Competishun

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

Date: 28/10/2024

Time: 3 hours **Max. Marks:** 300

Comprehensive Cumulative Test CT-2 (2025)

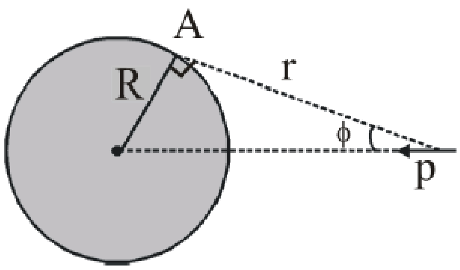
Physics

Single Choice Question

Q1 A glass convex lens ($\mu_g = 1.5$) has a focal length of 8 cm when placed in air. What would be the focal length of the lens when it is immersed in water ($\mu_w = 1.33$)

a) 2m **b)** 4m **c)** 16m **d)** 32m

Q2 A dipole having dipole moment p is placed in front of a solid uncharged conducting sphere as shown in the diagram. The net potential at point A lying on the surface of the sphere is :-

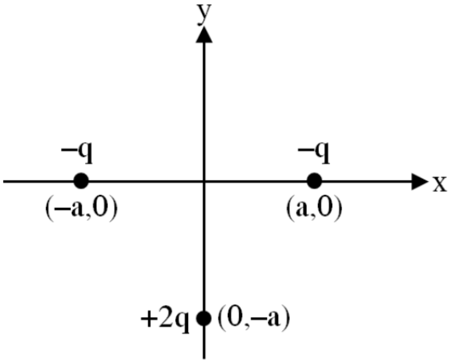


a) $\frac{kp\cos\phi}{r^2}$ **b)** $\frac{kp\cos^2\phi}{r^2}$ **c)** 0 **d)** $\frac{2kp\cos^2\phi}{r^2}$

Q3 The electric field in a region is given by $\vec{E} = 200\hat{\mathbf{i}}$ N/C for x > 0 and $-200\hat{i}$ N/C for x < 0. A closed cylinder of length 2m and cross-section area 10^2 m^2 is kept in such a way that the axis of cylinder is along X-axis and its centre coincides with origin. The total charge inside the cylinder is :
[Take : $\varepsilon_0 = 8.85\times10^{-12} C^2/N-m^2$]

a) 0 **b)** $1.86\times10^{-5}C$ **c)** $1.77\times10^{-11}C$ **d)** $35.4\times10^{-8}C$

Q4 Three point charges –q, –q & +2q are kept at position (–a, 0), (a, 0) and (0, –a) as shown. Consider following statements S_1, S_2, S_3 and S_4



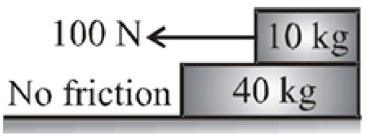
S_1 : Net dipole moment of the system is 2qa.
S_2 : Electric potential at origin is zero.
S_3 : Electric field at origin is $\frac{q}{2\pi\epsilon_0 a^2}$.
S_4 : Net force at charge 2q is $\frac{\sqrt{2}q^2}{4\pi\epsilon_0 a^2}$
The correct statement is :

a) S_1 only **b)** S_1,S_2 only **c)** S_1,S_2,S_3 only **d)** All statements

Q5 A boat having a speed of 5 km/hr in still water, crosses a river of width 1km along the shortest possible path in 15 minutes. The speed of the river in Km/hr.

a) 1 **b)** 3 **c)** 4 **d)** None of these

Q6 A 40 kg slab (B) rests on a smooth floor as shown in figure. A 10 kg block (A) rests on the top of the slab. The static coefficient of friction between slab and block is 0.6 while the kinetic friction coefficient is 0.4. The block (A) is acted upon by a horizontal force 100 N. If g = 9.8 m/s^2, the resulting acceleration of the slab (B) will be :-

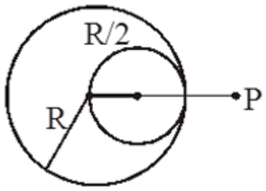


a) $0.98 m/s^2$ **b)** $1.47 m/s^2$ **c)** $1.52 m/s^2$ **d)** $6.1 m/s^2$

Q7 The total mass of an elevator with a 80 kg man in it is 1000 kg. This elevator moving upward with a speed of 8 m/sec, is brought to rest over a distance of 16 m. The tension T in the cables supporting the elevator and the force exerted on the man by the elevator floor will respectively be :-

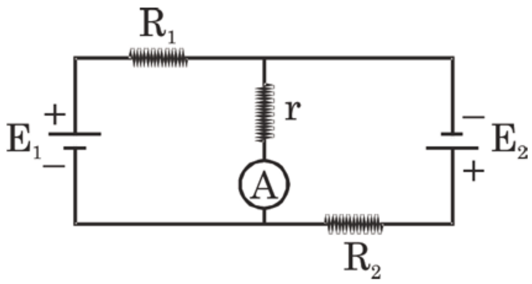
a) 7800 N, 624 N **b)** 624 N, 7800 N **c)** 11800 N, 624 N **d)** 624 N, 78 N

Q8 A solid sphere of uniform density and radius R applies a gravitational force of attraction equals to F_1 on a particle placed at P, distance 2R from the centre. O of the sphere. A spherical cavity of radius R/2 is now made in a sphere as shown in figure. The sphere with cavity now applies a gravitational force F_2 on the same particle placed at P. The ratio F_2/F_1 will be –



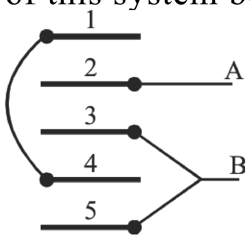
a) 1/2 **b)** 7/9 **c)** 3 **d)** 9/7

Q9 If the reading of ideal ammeter A in circuit shown here is zero, then the ratio $\frac{E_1}{E_2}$ of the emf's of the two batteries must be



a) 1 **b)** $\frac{R_1}{R_2}$ **c)** $\frac{R_2}{R_1}$ **d)** None of these

Q10 Five identical metal plates 1,2,3,4 and 5 each of area A on one side are fixed parallel and equidistant (d) to each other. The plates 1 and 4 are joined by a conductor, and plates 3 and 5 are also joined by a conductor as shown in figure. Then, the capacitance of this system between A and B is-

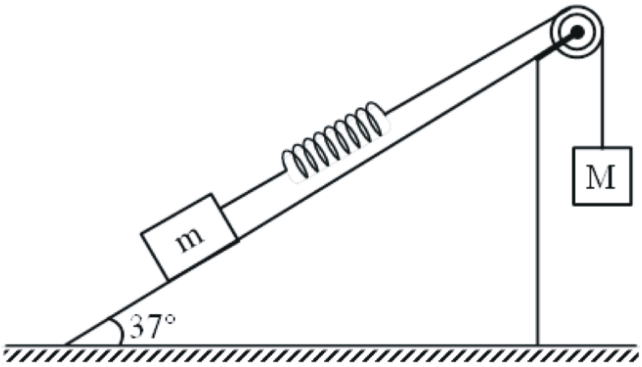


a) $\frac{5\varepsilon_0 A}{d}$ **b)** $\frac{4\varepsilon_0 A}{d}$ **c)** $\frac{5\varepsilon_0 A}{3d}$ **d)** None of the above

Q11 An elastic string of unstretched length I and force constant k is stretched by a small length x. It is further stretched by another small length y. The work done in the second stretching is :-

a) $\frac{1}{2}kx^2$ **b)** $\frac{1}{2}k\left(x^2+y^2\right)$ **c)** $\frac{1}{2}ky(2x+y)$ **d)** $\frac{1}{2}kx(x+2y)$

Q12 A block of mass m is attached with a massless spring of force constant K. The block is placed over a rough inclined surface for which the coefficient of friction is $\mu = 3/4$. The minimum value of M required to move the block up the plane is : (Neglect mass of string and pulley and friction in pulley) :

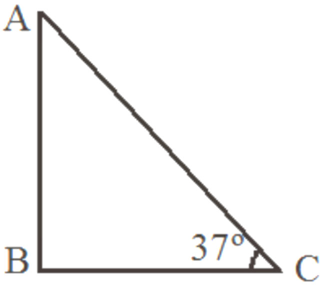


a) 3/5 m **b)** 4/5 m **c)** 2 m **d)** 3/2 m

Q13 A ball approaches a moving wall of infinite mass with speed v along the normal to wall the speed of wall is u away from ball and u < v. The speed of ball after an elastic collision is :-

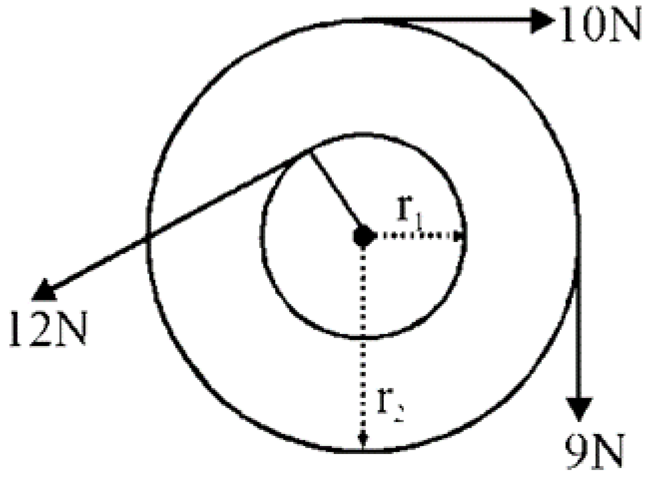
a) u + v away from wall **b)** 2 u + v away from wall **c)** v – u towards the wall
d) v – 2 u away from wall

Q14 ABC is a right angled triangular plate of uniform thickness I_1,I_2 and I_3 are moment of inertia about AB,BC and AC respectively. Then which of the following relation is correct?



a) $I_1 = I_2 = I_3$ **b)** $I_2 > I_1 > I_3$ **c)** $I_3 < I_2 < I_1$ **d)** $I_3 > I_1 > I_2$

Q15 In the following figure r_1 and r_2 are 5 cm and 30 cm respectively. If the moment of inertia of the wheel is 5100 kg – m^2 then its angular acceleration will be :-



a) $10^{-4}\text{rad}/s^2$ b) $10^{-3}\text{rad}/s^2$ c) $10^{-2}\text{rad}/s^2$ d) $10^{-1}\text{rad}/s^2$

Q16 A simple pendulum has a time period T = 2s in air. If the whole arrangement is placed in a non-viscous liquid whose density is 1/2 times the density of bob, the time period in liquid will be-

a) $\sqrt{2}$S b) 4 s c) $2\sqrt{2}$ s d) $4\sqrt{2}S$

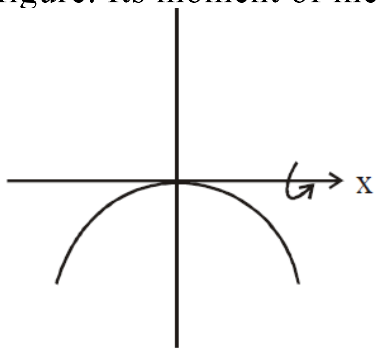
Q17 Two identical metallic sheets of area $\frac{10^3}{17\times 27}m^2$ are arranged parallel with some separation between them in vacuum. Thermal energy at a constant rate 'P' is generated in one of the sheets by passing current through it. In steady state, the temperature of the other sheet is found to be 300 K. The value of P (in KW) is :-$\left(\sigma=\frac{17}{3}\times 10^{-8}\frac{W}{m^2K^4}\right)$

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

Q18 Vertical displacement of a plank with a body of mass 'm' on it is varying according to law $y=\sin\omega t+\sqrt{3}\cos\omega t$. The minimum value of ω for which the mass just breaks off the plank and the moment it occurs first after t = 0 are given by: (y is positive vertically upwards)

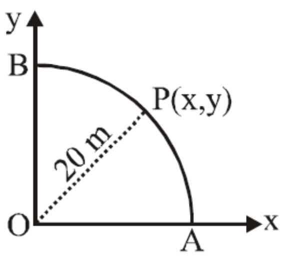
a) $\sqrt{\frac{g}{2}},\frac{\sqrt{2}}{6}\frac{\pi}{\sqrt{g}}$ b) $\frac{g}{\sqrt{2}},\frac{2}{3}\sqrt{\frac{\pi}{g}}$ c) $\sqrt{\frac{g}{2}},\frac{\pi}{3}\sqrt{\frac{2}{g}}$ d) $\sqrt{2g},\sqrt{\frac{2\pi}{3g}}$

Q19 A semicircular ring of mass m and radius R rotates about x-axis as shown in the figure. Its moment of inertia about x-axis will be,



a) $\frac{3}{2}mR^2$ **b)** $2mR^2$ **c)** $\frac{3}{2}mR^2 - \frac{4mR^2}{\pi}$ **d)** $\frac{3mR^2}{2\pi}$

Q20 A point P moves in counter clockwise direction on a circular path as shown in the figure. The movement of 'P' is such that it sweeps out a length $s = t^2 + 5$, where s is in metres and t is in seconds. The radius of the path is 20 m. The acceleration of ' P ' when $t = 5\sqrt{\frac{3}{10}}$ seconds is nearly :

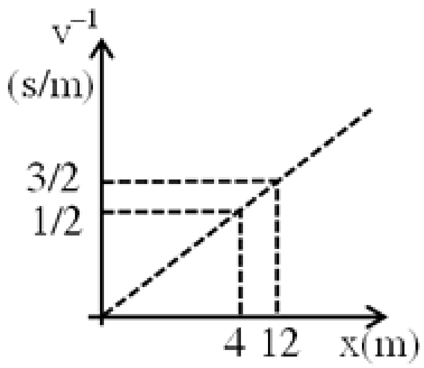


a) $2\ m/s^2$ **b)** $1.5\ m/s^2$ **c)** $2.5\ m/s^2$ **d)** $3\ m/s^2$

Numerical

Q21 An air bubble in a glass slab with refractive index 1.5 (near normal incidence) is 5cm deep when viewed from one surface and 3cm deep when viewed from the opposite face. The thickness (in cm) of the slab is :-

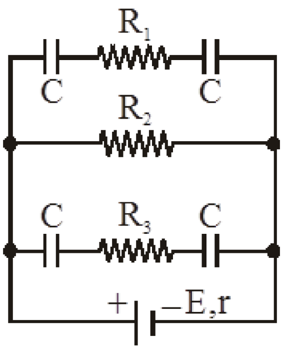
Q22 Graph of 1/v versus x for a particle under motion is shown as, where v is velocity and x is position. The time taken by particle to move from x = 4 to x = 12 m is :-



Q23 The series combination of two batteries, both of the same emf 10 V, but different internal resistance of 20Ω and 5Ω, is connected to the parallel combination of two resistors 30Ω and RΩ. The voltage difference across the battery of internal resistance 20Ω is zero, the value of R (in Ω) is :

Q24 A weightless thread can withstand tension upto 30N. A stone of mass 0.5 kg is tied to it and is revolved in a circular path of radius 2 m in a vertical plane. If $g = 10\ m/s^2$, then the maximum angular velocity of the stone can be:-

Q25 In the circuit diagram of figure, E = 5 volt, r = 1Ω, $R_2 = 4\Omega$, $R_1 = R_3 = 1\Omega$ and C = 3μF. Then the magnitude of the charge (in μC) on each capacitor plate is :-



Chemistry

Single Choice Question

Q26 Calculate the weight of V_2O_5 produced from 1.7 g VO and 4.8g of Fe_2O_3.

$2VO + 3Fe_2O_3 \rightarrow 6FeO + V_2O_5$

(At wt. of $V = 51$, At wt. of $Fe = 56$)

a) 4.32 **b)** 7.755 **c)** 2.585 **d)** 1.82

Q27 Mole fraction of water in $20\% w / h_2O_2$ solution is :-

a) $\frac{77}{68}$ **b)** $\frac{68}{77}$ **c)** $\frac{20}{80}$ **d)** $\frac{9}{77}$

Q28 Half life $(t_{1/2})$ and completion time (T) for a zero order reaction will be

$K = 0.001 \frac{mol}{L/sec}$ and $a = 1M$

a) $500 min, 750 min$ **b)** $500 sec, 750 sec$ **c)** $500 sec, 1000 sec$ **d)** None of these

Q29 In a reaction $A_2B_3(g) \rightarrow A_2(g) + \frac{3}{2}B_2(g)$, the pressure increases from 60 torr to 75 torr in 2.5 minutes. The rate of disappearance of A_2B_3 is –

a) 8 torr min^{-1} **b)** 18 torr min^{-1} **c)** 4 torr min $^{-1}$ **d)** 10 torr min^{-1}

Q30 For the reaction $A \rightarrow B$, data of initial concentration and corresponding half life period are given in the tabular from :

[A]	1M	2M	4M
$T_{0.5}$	300_s	600_s	1200_s

The order of the reaction is :-

a) 0 **b)** 1 **c)** 2 **d)** 3

Q31 The electrons identified by quantum numbers n and 1,

(i) $n = 4, 1 = 1$ (ii) $n = 4, 1 = 0$ (iii) $n = 3, 1 = 2$ (iv) $n = 3, 1 = 1$

can be placed in order of increasing energy, from the lowest to highest as :-

a) iv < ii < iii < i **b)** ii < iv < i < iii **c)** i < iii < ii < iv **d)** iii < i < iv < ii

Q32 The orbital angular momentum of an electron in a single electron system is $\sqrt{3}\frac{h}{\pi}$.

Which of the following angular momentum value (s) are not possible for this electron in Bohr orbit.

a) $\frac{3h}{2\pi}$ **b)** $\frac{5h}{2\pi}$ **c)** $\frac{2h}{\pi}$ **d)** $\frac{7h}{2\pi}$

Q33 Which is set of paramagnetic molecules or ions?

a) $NO, NO_2, O_2^{2+}, O_2^{2-}$ **b)** O_2^+, O_2^-, NO, NO_2 **c)** C_2, B_2, O_2, S_2

d) B_2, N_2, O_2, O_2^-

Q34 Select incorrect order :-

a) $NO_3^- > NO_2^- > NO_2^+$ ($N-O$ bond length)

b) $HI > HF > HBr > HCl$ (order of melting point)

c) $CH_4 < CH_3Cl < CH_2Cl_2 < CHCl_3$ (order of dipole moment)

d) $SbH_3 > NH_3 > AsH_3 > PH_3$ (order of boiling point)

Q35 For the reaction takes place at certain temperature

$$NH_2COONH_4(s) \rightleftharpoons 2NH_3(g) + CO_2(g) \ldots$$

If equilibrium pressure is $3X$ bar then $\Delta_r G^\circ$ would be :-

a) $-RT\ln 4 - 3RT\ln X$ **b)** $RT\ln 4 - 3RT\ln X$ **c)** $-3RT\ln X$

d) None of these

Q36 Type of isomerism exhibited $\left[Cr(NCS)(NH_3)_3\right][ZnCl_4]$:-

a) Coordination isomerism **b)** Linkage isomerism **c)** Ionization isomerism

d) Both coordination and linkage isomerism

Q37 Complexes $\left[Co(SO_4)(NH_3)_5\right]Br$ and $\left[CoBr(NH_3)_5\right]SO_4$ can be distinguished by:-

a) Conductance measurement **b)** using $BaCl_2$ **c)** using $AgNO_3$ **d)** All

Q38 Assign the hybridisation, shape and magnetic moment of $\left[Cu(NH_3)_4\right]SO_4$

a) dsp^2, square planer, $1.73BM$ **b)** sp^3, tetrahedral, $1.73BM$

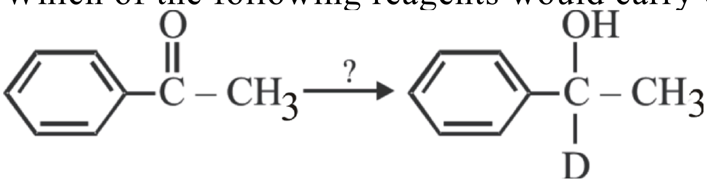
c) dsp^2, square planer, $2.44BM$ **d)** sp^3, tetrahedral, $2.44BM$

Q39 The octahedral complex of a metal ion M^{3+} with four monodentate ligands L_1, L_2, L_3 and L_4 absorb wavelength in the region of red, green, yellow and blue, respectively. The increasing order of ligand strength of the four ligands is:

a) $L_3 < L_2 < L_4 < L_1$ **b)** $L_1 < L_2 < L_4 < L_3$ **c)** $L_4 < L_3 < L_2 < L_1$

d) $L_1 < L_3 < L_2 < L_4$

Q40 Which of the following reagents would carry out the following transformation?



a) $NaBD_4$ in CH_3OH **b)** $LiAlH_4$, then D_2O **c)** $NaBO_4$ in CH_3OD

d) $LiAlO_4$, then D_2O

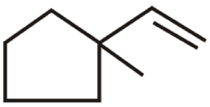
Q41 Which one/ones of the following reactions will yield 2-propanol?

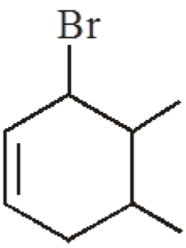
(i) $CH_3CH=CH_2 + H_2O \xrightarrow{H^+}$ (ii) $CH_3CHO \xrightarrow[\text{(ii) } H_2O]{\text{(i) } CH_3MgI}$

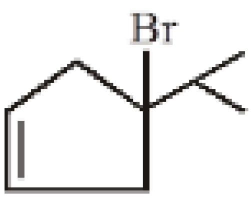
(iii) $HCHO \xrightarrow{\text{(i) } C_2H_5MgI}$ (iv) H_2O

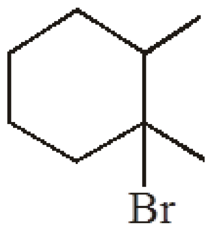
Choose the right answer :

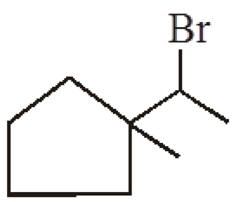
a) (i) and (ii) **b)** (ii) and (iii) **c)** (iii) and (i) **d)** None of these

Q42  $\xrightarrow[CCl_4]{HBr}$ $\underset{\text{major}}{A}$ Product (A) is :-

a) 

b) 

c) 

d) 

Q43 Tell which of the following statements accurately describes the effect of adding CN^- to the cathode of a cell with a cell reaction: $Cd + 2Ag^+ \rightarrow 2Ag + Cd^{2+}$, $E° = 1.2$ V

a) $E°$ increases because $Cd(CN)_4^{2-}$ forms

b) $E°$ decreases because $Cd(CN)_4^{2-}$ forms **c)** $E°$ increases because $Ag(CN)_2^-$ forms

d) $E°$ decreases because $Ag(CN)_2^-$ forms

Q44 Select the correct option if it is known that K_{sp} (AgCl) > K_{sp} (AgBr) > K_{sp} (AgI)

a) $E^o_{I^-|AgI|Ag} > E^o_{Br^-|AgBr|Ag} > E^o_{Cl^-|AgCl|Ag}$

b) $E^o_{I^-|AgI|Ag} < E^o_{Br^-|AgBr|Ag} < E^o_{Cl^-|AgCl|Ag}$

c) $E^o_{I^-|AgI|Ag} < E^o_{Cl^-|AgCl|Ag} < E^o_{Br^-|AgBr|Ag}$

d) $E^o_{I^-|AgI|Ag} < E^o_{Br^-|AgBr|Ag} = E^o_{Cl^-|AgCl|Ag}$

Q45 Two students use same stock solution of $ZnSO_4$ but different solutions of $CuSO_4$. The EMF of one cell is 0.03 V higher than the other. The concentration of $CuSO_4$ in the cell with higher EMF value is 0.5 M. The concentration of $CuSO_4$ in the other cell is (2.303 RT/F = 0.06)

a) 0.05 M **b)** 5.0 M **c)** 0.5 M **d)** 0.005 M

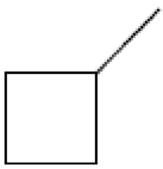
Numerical

Q46

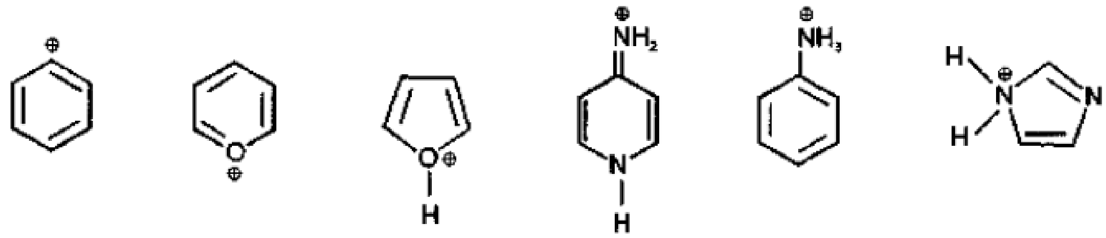
$$CH_3-CH=CH-\underset{\substack{|\\ CH_3}}{CH}-C_2H_5 \xrightarrow[h\nu]{NBS} \text{Products}$$

How many stereoisomer(s) is/are possible by the major product of above reaction? [Consider the product as an isomer]

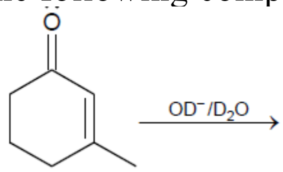
Q47 Number of distinct monochlorinated products, (including stereoisomersm) x obtained when the alkane shown below is heated in the presence of Cl_2. Find value of x. Find the value of x



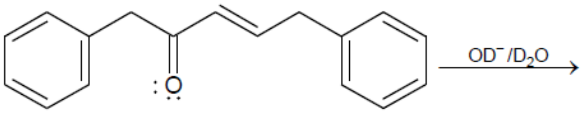
Q48 In how many species positive charge is not delocalized?



Q49 The following compound[X] and [Y] are treated with D_2O/OD^-



[X]



[Y]

The total number of H that may be replaced by D in both compounds [X] and [Y] are Z. What is the value of Z?

Q50 What is the total number of stereoisomers of the following compound?

$$Me-CH=CH-\underset{\displaystyle OH}{\underset{|}{CH}}-CH=CH-Me$$

Mathematics

Single Choice Question

Q51 If A is matrix of order (3×3) and $|A|=2$ then value of |adj adj adj adj adj (2A)| is equal to : -

a) 2^9 **b)** 2^{128} **c)** 2^{32} **d)** None

Q52 Let the tangent to the parabola $S: y^2=2x$ at the point $\text{P}(2,2)$ meet the x -axis at Q and normal at it meet the parabola S at the point R. Then the area (in sq. units) of the triangle PQR is equal to:

a) $\frac{25}{2}$ **b)** $\frac{35}{2}$ **c)** $\frac{15}{2}$ **d)** 25

Q53 Let a parabola P be such that its vertex and focus lie on the positive x-axis at a distance 2 and 4 units from the origin, respectively. If tangents are drawn from $\text{O}(0,0)$ to the parabola P which meet P at S and R, then the area (in sq. units) of ΔSOR is equal to :

a) $16\sqrt{2}$ **b)** 16 **c)** 32 **d)** $8\sqrt{2}$

Q54 If the three normals drawn to the parabola, $y^2=2x$ pass through the point $(a,0)\text{a}\neq 0$, then 'a' must be greater than :

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

Q55 Let $E_1:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1a>b$. Let E_2 be another ellipse such that it touches the end points of major axis of E_1 and the foci of E_2 are the end points of minor axis of E_1. If E_1 and E_2 have same eccentricities, then its value is :

a) $\frac{-1+\sqrt{5}}{2}$ **b)** $\frac{-1+\sqrt{8}}{2}$ **c)** $\frac{-1+\sqrt{3}}{2}$ **d)** $\frac{-1+\sqrt{6}}{2}$

Q56 If $\left(x^2+x+1\right)+\left(x^2+2x+3\right)+\left(x^2+3x+5\right)+\ldots\ldots+\left(x^2+20x+39\right)=4500$ then x equals to:-

a) $\left\{10,-\frac{41}{2}\right\}$ **b)** $\left\{10,\frac{41}{2}\right\}$ **c)** $\left\{10,\frac{21}{2}\right\}$ **d)** $\left\{-10,-\frac{41}{2}\right\}$

Q57 If $\sin^{-1}x+\sin^{-1}y=\pi$ and if $x=\lambda y$, then the value of $39^{2\lambda}+5^{\lambda}$ must be :-

a) 1526 **b)** 1525 **c)** 1524 **d)** 1527

Q58 Find the values of x for which

$$f(x)=\frac{(x-2)^2(1-x)(x-3)^3(x-4)^2}{(x+1)}\le 0$$

a) $(-1,1]\cup[3,\infty)$ **b)** $(-1,1)\cup(3,\infty)\cup\{2\}$ **c)** $(-\infty,-1)\cup[1,3]$

d) $(-1,1]\cup[3,\infty)\cup\{2\}$

Q59 Let f be any function defined on R and let it satisfy the condition :

$|f(x)-f(y)|\le|(x-y)^2|,\ \forall(x,y)\in R$

If f(0) = 1, then :

a) f(x) can take any value of R **b)** $f(x)<0,\ \forall x\in R$ **c)** $f(x)=0,\ \forall x\in R$

d) $f(x)>0,\ \forall x\in R$

Q60

$$\text{Given } f(x)=\begin{cases}\dfrac{\ln\left(1+\text{sgn}[x]+\{x\}^2\right)}{1-\cos\{x\}} & \text{if } x\ne 0\\ k & \text{if } x=0\end{cases},$$

then (where [.], {.} and sgnx denotes greatest integer function, fractional part function and signum function respectively)

a) $f(x)$ is continuous at $x=0$ if $k=2$

b) for $k=1, f(x)$ has removable discontinuity at $x=0$

c) for $k=2, f(x)$ has non-removable discontinuity at $x=0$ **d)** $\lim_{x\to 0} f(x)$ exists

Q61 If $\phi(x)=f(x)+f(2a-x)$ and $f''(x)>0, a>0, 0\le x\le 2a$, then :-

a) $\phi(x)$ increases in (a, 2a) **b)** $\phi(x)$ increases in $(0,a)$

c) $\phi(x)$ decreases in (a, 2a) **d)** None

Q62 Let $f(x)=\begin{cases}\alpha+x^2, & 0<x<1\\ 2x, & x\ge 1\end{cases}$ f(x) can have a minimum at $x=1$ is the value of α is :-

a) 1 **b)** -1 **c)** 0 **d)** 2

Q63 The height of a right circular cone of maximum volume inscribed in a sphere of diameter a is-

a) $(2/3)a$ **b)** $(3/4)a$ **c)** $(1/3)a$ **d)** $(1/4)a$

Q64 Let $f(x)=3^{\alpha x}+3^{\beta x}$, where $\alpha\ne\beta$ and $3f'(x)\log_3 e=2f(x)+f''(x).(\log_3 e)^2$ for all x. Then the value of $\alpha+\beta$ is :

a) 3 **b)** 2 **c)** -3 **d)** 6

Q65 If $y=\tan^{-1}\left(\dfrac{\log(e/x^2)}{\log(ex^2)}\right)+\tan^{-1}\left(\dfrac{3+2\log x}{1-6\log x}\right)$, then $\dfrac{d^2y}{dx^2}$ is

a) 2 **b)** 1 **c)** 0 **d)** -1

Q66 If the intercepts of the variable circle on the x-axis and y-axis are 2 units and 4 units respectively, then the locus of the centre of the variable circle is :-

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

Q67 The length of the chord cut off by $y = 2x + 1$ from the circle $x^2 + y^2 = 2$ is :-

a) $\frac{5}{6}$ b) $\frac{6}{\sqrt{5}}$ c) $\frac{6}{5}$ d) None of these

Q68 If $a, b, c > 0$ and $x, y, z \in R$, then the determinant

$$\begin{vmatrix} (a^x + a^{-x})^2 & (a^x - a^{-x})^2 & 1 \\ (b^y + b^{-y})^2 & (b^y - b^{-y})^2 & 1 \\ (c^z + c^{-z})^2 & (c^z - c^{-z})^2 & 1 \end{vmatrix}$$ is equal to -

a) $a^x b^y c^x$ b) $a^{-x} b^{-y} c^{-z}$ c) $a^{2x} b^{2y} c^{2z}$ d) zero

Q69 The point P (a,b) undergoes the following three transformations successively :
(a) reflection about the line y = x.
(b) translation through 2 units along the positive direction of x-axis.
(c) rotation through angle $\frac{\pi}{4}$ about the origin in the anti-clockwise direction.

If the co-ordinates of the final position of the point P are $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$, then the value of 2a + b is equal to :

a) 13 b) 9 c) 5 d) 7

Q70 If S.D. of 0,1,2, ... 9 is K then the S.D. of 10,11,12, ... 19 is :-

a) K b) K + 10 c) $K + \sqrt{10}$ d) 10 K

Numerical

Q71 Tangents to the curve xy = 4 at point P meets x-axis at A and y-axis at B; where O is origin then area of triangle OAB is

Q72 Total number of co-ordinate(s) out of (1, 2), (1,–1), (3, 5), (–3,2) & (5,4) so that we have pair of tangents to the same branchs of hyperbola $\frac{x^2}{16} - \frac{y^2}{25} = 1$

Q73 If $f(x) = \begin{cases} A + Bx^2, & x < 1 \\ Ax + 3x^2 - B, & x \geq 1 \end{cases}$ is differentiable at $x = 1$, then the value of $(A + 4B)$ is :

Q74 If A and B are two sets such that $A=\{1,2,x\}$, $B=\{3,4,y\}$ and $\{1,3\}\times\{2,4\}\subseteq A\times B$ then the value of x + y is

Q75 Minimum value of $\frac{b+c}{a}+\frac{c+a}{b}+\frac{a+b}{c}$, (for real positive number a,b,c) is

Answer Key

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**D**	**B**	**D**	**D**	**B**	**A**	**A**	**B**	**B**	**C**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**C**	**A**	**D**	**C**	**B**	**C**	**C**	**A**	**C**	**C**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**12**	**8**	**30**	**5**	**6**	**D**	**B**	**C**	**C**	**A**
Que.	31	32	33	34	35	36	37	38	39	40
Ans.	**A**	**A**	**B**	**C**	**A**	**D**	**D**	**A**	**D**	**A**
Que.	41	42	43	44	45	46	47	48	49	50
Ans.	**A**	**C**	**D**	**B**	**A**	**4**	**8**	**4**	**13**	**4**
Que.	51	52	53	54	55	56	57	58	59	60
Ans.	**B**	**A**	**B**	**D**	**A**	**A**	**A**	**D**	**D**	**C**
Que.	61	62	63	64	65	66	67	68	69	70
Ans.	**A**	**A**	**A**	**A**	**C**	**B**	**B**	**D**	**B**	**A**
Que.	71	72	73	74	75					
Ans.	**8**	**3**	**3**	**5**	**6**					