Competishun

52/6, Opposite Metro Mas Hospital, Shipra Path, Mansarovar

Date: 15/07/2024

Time: 3 hours **Max. Marks:** 180

PRAVEEN-2_(24-25)-ACT-2_PAPER-2

Physics

Multiple Choice Question

Q1 Two balls are thrown from an inclined plane of inclination β with the horizontal, both with speed u at angle of projection α with the plane one up the incline plane and other down the incline. If R_1 & R_2 be their respective ranges, T_1 & T_2 are their respective time of flight and h_1 & h_2 are respective maximum height perpendicular to the inclined plane, then choose the correct option(s) : (Acceleration due to gravity is g)

a) $h_1 = h_2$ **b)** $T_1 = T_2$ **c)** $R_2 - R_1 = (g\sin\beta)T_2^2$ **d)** $R_2 - R_1 = (g\sin\beta)T_1^2$

Q2 A man in a lift ascending with an upward acceleration 'a' throws a ball vertically upwards with a velocity ‘v’ with respect to himself and catches it after ‘t_1’ seconds. Afterwards when the lift is descending with the same acceleration 'a' acting downwards the man again throws the ball vertically upwards with the same velocity with respect to him and catches it after ‘t_2’ seconds?

a) the acceleration of the ball w.r.t. ground is g when it is in air

b) the velocity v of the ball relative to the lift is $\frac{g\ \ (t_1+t_2)}{t_1\ \ t_2}$

c) the acceleration 'a' of the lift is $\frac{g\ \ (t_2-t_1)}{t_1+t_2}$

d) the velocity ‘v’ of the ball relative to the man is $\frac{g\ \ t_1\ \ t_2}{(t_1+t_2)}$

Q3 The potential energy of a particle of mass 1 kg in a conservative field is given as U = $(3x^2y^2 + 6x)$ J, where x and y are measured in meter. Initially particle is at (1,1) & at rest then :

a) Initial acceleration of particle is $6\sqrt{5}\ ms^2$

b) Work done to slowly bring the particle to origin is 9 J

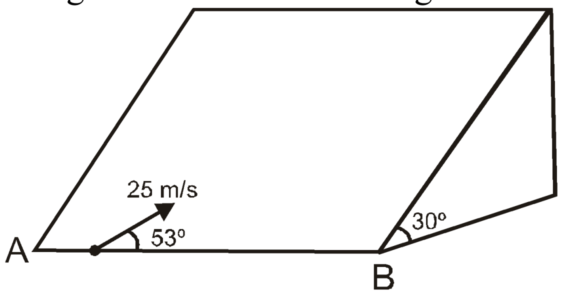
c) Work done to slowly bring the particle to origin is – 9 J

d) If particle is left free it moves in straight line

Q4 A stone is projected from level ground at t = 0 sec such that its horizontal and vertical components of initial velocity are 10 m/s and 20 m/s respectively. Then the instant of time at which magnitude of tangential and magnitude of normal components of acceleration of stone are same is : (neglect air resistance) g = 10 m/s^2.

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

Q5 A particle is projected on a smooth fixed incline plane. Initial velocity of particle is along inclined and at an angle 53° with horizontal line AB. Then : [g = 10 m/s^2]



a) minimum speed of particle during it's motion on inclined is 15 m/s

b) maximum height of particle from ground is 30 m

c) particle returns back to line AB after 5 sec.

d) Range of particle along line AB is 120 m

Q6 A particle of mass m (starting at rest) moves vertically upward from the surface of earth under an external force $\vec{F}$ (vertical upward) which varies with height h as F = (2 – αh) mg, where α is a positive constant. If H is the maximum height to which particle rises. Then

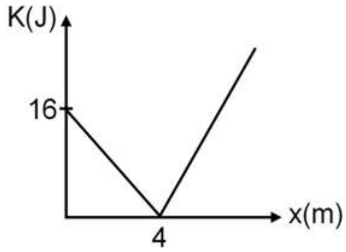
a) $H = \frac{1}{\alpha}$

b) Work done by $\vec{F}$ during motion up to height $\frac{H}{2}$ is $\frac{3mg}{2\alpha}$

c) $H = \frac{2}{\alpha}$

d) Velocity of particle at $\frac{H}{2}$ is $\sqrt{\frac{g}{\alpha}}$

Q7 Kinetic energy (K) versus displacement (x) graph of a particle moving in a straight line is as shown in figure. Mass of the particle is 2 kg. Select the correct alternative



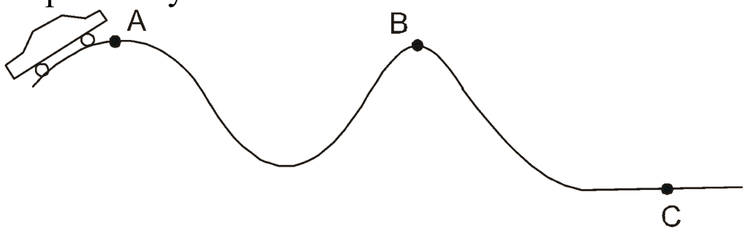
a) Particle has uniform acceleration from x=0 to x=4m.

b) Particle has non uniform acceleration from x=0 to x=4m.

c) Acceleration of particle is decreasing from x=0 to x=4m.

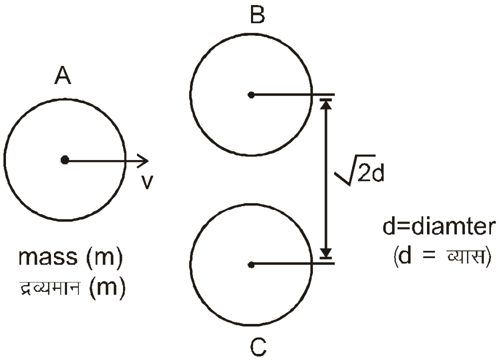
d) Acceleration of particle is –2m/s^2 from x=0 to x=4m.

Q8 A car is moving with constant speed on a road as shown in figure. The normal reaction by the road on the car is N_A , N_B and N_C when it is at the points A, B and C respectively.



a) $N_A = N_B$ **b)** $N_A > N_B$ **c)** $N_A < N_B$ **d)** $N_C > N_A$

Q9 Three identical discs A, B and C rest on a smooth horizontal plane, the disc A set in motion with velocity v along perpendicular bisector of line BC joining centre of disc. Distance between the centers of disc B and C is $\sqrt{2}$ times of the diameter of each disc. A stops after collision and all collisions are elastic, then which of the following statements is/are correct -



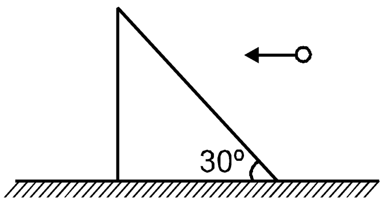
a) Net impulse on A is $\sqrt{2}$ (mv)

b) Net impulse on A is mv

c) Impulse on B due to A is of same magnitude as impulse on C due to A

d) Total kinetic energy of system (A+B+C) before collision is equal to total kinetic energy of system (A+B+C) after collision

Q10 A small ball of mass 1 kg strikes a wedge of mass 4kg horizontally with a velocity of 10 m/s. Friction is absent everywhere and collision is elastic. Select the correct answers :



a) the horizontal component of linear momentum of the system (wedge + ball) during the collision will remain conserved

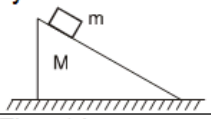
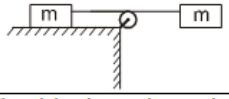
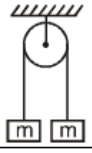
b) the linear momentum of the system (wedge + ball) will remain conserved during the collision

c) the component of linear momentum of the ball along common tangent will remain same during the collision

d) the linear momentum of the ball along common normal will change during collision

MTC-SCQ

Q11 In each situation of column-I, a system involving two bodies is given. All strings and pulleys are light and friction is absent everywhere. Initially each body of every system is at rest. Consider the system in all situation of column I from rest till any collision occurs. Then match the statements in column-I with the corresponding results in column-II and indicate your answer by darkening appropriate bubbles in the 4 × 4 matrix given in the OMR.

Column-I	Column-II
(P) The block plus wedge system is placed over smooth horizontal surface. After the system is released from rest, the centre of mass of system. 	(1) Shifts towards right
(Q) The string connecting both the blocks of mass m is horizontal. Left block is placed over smooth horizontal table as shown. After the two block system is released from rest, the centre of mass of system 	(2) Shifts downwards
(R) The block and monkey have same mass. The monkey starts climbing up the rope. After the monkey starts climbing up, the centre of mass of monkey + block system. 	(3) Shifts upwards
(S) Both block of mass m are initially at rest. The left block is given initial velocity u downwards. Then, the centre of mass of two block system afterwards. 	(4) Does not shift

a) P→2 Q→2,3 R→1 S→4

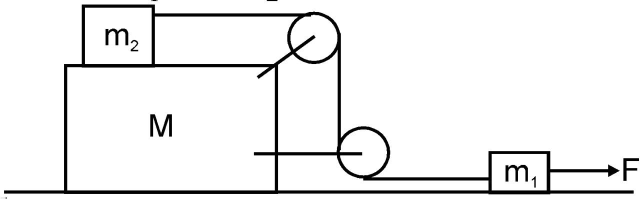
b) P→1 Q→3,4 R→2,3 S→4

c) P→2 Q→1,2 R→3 S→4

d) P→2 Q→1,3 R→3 S→1

Q12 Match the following:

Three blocks of masses m_1, m_2 and M are arranged as shown in figure. All the surfaces are frictionless and string is inextensible. Pulleys are light. A constant force F is applied on block of mass m_1. Pulleys and string are light. Part of the string connecting both pulleys is vertical and part of the strings connecting pulleys with masses m_1 and m_2 are horizontal.

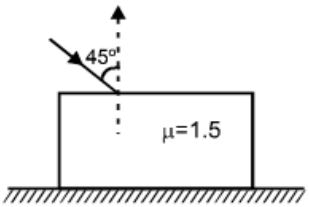
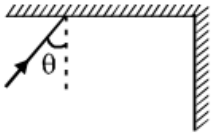


	List-I	List-II
(P)	Acceleration of mass m_1	(1) $\frac{F}{m_1}$
(Q)	Acceleration of mass m_2	(2) $\frac{F}{m_1+m_2}$
(R)	Acceleration of mass M	(3) zero
(S)	Tension in the string	(4) $\frac{m_2F}{m_1+m_2}$

a) P→2 Q→2 R→3 S→4 **b)** P→2 Q→1 R→3 S→4 **c)** P→2 Q→2 R→4 S→1

d) P→2 Q→1 R→3 S→1

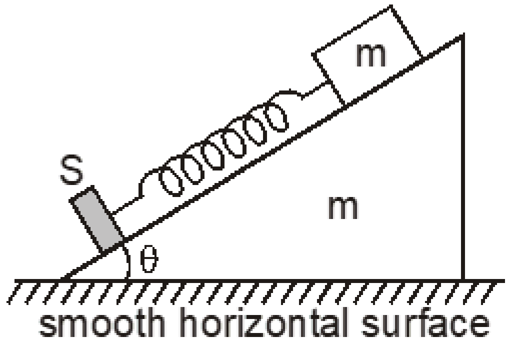
Q13 **Match the following :**

Column–I	Column–II
(P) A ray incident at 25º on one refracting surface of a prism of angle 60º suffers a deviation of 50º. Then angle of emergence is equal to	(1) 30º
(Q) A ray incident at 60º on one face of a prism which has prism angle 30º. The angle between the emergent ray and incident ray is 30º. Then the angle between the ray and the face from which it emerges is equal to	(2) 60º
(R) One side of a glass slab is silvered as shown. A ray of light is incident on the otherside at angle of incidence i = 45º. Refractive index of glass is 1.5. Then deviation of the ray of light from its initial path when it comes out of slab is 	(3) 90º
(S) A ray of light incident on the horizontal mirror at an angle θ. For what value of θ the ray emerges parallel to the incoming ray after reflection from the vertical mirror 	(4) 85º
	(5) 80º

a) P→4 Q→1 R→5 S→2 **b)** P→4 Q→3 R→3 S→5 **c)** P→5 Q→3 R→1 S→2

d) P→4 Q→3 R→5 S→3

Q14 A block of mass m is placed on wedge also of mass m. The wedge is placed on sooth horizontal fixed surface. One end of a light spring is connected to block and the other end to a light support S rigidly fixed to wedge as shown. Friction is absent every where. The system is initially released from rest with spring unstressed. Match statements in column-I with corresponding statements in column-II.



Column-I	**Column-II**
(A) At the instant compression in spring is maximum	(p) speed of block is zero
(B) At the instant spring has natural length, that is, it is unstressed.	(q) speed of block is non zero
(C) At the instant net force on wedge is zero	(r) speed of block is maximum
(D) At the instant elastic potential energy stored in spring is least	(s) speed of block is minimum

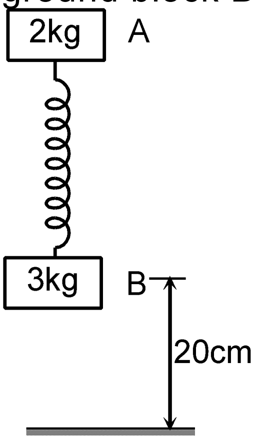
a) (A) p,s (B) p,s (C) q,r (D) p,s

b) (A) p,q (B) p,s (C) q,r (D) q,s

c) (A) p,s (B) p,q (C) q,s (D) p,s

d) (A) r,p (B) p,s (C) q,p (D) p,r

Q15 A massless spring of spring constant k = 100 N/m is connected to two blocks A and B of masses 2 kg and 3 kg respectively held at rest with the spring relaxed at height 20 cm above the ground. The system is released and after hitting the ground block B comes to rest.



List-I		List-II	
(P)	loss of energy during collision	(1)	Zero
(Q)	spring energy when block A is in equilibrium	(2)	6 J
(R)	work done by gravitational force on A from initial to till block A comes in equilibrium	(3)	8 J
(S)	spring energy at the time of collision of B with surface	(4)	2 J

a) P→4 Q→2 R→3 S→1 **b)** P→2 Q→4 R→3 S→1 **c)** P→2 Q→4 R→1 S→3

d) P→4 Q→2 R→3 S→1

Chemistry

Multiple Choice Question

Q16 Which of the following is/are correct statement(s) ?

a) The dissociation of $CaCO_3$ is suppressed at high pressure.

b) The apparent molecular mass of PCl_5 shows lower value on dissociation.

c) Low pressure is favourable for melting of ice.

d) Combination of hydrogen atoms to form hydrogen molecule is favourable at high temperature.

Q17 Which of the following is/are correctly matched ?

a) Species $\rightarrow$ He; Excited state $\rightarrow 2^{nd}$; Degeneracy $\rightarrow 3$

b) Species $\rightarrow$ H; Excited state $\rightarrow 2^{nd}$; Degeneracy $\rightarrow 9$

c) Species $\rightarrow He^+$; Excited state $\rightarrow 1^{st}$; Degeneracy $\rightarrow 4$

d) Species $\rightarrow Li^+$; Excited state $\rightarrow 2^{nd}$; Degeneracy $\rightarrow 9$

Q18 Which of the following statement(s) is/are correct?

a) $\frac{P}{V}$ v/s P graph will be a rectangular hyperbola for a fixed amount of an ideal gas at constant temperature.

b) $\frac{V}{P}$ v/s $\frac{1}{p^2}$ graph will be a straight line for a fixed amount of an ideal gas at constant temperature.

c) log V v/s log T graph will be a straight line for an isobar.

d) Dalton's Law is applicable on non reacting ideal gaseous mixture.

Q19 The equilibrium constant for some reactions are given below against each of the reaction.

(i) $2N_2 + 5O_2 \rightleftharpoons 2N_2O_5$; $K = 5 \times 10^{-27}$

(ii) $N_2 + O_2 \rightleftharpoons 2NO$; $K = 2 \times 10^{-15}$

(iii) $N_2 + 2O_2 \rightleftharpoons 2NO_2$; $K = 1.5 \times 10^{-29}$

Which of the following statement is correct?

a) The least stable oxide is NO_2.

b) The most stable oxide is NO.

c) The stability order is $N_2O_5 > NO_2 > NO$.

d) The stability order is $NO_2 > NO > N_2O_5$.

Q20 Which of the following will occur if a 0.1 M solution of a weak acid is diluted to 0.01 M at constant temperature?

a) $[H^+]$ will decrease. **b)** pH will increase. **c)** Percentage ionization will increase.

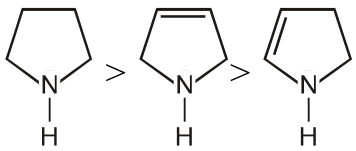
d) Ka will increase.

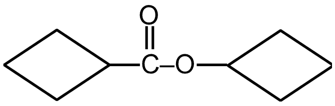
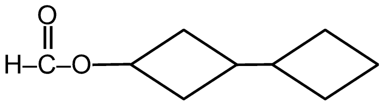
Q21 Which of the following is/are correct for basic strength:

a) $(CH_3)_2NH > (CH_3)_3N > CH_3NH_2 > NH_3$

b) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

c) $PhNH_2 > Ph_2NH > Ph_3N$

d) 

Q22  and 

a) DU of each is 3.

b) Both are functional isomers.

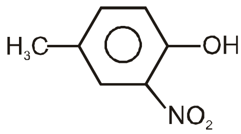
c) Both have same general formula

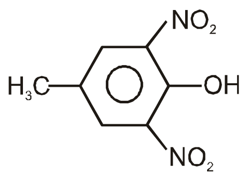
d) Both are metamers.

Q23 Carbolic acid is less acidic than :

a) CH_3COOH

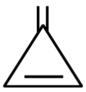
b) 

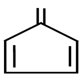
c) 

d) 

Q24 Which of the following is correct option (A) in the given reaction sequence.

Unsaturated Hydrocarbon (A) $\xrightarrow[\text{excess}]{H_2/Ni}$ Saturated Hydrocarbon (B) $\xrightarrow{Cl_2, h\nu}$ 3-monochlorinated product

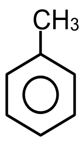
a) 

b) 

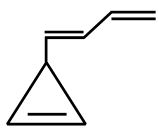
c) $CH_3-C(CH_3)_2-CH=CH_2$ (i.e. CH_3 above and CH_3 below the central C of $CH_3-C-CH=CH_2$)

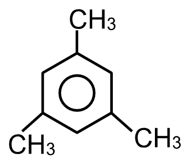
d) $CH_2=CH-CH(CH=CH_2)-CH=CH_2$

Q25 Which of the following molecules gives 'Glyoxal' as one of the product on reductive ozonolysis.

a) 

b) 

c) 

d) 

MTC-SCQ

Q26

	List –I		List-II
(P)	On increasing volume at equilibrium, amount of product will increase but concentration of product will remain same	(1)	$NH_4HS(s) \rightleftharpoons NH_3(g) + H_2S(g)$
(Q)	On decreasing volume at equilibrium, amount of product will increase but concentration of product will remain same	(2)	$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$
(R)	On increasing volume at equilibrium, both amount and concentration of product will decrease	(3)	$2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$
(S)	On decreasing volume at equilibrium, amount of product will decrease but concentration of product will increase	(4)	$CaO(s) + CO_2(g) \rightleftharpoons CaCO_3(s)$

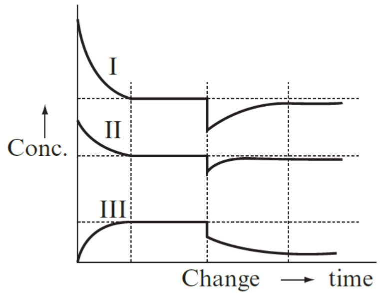
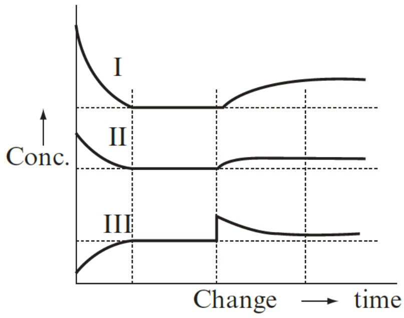
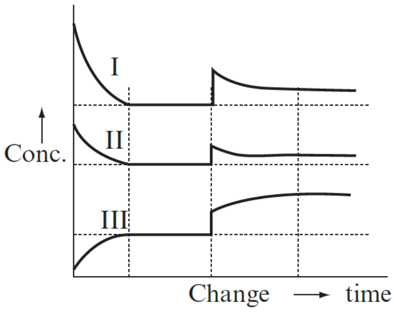
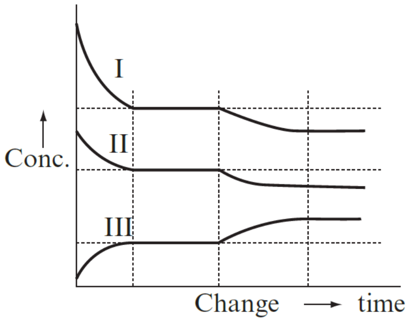
a) $P \rightarrow 3; Q \rightarrow 4; R \rightarrow 1; S \rightarrow 2$
b) $P \rightarrow 1; Q \rightarrow 2; R \rightarrow 4; S \rightarrow 3$
c) $P \rightarrow 1; Q \rightarrow 4; R \rightarrow 2; S \rightarrow 3$
d) $P \rightarrow 1; Q \rightarrow 4; R \rightarrow 3; S \rightarrow 2$

Q27

Column I	Column II
(A) CN^-	(P) Bond order is 2, diamagnetic
(B) C_2	(Q) Bond order is 3, diamagnetic
(C) NO	(R) Bond order is 1/2, paramagnetic
(D) Ne_2^+	(S) Bond order is 5/2, paramagnetic

a) $A \rightarrow P, B \rightarrow R, C \rightarrow S, D \rightarrow R$
b) $A \rightarrow P, B \rightarrow Q, C \rightarrow R, D \rightarrow S$
c) $A \rightarrow Q, B \rightarrow P, C \rightarrow S, D \rightarrow R$
d) $A \rightarrow R, B \rightarrow P, C \rightarrow S, D \rightarrow Q$

Q28 For an endothermic reaction: $4A(g) + B_2(g) \rightleftharpoons 2A_2B(g)$

Column I	Column II
A. 	(P) Increase in temperature.
B. 	(Q) Increase in pressure.
C. 	(R) Addition of A_2B at equilibrium.
D. 	(S) Addition of inert gas at constant pressure.
	(T) Increase in volume.

a) A→S, T; B→ R; C→Q; D→P

b) A→R; B→ S, T; C→Q; D→P

c) A→S, T; B→ Q; C→R; D→P

d) A→S, T; B→ Q; C→P; D→Q

Q29 Match the following:

LIST-I Molecular formula	LIST-II Number of isomers
(P) C_4H_6 (Alkadiene)	(1) Six
(Q) $C_5H_{10}O$ (Ketone)	(2) Three
(R) $C_4H_{10}O$ (Alcohol)	(3) Two
(S) $C_5H_{12}O$ (Ether)	(4) Four

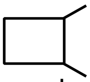
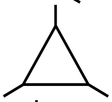
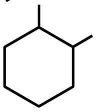
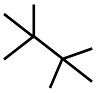
a) P → 2; Q → 3; R → 4; S → 1

b) P → 3; Q → 2; R → 4; S → 1

c) P → 2; Q → 3; R → 1; S → 4

d) P →1; Q → 2; R → 3; S → 4

Q30

LIST-I **Molecule**	**LIST-II** **Number of monochloro products**
(P) 	(1) Two
(Q) 	(2) Three
(R) 	(3) One
(S) 	(4) Four

a) P → 1; Q → 2; R → 4; S → 3

b) P → 4; Q → 1; R → 2; S → 3

c) P → 3; Q → 4; R → 1; S → 2

d) P → 2; Q → 1; R → 4; S → 3

Mathematics

Multiple Choice Question

Q31 The range of values of 'a' such that the angle θ between the pair of tangents drawn from (a, 0) to the circle $x^2 + y^2 = 1$ satisfies $\frac{\pi}{2} < \theta < \pi$, lies in

a) (1, 2) **b)** $(1, \sqrt{2})$ **c)** $(-\sqrt{2}, -1)$ **d)** $(-\sqrt{2}, -1) \cup (1, \sqrt{2})$

Q32 A light ray is incident to a line mirror 'L' along the line 3x – 4y + 5 = 0 and is reflected along the line 5x – 12y + 19 = 0. The equation of line 'L' may be

a) 7x – 4y + 1 = 0 **b)** 7x + 4y – 15 = 0 **c)** 4x – 7y + 10 = 0 **d)** 4x + 7y – 18 = 0

Q33 $a_1, a_2, a_3, \ldots$.. are distinct terms of an A.P. We call (p, q, r) an increasing triad if a_p, a_q, a_r are in G.P. where p, q, r ∈ N such that p < q < r. If (5, 9, 16) is an increasing triad, then which of the following option is/are correct?

a) if a_1 is a multiple of 4 then every term of the A.P. is an integer

b) (85, 149, 261) is an increasing triad

c) if the common difference of the A.P. is $\frac{1}{4}$, then its first term of A.P. is $\frac{1}{3}$

d) common ratio of G.P. having terms a_p, a_q, a_r is $\frac{7}{4}$

Q34 The value of $\dfrac{\dfrac{2\sin(140^\circ)\sec(280^\circ)}{\sec(220^\circ)} + \dfrac{\sec(340^\circ)}{\operatorname{cosec}(20^\circ)}}{\dfrac{\cot(200^\circ) - \tan(280^\circ)}{\cot(200^\circ)}}$ is NOT equal to

a) $\sqrt{3}$ **b)** $-\sqrt{3}$ **c)** $\frac{1}{\sqrt{3}}$ **d)** $\frac{-1}{\sqrt{3}}$

Q35 If $a = \log_{10}15$ and $b = \log_{10}50$, then $\log_9 40$ is NOT equal to

a) $\frac{5-2b}{2(a-b+1)}$ **b)** $\frac{b-1}{2(a-b+1)}$ **c)** $\frac{2b-5}{2(a-b+1)}$ **d)** $\frac{5-2b}{(a-b+1)}$

Q36 The determinant $\begin{vmatrix} x^2 & (y+z)^2 & yz \\ y^2 & (z+x)^2 & zx \\ z^2 & (x+y)^2 & xy \end{vmatrix}$ is divisible by:

a) $x^2 + y^2 + z^2$ **b)** x – y **c)** x – y – z **d)** x + y + z

Q37 Which of the following functions is/are periodic ?

a) f(x) = $\begin{cases} 1, x \text{ is integer} \\ 0, x \text{ is non} - \text{integer} \end{cases}$

b) f(x) = $\begin{cases} x - [x] & ; \quad 2n \le x < 2n+1 \\ \frac{1}{2} & ; \quad 2n+1 \le x < 2n+2 \end{cases}$; where [.] denotes the greatest integer function

c) f(x) = $(-1)^{\left[\frac{2x}{\pi}\right]}$, where [.] denotes the greatest integer function

d) f(x) = x – [x + 3] + tan$\left(\frac{\pi x}{2}\right)$, where [.] denotes the greatest integer function

Q38 Let C_1 and C_2 are circles defined by $x^2 + y^2 - 20x + 64 = 0$ and $x^2 + y^2 + 30x + 144 = 0$. PQ is a common tangent where P and Q are points of contact on circles C_1 and C_2 respectively, then

a) number of common tangents of both circles is 3.

b) number of common tangents of both circles is 4.

c) the maximum length of PQ is 25.

d) The shortest length of PQ is 20.

Q39 The third term of a G.P. is 64. The product of first five terms is

a) 4^{15}

b) $\frac{2^{33}}{8}$

c) 2^{15}

d) $\frac{2^{17}}{4}$

Q40 Family of lines represented by the equation (cos θ + sin θ) x + (cos θ – sin θ)y – 3(3 cos θ + sin θ) = 0 passes through a fixed point M for all real values of θ, then

a) The reflection of M in the line x – y = 0 is (3, 6)

b) The reflection of M in the line x – y = 0 is (6, 3)

c) Equation of line passes through (1, 2) and at maximum distance from M is 5x + y = 7

d) Equation of line passes through (1, 2) and at maximum distance from M is x – 5y + 9 = 0

MTC-SCQ

Q41 Match List I with List II and select the correct answer using the code given below the lists :

Let f(x) = $\frac{|x|-1}{2|x|-3}$

Lits-I

(P) Set of all solution of inequation f(x) < 0 is

(Q) Set of all solution of inequation f(x) > 1 is

(R) Set of all solution of inequation f(x) < 2 is

(S) Set of all solution of inequation 1 < f(x) < 2 is

List-II

(1) $\left(-2,-\frac{5}{3}\right)\cup\left(\frac{5}{3},2\right)$

(2) $\left(-2,-\frac{3}{2}\right)\cup\left(\frac{3}{2},2\right)$

(3) $\left(-\infty,-\frac{5}{3}\right)\cup\left(-\frac{3}{2},\frac{3}{2}\right)\cup\left(\frac{5}{3},\infty\right)$

(4) $\left(-\frac{3}{2},-1\right)\cup\left(1,\frac{3}{2}\right)$

a) P→4; Q→3 ; R→2; S→1

b) P→4; Q→2 ; R→1; S→3

c) P→2; Q→4 ; R→3; S→1

d) P→4; Q→2; R→3; S→1

Q42 Match List I with List II and select the correct answer using the code given below the lists :

If f(x) = ax^2 + bx + c is such that (f(0))^2 + (f(1))^2 + (f(–1))^2 + 30 = 4f(0) + 10 f(1) + 2f(–1) then match the items in columns I with those in column II (where [.] denotes greatest integer function)

List – I	**List – II**
(P) [sin^{-1}(f(x))] equal to	(1) 0
(Q) 2 + [tan^{-1} (f(x)] can be equal to	(2) 1
(R) [2$^{-f(x)}$] can be equal to	(3) 2
(S) 3 + $\left[\frac{1}{f(x)}\right]$ can be equal to	(4) 4

a) P→1; Q→2; R→1; S→4

b) P→2; Q→3; R→1; S→4

c) P→2; Q→1; R→3; S→4

d) P→1; Q→1; R→2; S→3

Q43 Match List I with List II and select the correct answer using the code given below the lists :

List – I

(P) If the equation of the image of line pair, y = | x – 2 | in yaxis is $y^2 - x^2 - 4x + 3 = \lambda$, then '$\lambda$' equals

(Q) The radius of the circle whose two normals are represented by the equation $x^2 - 5xy - 5x + 25y = 0$ and which touches externally the circle $x^2 + y^2 - 2x + 4y - 4 = 0$ will be

(R) Let $3y^2 - 8xy + 5x^2 = 0$ are two tangents from origin to a unit circle in first quadrant. If the length of tangent on this circle from origin is $a + \sqrt{b}$, then (a + b) equals (where a, b ∈ N)

(S) If point ([a + 1], [a]) lies inside the annular region bounded by circles $x^2 + y^2 - 2x - 15 = 0$ and $x^2 + y^2 - 2x - 7 = 0$ then number of values of a are (where [.] denotes greatest integer function)

List – II

(1) 21
(2) 7
(3) 2
(4) 0

a) P→3; Q→2; R→1; S→4
b) P→2; Q→3; R→1; S→4
c) P→2; Q→1; R→3; S→4
d) P→2; Q→3; R→4; S→1

Q44 The set of all points of continuity of f(x) where f is given by

Column – I	**Column – II**
(A) $[x] + \sqrt{x - [x]}$	(P) $\pm\sqrt{n}$, n ∈ I^+ ∪ 0
(B) [x] + [–x]	(Q) (0, ∞)
(C) cos log x	(R) R – I
(D) $x^2 + [x^2]$	(S) R

a) A → S, B → R, C → Q, D → P
b) A → R, B → S, C → P, D → Q
c) A → R, B → S, C → Q, D → P
d) A → S, B → Q, C → R, D → P

Q45

List-I	**List-II**
(P) A is a real skew symmetric matrix such that $A^2 + I = 0$. Then	(1) BA – AB
(Q) A is a matrix such that $A^2 = A$. If $(I + A)^n = I + \lambda A$, then λ equals	(2) A is of even order
(R) If for a matrix A, $A^2 = A$, and B = I – A, then AB + BA + I – $(I - A)^2$ equals	(3) A
(S) A is a matrix with complex entries and A* stands for transpose of complex conjugate of A. If A*= A & B* = B, then (AB – BA)* equals	(4) 2^n-1

a) P→1; Q→2; R→3; S→4
b) P→2; Q→4; R→3; S→1
c) P→4; Q→2; R→3; S→1
d) P→2; Q→1; R→4; S→3

Answer Key

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**A, B, C, D**	**A, C, D**	**A, C**	**B, C**	**A, D**	**B, C, D**	**A, D**	**B, D**	**B, C, D**	**A, C, D**

Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**C**	**A**	**B**	**A**	**B**	**A, B**	**A, B, C**	**B, C, D**	**A, B**	**A, B, C**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**B, C, D**	**A, C, D**	**A, C, D**	**A, C, D**	**A, B, C**	**C**	**C**	**A**	**B**	**D**
Que.	31	32	33	34	35	36	37	38	39	40
Ans.	**C, D**	**B, C**	**A, B, C, D**	**A, C, D**	**B, C, D**	**A, B, D**	**A, B, C, D**	**B, D**	**A, B**	**A, C**

Que.	41	42	43	44	45
Ans.	**D**	**B**	**B**	**A**	**B**