Competishun

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

Date: 06/01/2025

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

UTS-1-MT-16_(24-25)

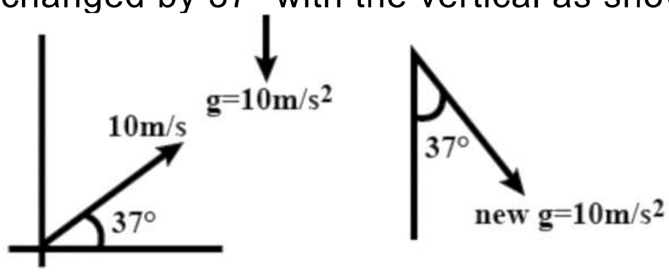
Physics

Single Choice Question

Q1 The velocity of an electron while entering a magnetic field $\vec{B} = B_0\hat{k}$ (where B_0 is a positive constant) is $\vec{v} = 3\hat{i} + 4\hat{j} + 6\hat{k}$. After some time the velocity of the electron may be

a) $4\hat{i} + 3\hat{j} + 6\hat{k}$ **b)** $\hat{i} + \hat{j} + \hat{k}$ **c)** $3\hat{i} + 6\hat{j} + 4\hat{k}$ **d)** $6\hat{i} + 3\hat{j} + 6\hat{k}$

Q2 A particle is projected with a velocity 10 m/s at an angle 37° with the horizontal. It reaches to a point P in 1 sec. Now the direction of gravity is changed by 37° with the vertical as shown.



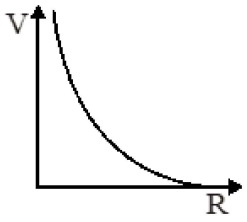
The new projection velocity (may be at a different angle) so that the particle reaches the same point P in 1 sec, is:

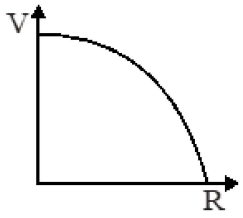
a) $\sqrt{10}$ m/s **b)** 20 m/s **c)** $5\sqrt{2}$ m/s **d)** $10\sqrt{3}$

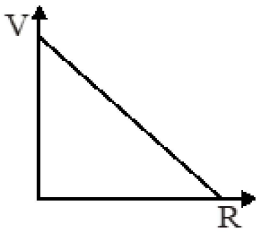
Q3 How much heat must be supplied to convert 1 kg ice at –10ºC to steam at 100ºC. (Take specific heat of ice S_i = 0.5cal/gm ºC. Latent heat of fusion of ice = 80cal/gm and Latent heat of vaporization = 540cal/gm)

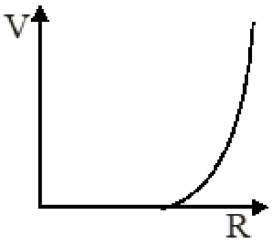
a) 725 kcal **b)** 820 kcal **c)** 830 kcal **d)** 735 kcal

Q4 A small, charged pith ball moves on a smooth table toward an oppositely charged metal ball that is held in place on the table. Which of the curves shown in figure most realistically reflects the speed v of the pith ball as a function of the distance 'r' between the balls? Initial distance between them is R.

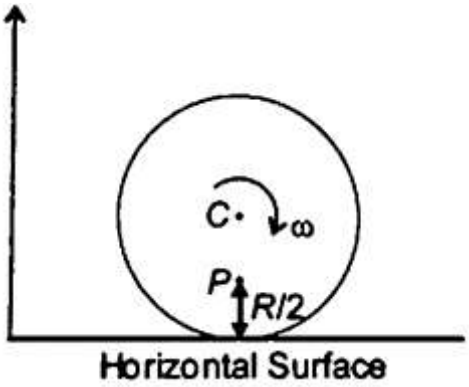
a) 

b) 

c) 

d) 

Q5 A disc of mass m and radius R is rolling with angular speed ω on a horizontal surface as shown in the figure. The magnitude of angular momentum of the disc about the point P on the disc, which is distance $\frac{R}{2}$ from the horizontal surface as shown is

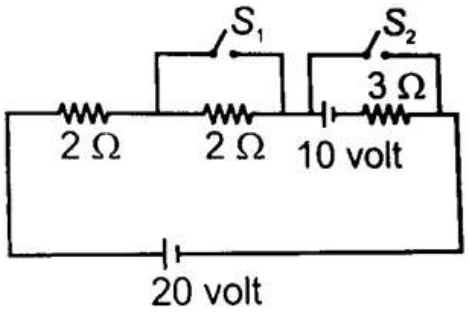


a) $mR^2\omega$ **b)** $\frac{3}{4}mR^2\omega$ **c)** $\frac{3}{2}mR^2\omega$ **d)** $\frac{3}{8}mR^2\omega$

Q6 Maximum height reached by a rocket fired with a speed equal to 50% of the escape velocity from earths surface is given by (R is radius of earth) :

a) $\frac{R}{3}$ **b)** $3R$ **c)** $\frac{2R}{3}$ **d)** R

Q7 In the circuit shown below, if current supplied by a cell of e.m.f. 20 volt is i, then the correct statement is



a) i = 2 A, when S_1 is closed and S_2 is open

b) i = 3A, when S_1 is open and S_2 is closed

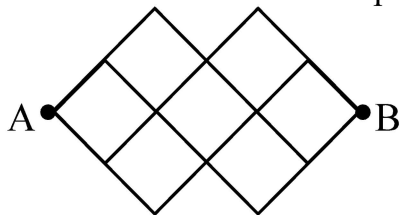
c) $i = \frac{10}{3}$ A, when S_1,S_2 both are open

d) $i = \frac{10}{7}$ A when S_1, S_2 both are closed

Q8 An electron in hydrogen like atom makes a transition from n^{th} orbit and emits radiations corresponding to Lyman series. If the de Broglie wavelength of electron in n^{th} orbit is equal to wavelength of the radiation emitted, value of n, is. (The atomic number of atom is 11)

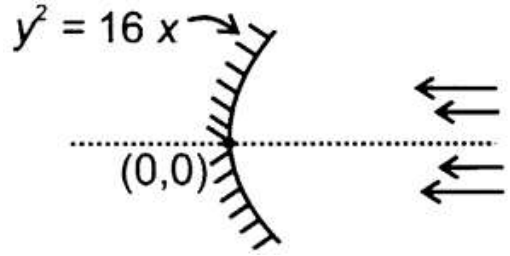
a) 5 **b)** 8 **c)** 25 **d)** 30

Q9 Each branch in the following circuit has a resistance R. The equivalent resistance of the circuit between two points A and B



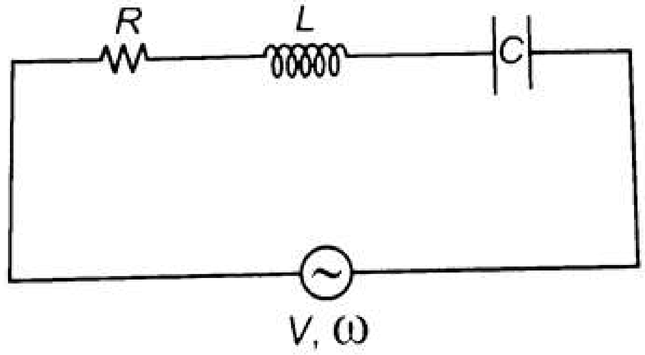
a) R **b)** 2R **c)** 4R **d)** 8R

Q10 A mirror of parabolic shape is shown. The equation of mirror surface is $y^2 = 16x$. Rays parallel to the principal axis are focused at



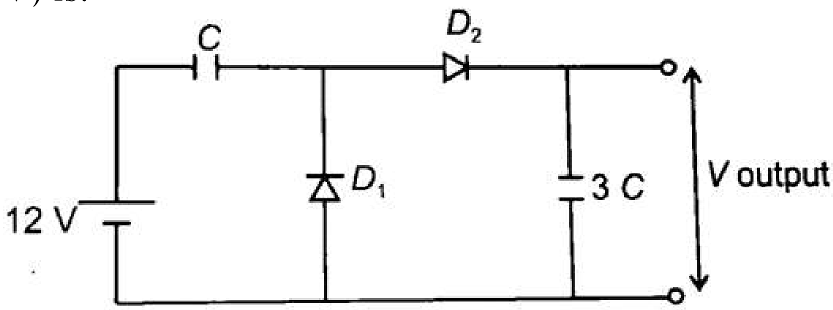
a) (2, 0) **b)** (4, 0) **c)** (6, 0) **d)** (0, 4)

Q11 In shown series L – C – R circuit; $L=\frac{R}{\omega}$, $C=\frac{1}{2\omega R}$. Then the average power consumed in the circuit, is



a) $\frac{v^2}{R}$ b) $\frac{2v^2}{R}$ c) $\frac{v^2}{2R}$ d) $\frac{v^2}{3R}$

Q12 The ideal diodes D_1 and D_2 and two capacitors of capacitances C and 3C are connected as shown. A battery of 12 V is connected as shown. Then output voltage (in V) is:



a) 5 b) 7 c) 1 d) 3

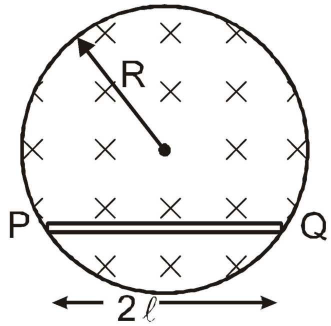
Q13 A pendulum of length 2 m consists of a wooden bob of mass 50 g. A bullet of mass 75 g is fired towards the stationary bob with a speed v. The bullet emerges out of the bob with a speed $\frac{v}{3}$ and the bob just completes the vertical circle. The value of v is ________ ms^{-1}. (if g = 10 m/s^2)

a) v = 7 m/s b) v = 8 m/s c) v = 10 m/s d) v = 12 m/s

Q14 A tube of length ℓ open at only one end is cut into two equal halves. The sixth overtone frequency of piece closed at one end equals to sixth overtone frequency of piece open at both ends. The radius of cross–section of tube is :

a) $\frac{5\ell}{72}$ b) $\frac{\ell}{24}$ c) $\frac{5\ell}{24}$ d) $\frac{5\ell}{12}$

Q15 A uniform magnetic field, $B = B_0 t$ (where B_0 is a positive constant), fills a cylindrical volume of radius R, then the potential difference in the conducting rod PQ due to electrostatic field is :

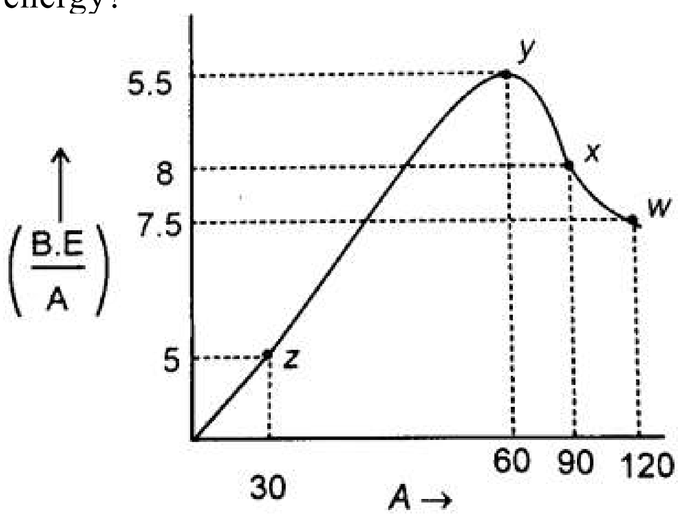


a) $B_0 \ell \sqrt{R^2 + \ell^2}$ **b)** $B_0 \ell \sqrt{R^2 - \frac{\ell^2}{4}}$ **c)** $B_0 \ell \sqrt{R^2 - \ell^2}$ **d)** $B_0 R \sqrt{R^2 - \ell^2}$

Q16 A particle of mass m is moving in a straight line with momentum P. Starting at time t = 0, a force F = kt acts in the same direction on the moving particle during time interval T so that its momentum changes from P to 3P. Here K is a constant. The value of T is

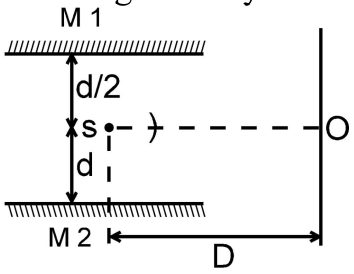
a) $\sqrt{\frac{2K}{P}}$ **b)** $2\sqrt{\frac{P}{K}}$ **c)** $\sqrt{\frac{2P}{K}}$ **d)** $2\sqrt{\frac{K}{P}}$

Q17 Binding energy per nucleon vs mass number curve for nuclei is shown in the figure. w, x, y and z are four nuclei indicated on the curve. The process that would release energy?



a) y → 2z **b)** w → x + z **c)** w → 2y **d)** x → y + z

Q18 M_1 and M_2 are plane mirrors and kept parallel to each other. At point O there will be a maxima for wavelength. Light from monochromatic source S of wavelength λ is not reaching directly on the screen. Then λ is : [D > > d, d > > λ]



a) $\frac{3d^2}{D}$ **b)** $\frac{3d^2}{2D}$ **c)** $\frac{d^2}{D}$ **d)** $\frac{2d^2}{D}$

Q19 The value of tension in a long thin metal wire has been changed from T_1 to T_2. The lengths of the metal wire at two different values of tension T_1 and T_2 are ℓ_1 and ℓ_2 respectively. The actual length of the metal wire is :

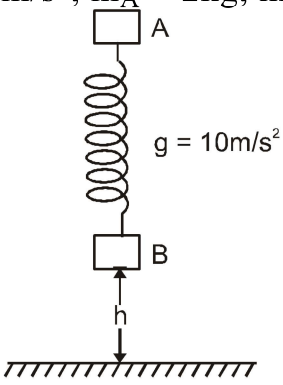
a) $\frac{T_1\ell_2 - T_2\ell_1}{T_1 - T_2}$ **b)** $\frac{T_1\ell_1 - T_2\ell_2}{T_1 - T_2}$ **c)** $\frac{\ell_1 - \ell_2}{2}$ **d)** $\sqrt{T_1 T_2 \ell_1 \ell_2}$

Q20 The amplitude of magnetic field in an electromagnetic wave propagating along y-axis is 6.0×10^{-7} T. The maximum value of electric field in the electromagnetic wave is:

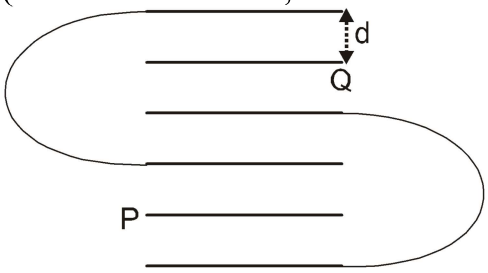
a) 5×10^{14} Vm^{-1} **b)** 180 Vm^{-1} **c)** 2×10^{15} Vm^{-1} **d)** 6.0×10^{-7} Vm^{-1}

Numerical

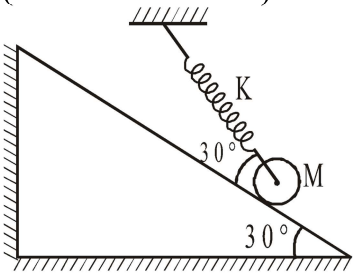
Q21 From what minimum height 'h' in metre must the system be released when spring is in its natural length as shown in the figure. So that after perfectly inelastic collision. (e = 0), of block B, with ground, B may be lifted off ground. (Take k = 40 N/m, g = 10 m/s^2, m_A = 2kg, m_B = 4kg)



Q22 Six identical parallel metallic large plates are located in air at equal distances d to neighbouring plates. The area of each plate is A. Some of the plates are connected by conducting wires to each other. The capacitance of the system of plates between two points P and Q in pF is :
(Take A = 0.05 m^2, d = 17.7 mm, $\varepsilon_0 = 8.85 \times 10^{-12}$ F/m).



Q23 A sphere of mass M and radius R is on a smooth fixed inclined plane in equilibrium as shown in the figure. If now the sphere is displaced through a small distance along the plane, what will be the angular frequency (in radian/sec) of the resulting SHM?
(Given k = 4M/3).



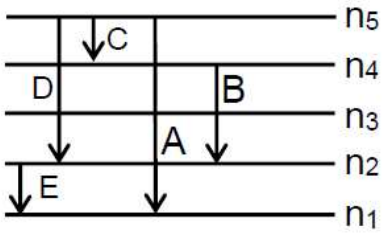
Q24 At a certain temperature, the degrees of freedom per molecule for gas is 8. The gas performs 150 J of work when it expands under constant pressure. The amount of heat absorbed by the gas will be ……..J.

Q25 A soap bubble of radius 3 cm is formed inside the another soap bubble of radius 6 cm. The radius of an equivalent soap bubble which has the same excess pressure as inside the smaller bubble with respect to the atmospheric pressure is ..... cm.

Chemistry

Single Choice Question

Q26 For H-atom some spectral lines were observed as shown. (n_1 to n_5 are successive shells). If 'E' belongs to visible region, then correct statements for the following transition.



(A) There cannot be any line in UV region (B) B and D lines belongs to Infrared region.
(C) Line having shortest wavelength is A (D) Line having least energy is C

a) (A), (B) and (C) **b)** (A) and (B) **c)** (C) and (D) **d)** (A), (B), (C) and (D)

Q27 Which of the following isoelectronic ion has the lowest 1^{st} ionization energy ?

a) Na^+ **b)** F^- **c)** Mg^{2+} **d)** O^{2-}

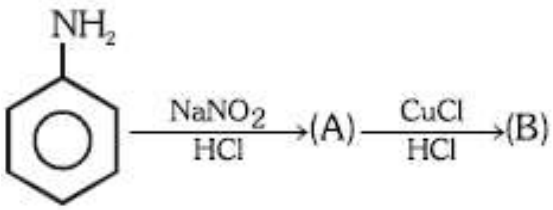
Q28 A current of 0.5 amp is passed through excess of molten mixture of Al_2O_3 and Na_3AlF_6 for 9.65 hours. The mass of Al (in mg) deposited at the cathode, with $\frac{1000}{12}\%$ current efficiency is $(Al = 27)$

a) 1150 mg **b)** 1275 mg **c)** 1350 mg **d)** 1485 mg

Q29 An ideal solution is prepared from A and B (both are volatile). The total vapour pressure of the solution is $\frac{2P_A^0.P_B^0}{P_A^0+P_B^0}$ Where P_A^0 and P_B^0 are vapour pressures of pure A and B respectively. $[P_A^0 \neq P_B^0]$ If x_A, x_B represents mole fraction of A and B in solution respectively and y_A, y_B represents mole fraction of A and B in vapour phase. If $y_A = \frac{1}{2}$ then the value of x_A is :

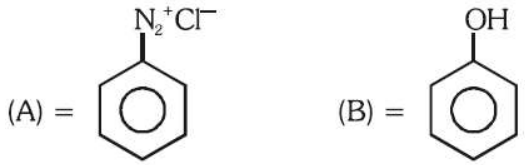
a) $1 - y_A$ **b)** $1 - y_B$ **c)** $\frac{P_A^0}{P_A^0+P_A^0}$ **d)** $\frac{P_B^0}{P_A^0+P_B^0}$

Q30

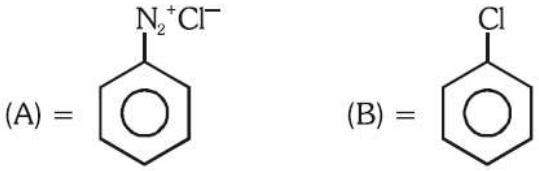


Identify (A) and (B)

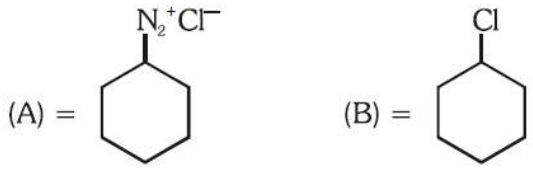
a)



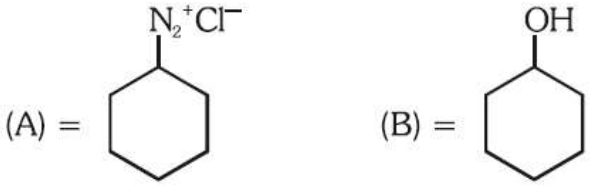
b)



c)



d)



Q31 Pyrolusite is MnO_2 used to prepare $KMnO_4$. Steps are,

$$MnO_2 \xrightarrow{I} MnO_4^{2-} \xrightarrow{II} MnO_4^-$$

Steps I and II are respectively :
(A) fuse with KOH, air and electrolytic oxidation.
(B) fuse with KOH, KNO_3 and oxidation by O_3.
(C) fuse with conc. HNO_3, air and electrolytic reduction.
(D) dissolve in H_2O and oxidation.

a) (A) & (B) **b)** (A) & (C) **c)** (B) & (D) **d)** (C) & (D)

Q32 Consider the species CH_4, NH_4^+ and BH_4^- . Choose the correct option with respect to the there species:

a) They are isoelectronic and only two have tetrahedral structures
b) They are isoelectronic and all have tetrahedral structures
c) Only two are isoelectronic and all have tetrahedral structures
d) Only two are isoelectronic and only two have tetrahedral structures

Q33 Given below are two statements :one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : In $T\ell I_3$, isomorphous to CsI_3, the metal is present in +1 oxidation state.

Reason R : $T\ell$ metal has fourteen f electrons in the electronic configuration.

In the light of the above statements, choose the most appropriate answer from the options given below:

a) **A** is correct but **R** is not correct

b) Both **A** and **R** are correct and **R** is the correct explanation of **A**.

c) **A** is not correct but **R** is correct

d) Both **A** and **R** are correct but **R** is NOT the correct explanation of **A**.

Q34 Which of the following statements are correct

(A) Order of oxidizing strength $F_2 > Cl_2 > Br_2 > I_2$

(B) Order of melting point HF > HI > HBr > HCl

(C) Order of bond dissociation enthalpy $Cl_2 > Br_2 > F_2 > I_2$

(D) Order of first ionization energy B > Tl > Ga > Al > In

a) (A), (C) & (D) b) (A), (B), (C) & (D) c) (B), (C) & (D) d) (A), (B) & (C)

Q35 To prepare a buffer solution of pH = 4.74, amount of Barium acetate to be added to 100 mL of 0.1 M acetic acid solution $[pK_b(CH_3COO^-) = 9.96]$ is :

a) 0.05 mole b) 0.025 mole c) 0.1 mole d) 0.005 mole

Q36 The results given in the below table were obtained during kinetic studies of the following reaction

$2A + B \rightarrow C + D$

Experiment	[A]/ $molL^{-1}$	[B]/ $molL^{-1}$	Initial rate / $molL^{-1} min^{-1}$
I	0.1	0.1	6.00×10^{-3}
II	0.1	0.2	2.40×10^{-2}
III	0.2	0.1	1.20×10^{-2}
IV	X	0.2	7.20×10^{-2}
V	0.3	Y	2.88×10^{-1}

X and Y in the given table are respectively

a) 0.4, 0.3 b) 0.3, 0.4 c) 0.4, 0.4 d) 0.3, 0.3

Q37 Consider the following reaction approaching equilibrium at 27ºC and 1 atm pressure

$$A + B \underset{K_b = 10^2}{\overset{K_f = 10^3}{\rightleftharpoons}} C + D$$

The standard Gibb′s energy change ($\Delta_r G°$) at 27ºC is (kJ mol^{-1}).
(Given : R = 8.3 J K^{-1} mol^{-1} and ln 10 = 2.3)

a) –5.7 KJ mol^{-1} **b)** +5.7 KJ mol^{-1} **c)** –6.7 KJ mol^{-1} **d)** –7.7 KJ mol^{-1}

Q38 The value of crystal field splitting (Δ_o) for $[Ti(H_2O)_6]^{3+}$ is 243 KJ mol^{-1}. The crystal field stabilization energy (CFSE) in this complex is : (in KJ mol^{-1})

a) –145.8 **b)** –97.2 **c)** –291.6 **d)** –243

Q39

$$PhCH_3 + (CH_3CO)_2O \xrightarrow[273K]{CrO_3} P \xrightarrow[\Delta]{H_3O^+} Q \xrightarrow[CH_3COONa]{(CH_3CO)_2O,\Delta} R$$

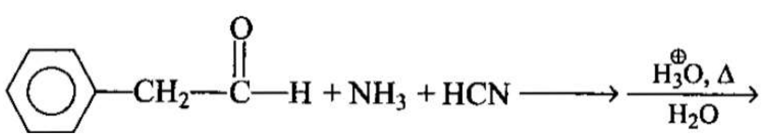
Product R is

a) Cinnamic acid **b)** Mandelic acid **c)** Phthalic acid **d)** Phenyl acetic acid

Q40 Order of pKa values for following acids is –
(a) CH_3–COOH (b) $O_2N - CH_2 - COOH$ (c) $NC - CH_2 - COOH$ (d) $MeO - CH_2 - COOH$

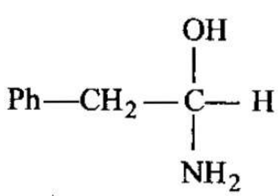
a) b > a > c > d **b)** a > d > c > b **c)** a > d > b > c **d)** b > c > d > a

Q41



Product:

a)



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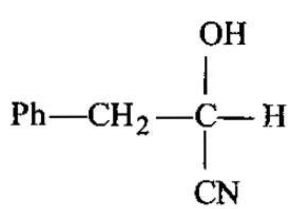
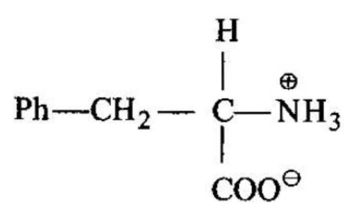
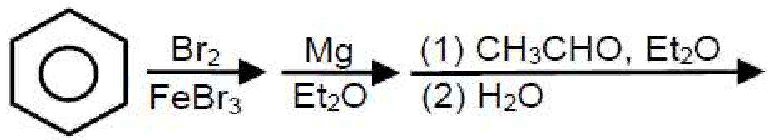


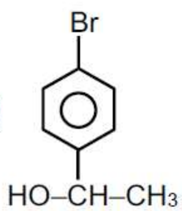
c)

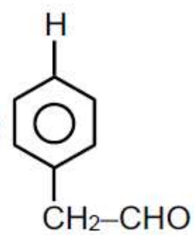


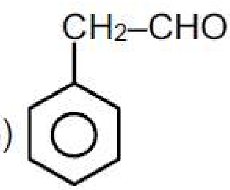
d) All of these

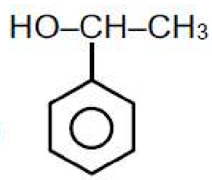
Q42 Final product of the given reaction is :

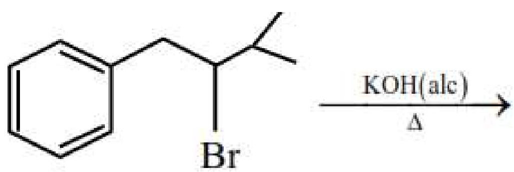


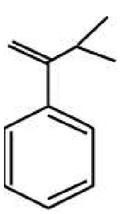
a) (1) 

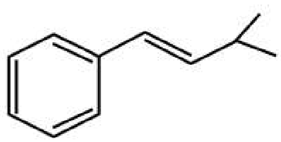
b) (2) 

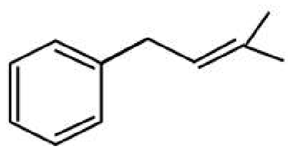
c) (3) 

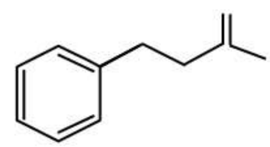
d) (4) 

Q43  Product P is

a) 

b) 

c) 

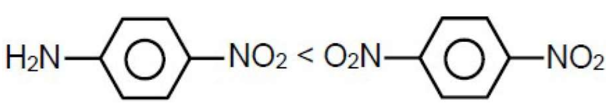
d) 

Q44 Two forms of D - glucopyranose, are called.

a) Enantiomers **b)** Anomers **c)** Epimers **d)** Diastereomers

Q45 Which is correct order regarding the dipole moments of the following molecules ?

a) $CH_3–CH_3–Cl < CH_2=CH–Cl$ **b)** $CH_3–CH_3–CH=O < CH_2=CH–CH=O$

c) 

d) $CH_3–Cl < CH_3–F$

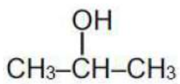
Numerical

Q46 15 mL of aqueous solution of Fe^{2+} in acidic medium completely reacted with 20 mL of 0.03 M aqueous $Cr_2O_7^{2-}$. The molarity of the Fe^{2+} solution is _______ $\times 10^{-2}$ M (Round off to the Nearest Integer).

Q47 A mixture of 1 mole of H_2O and 1 mole of CO is taken in a 10 litre container and heated to 725 K. At equilibrium 40% of water by mass reacts with carbon monoxide according to the equation

$$CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$$

The equilibrium constant $K_C \times 10^2$ for the reaction is ____. (Nearest integer)

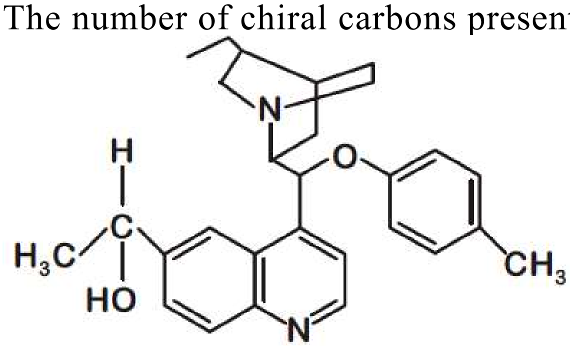
Q48 
$\xrightarrow[I_2]{NaOH} (A) + (B) \xrightarrow{H^+} (C) + (B)$

If molecular mass of the final product B (Consider product having higher molecular mass) is W than report your answer as W/10 in given reaction? Consider molecular mass of carbon = 12, hydrogen = 1, oxygen = 16, iodine = 127 (Nearest Integer)

Q49 The oxidation states of iron atoms in compounds (A), (B) and (C), respectively, are x, y and z. The sum of x, y and z is ________.

$Na_4[Fe(CN)_5(NOS)]$ (A) $Na_4[FeO_4]$ (B) $[Fe_2(CO)_9]$ (C)

Q50 The number of chiral carbons present in the molecule given below is ______.



Mathematics

Single Choice Question

Q51 Let f(x) = 30 – 2x – x^3, then the number of positive integral values of x which satisfies f(f(f(x))) > f(f(–x)) is_____.

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

Q52

Let $f(x)=\begin{cases}\left(\dfrac{p(x)}{10}\right)^{\frac{1}{\tan\left(x^2-1\right)}} & x\neq 1\\ e^{\frac{3x}{3\left(a^2-2a\right)+13}} & x=1\end{cases}$

where is polynomial function satisfying , if is continuous at , then value of 'a' can be

a) –1 **b)** 1 **c)** 2 **d)** –2

Q53 Two circles in the first quadrant of radii r_1 and r_2 touch the coordinate axes. Each of them cuts off an intercept of 2 units with the line x + y = 2. Then $r_1^2+r_2^2-r_1r_2$ is equal to ____.

a) 4 **b)** 6 **c)** 7 **d)** 8

Q54 Let A(4, –4) and B(9, 6) be points on the parabola, y^2 = 4x. Let C be chosen on the arc AOB of the parabola, where O is the origin, such that the area of ΔACB is maximum. Then, the area (in sq. units) of ΔACB, is $\frac{p}{q}$ (where p, q are coprime) Then p+ q =

a) 120 **b)** 116 **c)** 125 **d)** 129

Q55 If the equation $4y^3 - 8a^2yx^2 - 3ay^2x + 8x^3 = 0$ represent three straight lines, two of them are perpendicular then sum of all possible values of a is equal to :

a) $\frac{3}{8}$ **b)** $\frac{-3}{4}$ **c)** $\frac{1}{4}$ **d)** –2

Q56 Fifteen identical balls have to be put in five different boxes. Each box can contain any number of balls. The total number of ways of putting the balls into the boxes so that each box contains at least two balls is equal to

a) ${}^{9}C_5$ **b)** ${}^{10}C_5$ **c)** ${}^{6}C_5$ **d)** ${}^{10}C_6$

Q57 If the coefficients of r^{th} and $(r + 1)^{th}$ terms in the expansion of $(3 + 7x)^{29}$ are equal, then r equals

a) 15 **b)** 21 **c)** 14 **d)** None of these

Q58 If A and B are two square matrices such tha B = $-A^{-1}BA$, then $(A + B)^2$ is equal to

a) $A^2 + B^2$ **b)** O **c)** $A^2 + 2AB + B^2$ **d)** A +B

Q59 $\lim_{x\to\infty}\left\{(x+5)\tan^{-1}(x+5)-(x+1)\tan^{-1}(x+1)\right\}$ is equal to

a) π **b)** 2π **c)** $\pi/2$ **d)** None of these

Q60 Let e_1 and e_2 be the eccentricities of the ellipse, $\frac{x^2}{25}+\frac{y^2}{b^2}=1\,(b<5)$ and the hyperbola, $\frac{x^2}{16}-\frac{y^2}{b^2}=1$ respectively satisfying $e_1e_2 = 1$. If α and β are the distances between the foci of the ellipse and the foci of the hyperbola respectively, then the ordered pair (α, β) is equal to :

a) (8, 10) **b)** $\left(\frac{24}{5},10\right)$ **c)** $\left(\frac{20}{3},12\right)$ **d)** (8, 12)

Q61 The solution of the differential equation $x^2\frac{dy}{dx}\cos\frac{1}{x}-y\sin\frac{1}{x}=-1$, where $y\to -1$ as $x\to\infty$ is

a) $y=\sin\frac{1}{x}-\cos\frac{1}{x}$ **b)** $y=\frac{x+1}{x\sin\frac{1}{x}}$ **c)** $y=\cos\frac{1}{x}+\sin\frac{1}{x}$ **d)** $y=\frac{x+1}{x\cos 1/x}$

Q62 The outcome of each of 30 items was observed; 10 items gave an outcome $\frac{1}{2}-d$ each, 10 items gave outcome $\frac{1}{2}$ each and the remaining 10 items gave outcome $\frac{1}{2}+d$ each. If the variance of this outcome data is $\frac{4}{3}$ then $|d|$ equals

a) $\sqrt{2}$ **b)** $\frac{\sqrt{5}}{2}$ **c)** $\frac{2}{3}$ **d)** 2

Q63 The value of $\int_{-\pi/2}^{\pi/2}\frac{\sin^2 x\,dx}{1+e^x}$ is-

a) $\frac{\pi}{8}$ **b)** $\frac{\pi}{4}$ **c)** $\frac{\pi}{6}$ **d)** $\frac{\pi}{3}$

Q64 The area of the figure bounded by the curves $y = |x - 1|$ and $y = 3 - |x|$ is -

a) 2 **b)** 3 **c)** 4 **d)** None of these

Q65 $\vec{a}$ and $\vec{c}$ are unit vectors and $|\vec{b}|=4$. Then angle between $\vec{a}$ and $\vec{c}$ is $\cos^{-1}(1/4)$ and $\vec{b}-2\vec{c}=\lambda\vec{a}$. The value of λ is.

a) 3, –4 **b)** 1/4, 3/4 **c)** –3, 4 **d)** –1/4, 3/4

Q66 Let $\frac{d}{dx}(g(x)) = \frac{e^{\cos x}}{x}, x > 0, g(1) = 3a_1, g(2) = 6a_2, g(8) = 10a_3$ (where $a_1 a_2, a_3$ are constants) then $\int_1^2 \frac{3e^{\cos x^3}}{x} dx$ is equal to

a) $6a_2 - 3a_1$ **b)** $10a_3 - 6a_2$ **c)** $10a_3 - 3a_1$ **d)** $10a_3 - 6a_2 - 3a_1$

Q67 In a non-leap year, the probability of getting 53 Sunday or 53 Tuesday or 53 Thursday is

a) $\frac{1}{7}$ **b)** $\frac{2}{7}$ **c)** $\frac{3}{7}$ **d)** $\frac{4}{7}$

Q68 The area of the polygon, whose vertices are the non-real roots of the equation $\bar{z} = iz^2$ is :

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

Q69

$$f(x) = \begin{cases} 4x - x^3 + \ln(a^2 - 3a + 3), & 0 \le x < 3 \\ x - 18, & x \ge 3 \end{cases}$$

Complete set of values of a such that f(x) as a local minima at x = 3 is

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

Q70 The complex number which satisfies the equation $z + \sqrt{2}\,|z + 1| + i = 0$ is

a) 2 + i **b)** – 2 + I **c)** – 2 – i **d)** 2 – i

Numerical

Q71 The projection of the line segment joining the points (1, –1, 3) and (2, –4, 11) on the line joining the points (–1, 2, 3) and (3, –2, 10) is______

Q72 If f(1) = 1, f′(1) = 3, then the derivative of $f(f(f(x))) + (f(x))^2$ at x = 1 is :

Q73 Sum of values of p for which, the equations: x + y + z = 1; x+ 2y + 4z =p and x + 4y +10z = p^2 have a solution is.

Q74 The number of terms common to the two A.P.'s 3, 7, 11,.....,407 and 2, 9, 16,.....,709 is______.

Q75 Area bounded by the relation [2x] + [y] = 5, x, y > 0 is____.
(where [•] represents greatest integer function).

Answer Key

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**A**	**C**	**A**	**A**	**B**	**A**	**A**	**C**	**B**	**B**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**C**	**D**	**C**	**A**	**C**	**B**	**C**	**B**	**A**	**B**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**2**	**25**	**1**	**750**	**2**	**D**	**D**	**C**	**D**	**B**
Que.	31	32	33	34	35	36	37	38	39	40
Ans.	**A**	**B**	**D**	**A**	**B**	**B**	**A**	**B**	**A**	**B**
Que.	41	42	43	44	45	46	47	48	49	50
Ans.	**C**	**D**	**B**	**B**	**B**	**24**	**44**	**39**	**6**	**5**
Que.	51	52	53	54	55	56	57	58	59	60
Ans.	**B**	**B**	**C**	**D**	**B**	**A**	**B**	**A**	**B**	**A**
Que.	61	62	63	64	65	66	67	68	69	70
Ans.	**A**	**A**	**B**	**C**	**A**	**C**	**C**	**A**	**B**	**C**
Que.	71	72	73	74	75					
Ans.	**8**	**33**	**3**	**14**	**3**					