rules	s) Charge on colloidal solution

44.

List - I	**List – II**
a) $\left[pt\left(NH_3\right)_2 Cl_2\right]$	p) Ionisation isomerism
b) $\left[Co\left(en\right)_3\right]^{3+}$	q) Geometrical isomerism
c) $\left[Co\left(NH_3\right)_3\left(NO_2\right)_3\right]$	r) Optical Isomerism
d) $\left[Co\left(NH_3\right)_5 Br\right]cl$	s) Facial – meridonial isomerism

MATHEMATICS

SECTION - A

[Questions 45 to 53 are single correct answer type. For each correct answer 3 marks will be awarded and each incorrect choice 1 mark will be deducted. Each question has single correct answer only]

45. Let $\bar{a},\bar{b},\bar{c}$ be three vectors such that $\bar{a}\times\bar{b}=\bar{c};\ \bar{b}\times\bar{c}=\bar{a};\ \bar{c}\times\bar{a}=\bar{b};$ then

a) $|\bar{a}|=|\bar{b}|=|\bar{c}|$ b) $|\bar{a}|\neq|\bar{b}|=|\bar{c}|$ c) $|\bar{a}|=|\bar{b}|\neq|\bar{c}|$ d) $|\bar{a}|\neq|\bar{b}|\neq|\bar{c}|$

46. The probabilities of winning a running race by three persons A, B and C are $\frac{1}{2},\frac{1}{4},\frac{1}{4}$ respectively. They participate in two races. The probability of A winning the second race when B wins the first race is_____

a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) $\frac{2}{3}$

47. If A is a $n\times n$ matrix such that $a_{ij}=\sin^{-1}\sin(i-j)\ \forall\ i, j$ then which of the following statement is not true:

a) If 'n' is even, then A is an invertible matrix
b) If 'n' is odd, then A is an invertible matrix
c) For all values of 'n', A is not invertible matrix
d) None of these

48. In the usual notation, the summation $\frac{{}^{m}C_{n}}{2}+\frac{{}^{m+1}C_{n}}{2^2}+\frac{{}^{m+2}C_{n}}{2^3}+.....\infty$ is equal to

a) ${}^{m+n}C_{m}$ b) $1+{}^{m}C_{1}+{}^{m}C_{2}+.....{}^{m}C_{n}$ c) ${}^{m+1}C_{n+1}$ d) ∞

49. If $I_n=\sum_{r=1}^{n}\frac{1}{r}$, then

a) $I_n>\ln(n+1)$ b) $I_n=\ln(n+1)$ c) $I_n<\ln(n+1)$ d) $I_n=\ln(n)$

50. The roots of the equation $\frac{d^6}{dx^6}\left(x^2-1\right)^6=0$

a) Are not all real
b) Are all real but not distinct
c) Are all real, distinct and some of them are greater than 1
d) Are all real, distinct and lie between -1 and 1

51. The number of ways in which 'm' identical white balls and 'n' identical black balls be arranged in a row in such a way that there occurs exactly $(2r-1)$ contacts between black and white (m, n > r; suppose a black, a white and a black ball are placed consecutively there are two such contacts)

a) ${}^{m-1}C_{r-1}.{}^{n-1}C_{r-1}$ b) $2.{}^{m-1}C_{r-1}.{}^{n-1}C_{r-1}$ c) ${}^{m}C_{r}.{}^{n}C_{r}$ d) $2^{m-1}P_{r-1}.{}^{n-1}P_{r-1}$

52. A tangent to the parabola $x^2=4ay$ meets the hyperbola $x^2-y^2=a^2$ in two points P and Q. Then midpoint of P and Q lies on the curve

a) $y^3=x(y-a)$ b) $y^3=x^2(y-a)$ c) $y^2=x^2(y-a)$ d) None of these

53. The left hand derivative of $f(x)=[x]\sin\pi x$ at $x=k$ where K is an integer is

a) $(-1)^{K}(K-1)\pi$ b) $(-1)^{K-1}(K-1)\pi$ c) $(-1)^{K}K\pi$ d) $(-1)^{K-1}K\pi$

SECTION – B

[This section contains 4 question numbered 54 to 57 Each question contains STATEMENT-1 (Assertion) and STATEMENT-2(Reason) Each question has 4 choices (A), (B), (C) and (D) out of which ONLY ONE is correct For each correct answer 3 marks will be awarded and each incorrect choice 1 mark will be deducted.]

a) Both I and II are true and II is correct explanation of I
b) Both I and II are true but II is not correct explanation of I
c) I is true, II is false
d) I is false, II is true

54. **STATEMENT-I :** The lines are concurrent if

$$\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$$

STATEMENT-II : The area of the triangle formed by three concurrent lines must be zero.

55. **STATEMENT-I :** The function y = $\sin^{-1}$ (cos x) is not differentiable at x = nπ, n $\in$ Z

STATEMENT-II : $\frac{dy}{dx} = \frac{-\sin x}{|\sin x|}$ so the function is not differentiable at the points where sin x = 0

56. **STATEMENT-I :** Slopes of the tangents drawn from $(4,10)$ to the parabola $y^2 = 9x$ are $\frac{1}{4}, \frac{9}{4}$

STATEMENT-II : Every parabola is symmetric about its directrix

57. **STATEMENT-I :** f : A $\to$ B and g : B $\to$ C are two functions then $(gof)^{-1} = f^{-1}og^{-1}$

STATEMENT-II : f : A $\to$ B and g : B $\to$ C are bijections then f^{-1}, g^{-1} are also bijections.

SECTION - C

[The section contains 2 paragraphs Passage-I 58-60 and Passage-II 61-63. Based on each paragraph, 3 multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D) out of which ONLY ONE is correct For every correct answer 4 marks will be awarded and each incorrect answer 1 mark will be deducted.]

Passage - I

Let us consider the sketch of the graph of $y = \frac{a_1x^2 + b_1x + c_1}{a_2x^2 + b_2x + c_2}, \left(\frac{Q_1}{Q_2}, Say\right)$ we have $a_1, a_2 \neq 0$. Observe that $\underset{x\to\pm\infty}{Lt} y = \frac{a_1}{a_2}$, and if $a_2x^2 + b_2x + c_2 = 0$ has real roots α and β, we have that $\underset{x\to\alpha \text{ or } \beta}{Lt} y \to \pm\infty$

Analyse the cases as shown in the adjoining figure.

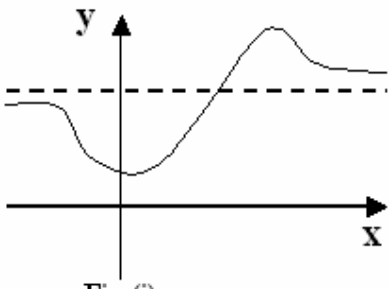


Fig (i)

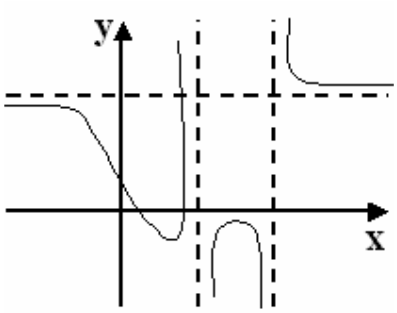


Fig (ii)

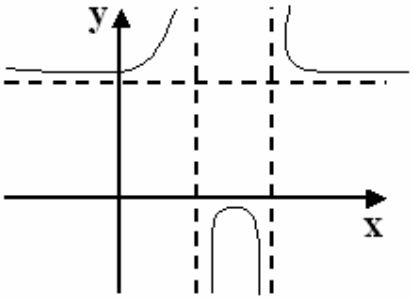


Fig (iii)

58. For which of the sketches $a_2x^2+b_2x+c_2=0$ has no real roots ?

(a) Fig (i) (b) Fig (ii) (c) Fig (iii) (d) Fig (i) & Fig (iv)

59. Which of the sketches satisfy the condition $\frac{a_1}{a_2}=\frac{b_1}{b_2}$?

(a) Fig (i) (b) Fig (ii) (c) Fig (iii) (d) Fig (iii) & Fig (iv)

60. Which of the above sketches, the Quadratic $Q_1=a_1x^2+b_1x+c_1=0$ has two distinct real roots ?

(a) Fig (i) (b) Fig (ii) (c) Fig (iii) (d) Fig (iv)

Passage – II

Consider the function $f(x)=\lim_{n\to\infty}\frac{x^{2n}f(x)+g(x)}{x^{2n}+1}$ then find $f(x)$ in terms of f(x) and g(x)

61. When $x\in(-1,1)$

a) $g(x)$ b) $\frac{f(x)+g(x)}{2}$ c) $f(x)$ d) None of these

62. When $x\in\{-1,1\}$

a) $g(x)$ b) $\frac{f(x)+g(x)}{2}$ c) $f(x)$ d) None of these

63. When $x\in(-\infty,-1)\cup(1,\infty)$

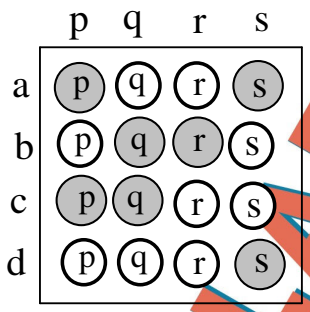
a) $g(x)$ b) $\frac{f(x)+g(x)}{2}$ c) $f(x)$ d) None of these

SECTION - D

[This section contains 3 questions. Each questions contains statements given in two columns which have to be matched. Statements (a, b, c, d) in column I have to be matched with statements (p, q, r, s) in Column II. The answer to the question have to be appropriately bubbled. Statements in Column-I may have one are more than one correct answers in Column – II. Select all correct answers to get 6 marks]

[If the correct matches are a - p, a - s, b – q, b – r , c – p, c - q and d – s, then the correctly bubbled

4 x 4 matrix should be as follows:]



64.

LIST - I	**LIST - II**
A) $\sum_{p=0}^{n}\left(\sum_{r=p}^{n} {}^{n}C_{r}.{}^{r}C_{p}\right)$ is equal to	p) $n.\ 2^{n}$
B) $\sum\sum_{0\le i<j\le n} \left({}^{n}C_{i}+{}^{n}C_{j}\right)$ is equal to	q) 3^{n}
C) $\sum\sum_{0\le i<j\le n} i\left({}^{n}C_{j}\right)$ is equal to	r) $n(n-1).\ 2^{n-3}$
D) $\sum_{r=0}^{n} r.\left({}^{n}C_{r}\right)$ is equal to	s) $n.\ 2^{n-1}$

65. A(a) = 3 + i, B(b) = 1 + 2i

ABQP and ABQ′P′ are squares

LIST - I	**LIST - II**
a) P(p)	p) 2 + 4i
b) Q(q)	q) 4 + 3i
c) P'(p')	r) 2 – i
d) Q'(q')	s) 0

66. Let $ax+by=1$ be a chord of the curve $3x^2-y^2-2x+4y=0$ intersecting the curve at the points A and B such that AB subtends a right angle at the origin. Then Match the following

LIST-I	**LIST-II**
A) $a-2b+1$ is	p) 5
B) The distance from the origin of the farthest chord cannot exceed	q) 2
C) If the triangle OAB is isosceles then the area of the triangle cannot exceed	r) $\sqrt{5}$
D) The number of chords such that triangle OAB is isosceles cannot exceed	s) 3