Q1. The distance of the line $\frac{x-2}{2}=\frac{y-6}{3}=\frac{z-2}{4}$ from the point (1,4,0) along the line $\frac{x}{1}=\frac{y-2}{-2}=\frac{z+3}{3}$ is :

(1) $\sqrt{17}$ (2) $\sqrt{15}$

(3) $\sqrt{14}$ (4) $\sqrt{13}$

Q2. Let $A=\{(x,y)\in\mathbf{R}\times\mathbf{R}:|x+y|\geqslant 3\}$ and $B=\{(x,y)\in\mathbf{R}\times\mathbf{R}:|x|+|y|\leq 3\}$. If $C=\{(x,y)\in A\cap B:x=0 \text{ or } y=0\}$, then $\sum_{(x,y)\in C}|x+y|$ is :

(1) 15 (2) 24

(3) 18 (4) 12

Q3. Let $X=\mathbf{R}\times\mathbf{R}$. Define a relation R on X as : $(a1,b1)R(a2,b2)\Leftrightarrow b1=b2$ Statement I : R is an equivalence relation. Statement II : For some $(a,b)\in X$, the set $S=\{(x,y)\in X:(x,y)R(a,b)\}$ represents a line parallel to $y=x$. In the light of the above statements, choose the correct answer from the options given below :

(1)Both Statement I and Statement II are false (2)Statement I is true but Statement II is false

(3)Both Statement I and Statement II are true (4)Statement I is false but Statement II is true

Let $\int x^3\sin x\,dx=g(x)+C$, where C is the constant of integration. If $8\left(g\left(\frac{\pi}{2}\right)+g'(\pi 2)\right)=\alpha\pi^3+\beta\pi^2+\gamma,\alpha,\beta,\gamma\in Z$, then $\alpha+\beta-\gamma$ equals :

(1) 48 (2) 55

(3) 62 (4) 47

Q5. A rod of length eight units moves such that its ends A and B always lie on the lines $x-y+2=0$ and $y+2=0$, respectively. If the locus of the point P, that divides the rod AB internally in the ratio 2:1 is $9(x^2+\alpha y^2+\beta xy+yx+28y)-76=0$, then $\alpha-\beta-\gamma$ is equal to :

(1) 22 (2) 21

(3) 23 (4) 24

Q6. If the square of the shortest distance between the lines $\frac{x-2}{1}=\frac{y-1}{2}=\frac{z+3}{-3}$ and $\frac{x+1}{2}=\frac{y+3}{4}=\frac{z+5}{-5}$ is $\frac{m}{n}$, where m,n are coprime numbers, then m+n is equal to :

(1) 21 (2) 9

(3) 14 (4) 6

$\lim_{x\to\infty}\left(\frac{2x^2-3x+5}{3x^2+5x+4}\right)^{(3x+2)}$ is equal to :

(1) $\frac{2}{\sqrt{3}e}$ (2) $\frac{2e}{\sqrt{3}}$

(3) $\frac{2}{3\sqrt{e}}$ (4) $\frac{2e}{3}$

Q8. Let the point A divide the line segment joining the points $P(-1,-1,2)$ and $Q(5,5,10)$ internally in the ratio r:1(r>0). If O is the origin and $(\vec{OQ}\cdot\vec{OA})-|\vec{OP}\times\vec{OA}|=10$, then the value of r is :

(1) $\sqrt{7}$ (2) 14

(3) 3 (4) 7

Q9. The length of the chord of the ellipse $\frac{x^2}{4} + \frac{y^2}{2} = 1$, whose mid-point is $(1, \frac{1}{2})$, is :

(1) $\frac{5\sqrt{13}}{3}$ (2) $\frac{\sqrt{15}}{3}$

(3) $\frac{2\sqrt{15}}{3}$ (4) $\sqrt{15}$

The system of equations $\begin{aligned} x + y + z &= 6 \\ x + 2y + 5z &= 9 \\ x + 5y + \lambda z &= \mu \end{aligned}$, has no solution if

(1) $\lambda = 15, \mu \neq 17$ (2) $\lambda \neq 17, \mu \neq 18$ (3) $\lambda = 17, \mu \neq 18$ (4) $\lambda = 17, \mu = 18$

Q11. Let the range of the function $f(x)=6+16\cos x \cdot \cos(\pi - x) \cdot \cos(3+x) \cdot \sin 3x \cdot \cos 6x, x \in \mathbf{R}$ be $[\alpha,\beta]$. Then the distance of the point (α,β) from the line $3x+4y+12=0$ is :

(1) 11 (2) 8

(3) 10 (4) 9

Q12. Let $x=x(y)$ be the solution of the differential equation $y=(x-y\,dx/dy)\sin(x/y), y>0$ and $x(1)=\pi/2$. Then $\cos(x(2))$ is equal to :

(1) $1-2(\log_e 2)^2$ (2) $1-2(\log_e 2)$

(3) $2(\log_e 2)-1$ (4) $2(\log_e 2)^2-1$

Q13. A spherical chocolate ball has a layer of ice-cream of uniform thickness around it. When the thickness of the ice-cream layer is 1 cm , the ice-cream melts at the rate of 81 cm3/min and the thickness of the ice-cream layer decreases at the rate of $\frac{1}{4\pi}$ cm/min. The surface area (in cm2) of the chocolate ball (without the ice-cream layer) is :

(1) 196π (2) 256π

(3) 225π (4) 128π

Q14. The number of complex numbers z, satisfying $|z|=1$ and $z+\bar{z} = \bar{z} - z = 1$, is :

(1) 4 (2) 8

(3) 10 (4) 6

Q15. Let $A=[a_{ij}]$ be 3×3 matrix such that $A\begin{bmatrix}1\\0\\0\end{bmatrix} = \begin{bmatrix}0\\1\\0\end{bmatrix}$, $A\begin{bmatrix}1\\3\\0\end{bmatrix} = \begin{bmatrix}1\\0\\0\end{bmatrix}$ and $A\begin{bmatrix}1\\2\\0\end{bmatrix} = \begin{bmatrix}0\\0\\1\end{bmatrix}$, then a_{23} equals :

(1) -1 (2)2

(3)1 (4)0

Q16. If $I=\int_0^{\frac{\pi}{2}} \frac{\sin^3 x}{\sin^3 x+\cos^3 x}\,dx$, then $\int_1^2 \frac{x\sin x\cos x}{\sin^4 x+\cos^4 x}\,dx$ equals :

(1) $\frac{\pi^2}{12}$ (2) $\frac{\pi^2}{4}$

(3) $\frac{\pi^2}{16}$ (4) $\frac{\pi^2}{8}$

Q17. A board has 16 squares as shown in the figure:

Out of these 16 squares, two squares are chosen at random. The probability that they have no side in common is :

(1) 7/10 (2) 4/5

(3) 23/30 (4) 3/5

Q18. Let the shortest distance from (a,0),a>0, to the parabola $y2=4x$ be 4 . Then the equation of the circle passing through the point $(\alpha,0)$ and the focus of the parabola, and having its centre on the axis of the parabola is :

(1) $x2+y2-10x+9=0$ (2) $x2+y2-6x+5=0$

(3) $x2+y2-4x+3=0$ (4) $x2+y2-8x+7=0$

Q19. If in the expansion of $(1+x)p(1-x)q$, the coefficients of x and $x2$ are 1 and -2 , respectively, then p2+q2 is equal to :

(1) 18 (2) 13

(3) 8 (4) 20

Q20. If the area of the region $\{(x,y):-1\le x\le 1,0\le y\le \alpha+e|x|-e-x,a>0\}$ is $e+8e+1$ ^{2} $_{e}$, then the value of α is :

(1) 8 (2) 7

(3) 5 (4) 6

The variance of the numbers 8,21,34,47,...,320 is

The roots of the quadratic equation $3x2-px+q=0$ are 10th and 11th terms of an arithmetic progression with common difference 32. If the sum of the first 11 terms of this arithmetic progression is 88 , then $q-2p$ is equal to -.

Q23. The number of ways, 5 boys and 4 girls can sit in a row so that either all the boys sit together or no two boys sit together, is -

The focus of the parabola $y2=4x+16$ is the centre of the circle C of radius 5 . If the values of λ, for which C passes through the point of intersection of the lines $3x-y=0$ and $x+\lambda y=4$, are $\lambda1$ and $\lambda2,\lambda1<\lambda2$, then $12\lambda1+29\lambda2$ is equal to

Q25. Let α,β be the roots of the equation $x2-ax-b=0$ with $\mathrm{Im}(\alpha)<\mathrm{Im}(\beta)$. Let $P=$ $_{n}$ $\alpha^{n-r}\beta$. If $P_{3}=-5\sqrt{7}i,P_{4}=-3\sqrt{7}i,P=11\sqrt{7}$ $_{5}$ i and $P_{6}=45\sqrt{7}$ i, then α $4+4\beta$ is equal to .

Q26. A galvanometer having a coil of resistance 30Ω need 20 mA of current for full-scale deflection. If a maximum current of 3 A is to be measured using this galvanometer, the resistance of the shunt to be added to the galvanometer should be $\frac{30}{X}\Omega$, where X is Options

(1) 596 (2) 149

(3) 298 (4) 447

Q27. A ball having kinetic energy KE, is projected at an angle of 60∘ from the horizontal. What will be the kinetic energy of ball at the highest point of its flight ?

(1) $\frac{8}{16}$(KE) (2) $\frac{2}{4}$(KE)

(3) (KE) (4) (KE)

Q28. Two charges 7μc and -4μc are placed at (−7 cm,0,0) and (7 cm,0,0) respectively. Given, $\epsilon_0 = 8.85\times10^{-12} C^2\,N^{-1}\,m^{-2}$, the electrostatic potential energy of the charge configuration is :

(1)-1.8 J (2)-2.0 J

(3)-1.5 J (4)-1.2 J

Q29. Two point charges $-4\mu c$ and $4\mu c$, constituting an electric dipole, are placed at (−9,0,0)cm and (9,0,0)cm in a uniform electric field of strength $10^4 NC^{-1}$. The work done on the dipole in rotating it from the equilibrium through 180∘ is :

(1)18.4 mJ (2)14.4 mJ

(3)12.4 mJ (4)16.4 mJ

Q30. A massless spring gets elongated by amount $x1$ under a tension of 5 N . Its elongation is $x2$ under the tension of 7 N . For the elongation of $(5x1-2x2)$, the tension in the spring will be,

(1)39 N (2)15 N

(3)11 N (4)20 N

Q31. Water of mass m gram is slowly heated to increase the temperature from $T1$ to Tz The change in entropy of the water, given specific heat of water is $1 Jkg^{-1} K^{-1}$, is :

(1) $\frac{(T_2-T)1}{(T1}$ mln (2)zero

(3) mln (4)m(T−T)

Water flows in a horizontal pipe whose one end is closed with a valve. The reading of the pressure gauge attached to the pipe is $P1$. The reading of the pressure gauge falls to $P2$ when the valve is opened. The speed of water flowing in the pipe is proportional to

(1) $P1-P2$ (2)$(P1-P2)^4$

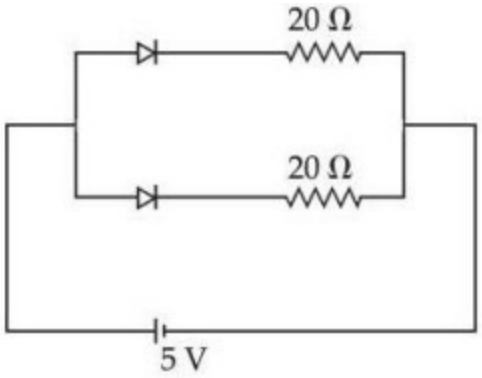
(3) $(P_1-P)2_2$ (4) $\sqrt{P1-P2}$

A concave mirror of focal length f in air is dipped in a liquid of refractive index μ. Its focal length in the liquid will be:

(1) μf (2) f

(3) $\frac{f}{(\mu-1)}$ (4) $\frac{f}{\mu}$

Q34.

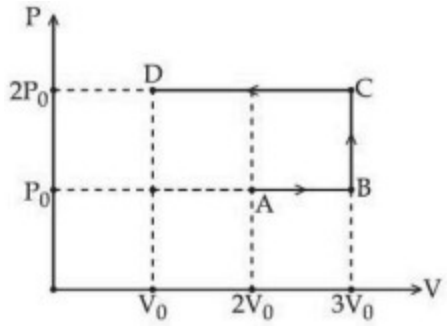


(1)1.5 A (2)0.5 A
(3)0.25 A (4)1.0 A

Q35. 5 The refractive index of the material of a glass prism is √3. The angle of minimum deviation is equal to the angle of the prism. What is the angle of the prism?
(1) 60∘ (2) 58∘
(3) 48∘ (4) 50∘

Q36. The width of one of the two slits in Young's double slit experiment is d while that of the other slit is x d. If the ratio of the maximum to the minimum intensity in the interference pattern on the screen is 9:4 then what is the value of x ? (Assume that the field strength varies according to the slit width.)
(1) 4 (2) 5
(3) 3 (4) 2

Q37.



Using the given P–V diagram, the work done by an ideal gas along the path ABCD is :
(1) 3P0 V0 (2) −4P0 V0
(3) −3P0 V0 (4) 4P0 V0

Q38. A plane electromagnetic wave of frequency 20 MHz travels in free space along the +x direction. At a particular point in space and time, the electric field vector of the wave is $E=9.3\underset{y}{V}m^{-1}$. Then, the magnetic field vector of the wave at that point is
(1)$B=6.2\times10^{-8}$ T (2)$B=3.1\times10^{-8}$ T
(3)$B=\underset{z}{1.55}\times10^{-8}$ T (4)$B=\underset{z}{9.3}\times10^{-8}$ T

Q39. The equation of a transverse wave travelling along a string is $y(x,t)=4.0\sin[20\times10^{-3}x+600t]$mm, where x is in mm and t is in second. The velocity of the wave is :

(1) -60 m/s
(2) -30 m/s
(3) +30 m/s
(4) +60 m/s

Q40. Given below are two statements. One is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : The binding energy per nucleon is found to be practically independent of the atomic number A, for nuclei with mass numbers between 30 and 170. Reason (R): Nuclear force is long range. In the light of the above statements, choose the correct answer from the options given below :
(1)(*A*) is true but (R) is false
(2)(A) is false but (R) is true
(3)Both (**A**) and (**R**) are true and (**R**) is the correct explanation of (**A**)
(4)Both (A) and (R) are true but (R) is NOT the correct explanation of (A)

If a satellite orbiting the Earth is 9 times closer to the Earth than the Moon, what is the time period of rotation of the satellite? Given rotational time period of Moon =27 days and gravitational attraction between the satellite and the moon is neglected.
(1)27 days
(2)1 day
(3)81 days
(4)3 days

Q42. A circular disk of radius R meter and mass M kg is rotating around the axis perpendicular to the disk. An external torque is applied to the disk such that $\theta(t)=5t2-8t$, where $\theta(t)$ is the angular position of the rotating disc as a function of time t. How much power is delivered by the applied torque, when t=2 s ?
(1) 72MR2
(2) 8MR2
(3) 108MR2
(4) 60MR2

Q43. The energy of a system is given as $E(t)=\alpha 3e-\beta t$, where t is the time and β=0.3 s−1. The errors in the measurement of α and t are 1.2% and 1.6%, respectively. At t=5 s, maximum percentage error in the energy is :
(1) 6%
(2) 8.4%
(3) 11.6%
(4) 4%

Match List - I with List - II.

	List - I	List - II
(A)	Permeability of free space	(I) $[M L^2 T^{-2}]$
(B)	Magnetic field	(II) $[M T^{-2} A^{-1}]$
(C)	Magnetic moment	(III) $[M L T^{-2} A^{-2}]$
(D)	Torsional constant	(IV) [L2 A]

Choose the correct answer from the options given below :
(1)(A)-(IV), (B)-(III), (C)-(I), (D)-(II) (3)
(2)(A)-(III), (B)-(II), (C)-(IV), (D)-(I) (4)
(A)-(I), (B)-(IV), (C)-(II), (D)-(III)
(A)-(II), (B)-(I), (C)-(III), (D)-(IV)

Q45. In photoelectric effect an em-wave is incident on a metal surface and electrons are ejected from the surface. If the work function of the metal is 2.14 eV and stopping potential is 2 V , what is the wavelength of the em-wave ? (Given hc =1242eVnm where h is the Planck's constant and c is the speed of light in vaccum.)

(1)300 nm (2)400 nm
(3)600 nm (4)200 nm

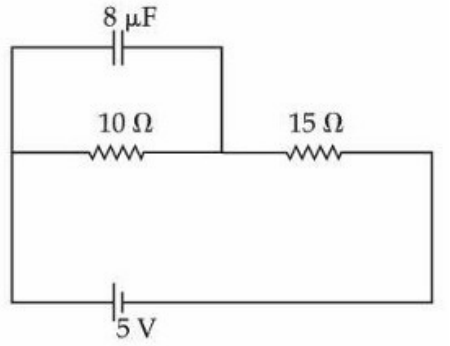
Q46. A time varying potential difference is applied between the plates of a parallel plate capacitor of capacitance 2.5μ F. The dielectric constant of the medium between the capacitor plates is 1 . It produces an instantaneous displacement current of 0.25 mA in the intervening space between the capacitor plates, the magnitude of the rate of change of the potential difference will be _____ Vs−1.

Q47. In a series LCR circuit, a resistor of 300Ω, a capacitor of 25 nF and an inductor of 100 mH are used. For maximum current in the circuit, the angular frequency of the ac source is _____ ×104 radians s−1.

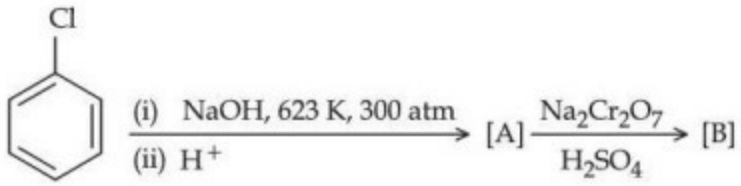
Q48. An air bubble of radius 1.0 mm is observed at a depth of 20 cm below the free surface of a liquid having surface tension 0.095 J/m2 and density 103 kg/m3. The difference between pressure inside the bubble and atmospheric pressure is _____ N/m2. (Take g=10 m/s2)

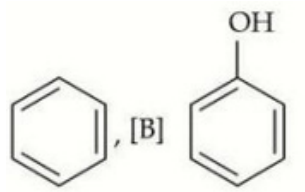
Q49. A satellite of mass M is revolving around earth in a circular orbit at a height of 3 R from earth surface. The angular momentum of the satellite is $\sqrt{\frac{GMR^2}{x}}$. The value of x is _____ , where M and R are the mass and radius of earth, respectively. (G is the gravitational constant)

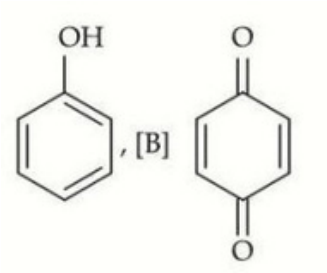
Q50. At steady state the charge on the capacitor, as shown in the circuit below, is μC.

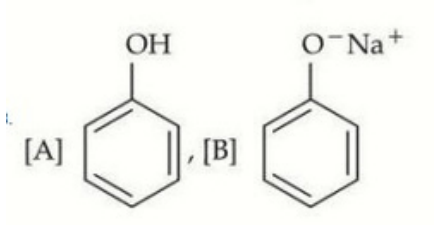


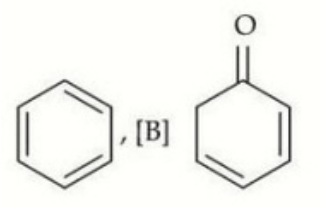
Q51. Identify the products [A] and [B], respectively in the following reaction :



(1) 

(2) 

(3) 

(4) 

Consider the following reactions $K_2Cr_2O_7 \xrightarrow[-H_2O]{KOH} [A] \xrightarrow[-H_2O]{H_2SO_4} [B] + KSO_2$ 4 The products [A] and [B], respectively are :

(1)K_2CrO_4 and CrO

(2) K_2CrO_4 and Cr_2O_3

(3)K_2CrO_4 and $K_2Cr_2O_7$

(4) $K_2Cr(OH)_6$ and Cr_2O_3

Q53. The effect of temperature on spontaneity of reactions are represented as :

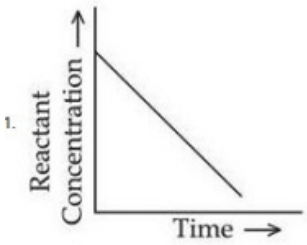
	ΔH	ΔS	Temperature	Spontaneity
(A)	+	–	any T	Non spontaneous
(B)	+	+	low T	spontaneous
(C)	–	–	low T	Non spontaneous
(D)	–	+	any T	spontaneous

(1)(B) and (C) only(2)(B) and (D) only (3)(A) and (D) only(4)(A) and (C) only

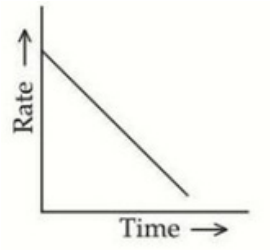
Which of the following graphs most appropriately represents a zero order reaction ?

Q54.

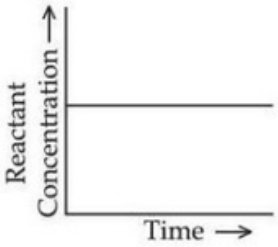
(1)



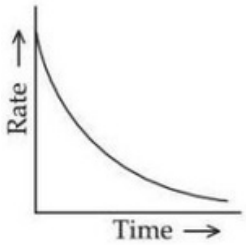
(2)



(3)



(4)



Q55. Consider the reaction $X_2Y(g) = X_2(g) + \frac{1}{2}Y_2(g)$ The equation representing correct relationship between the degree of dissociation (x) of $X_2Y(g)$ with its equilibrium constant Kp is _____ . Assume *x* to be very very small.

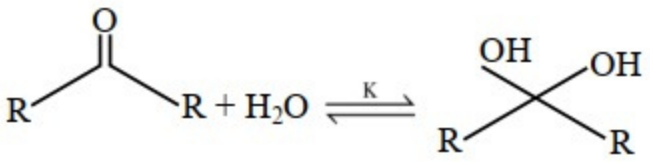
(1) $x = \sqrt{32K_p}$

(2) $x = \sqrt[3]{\frac{2K_{p2}}{p}}$

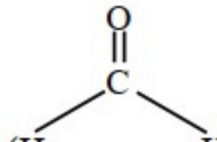
(3) $x = \sqrt{3K_p}$

(4) $x = \sqrt[3]{\frac{K_p}{2p}}$

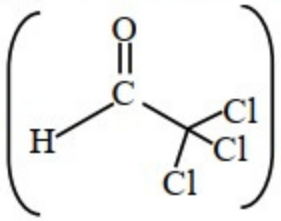
Q56. Given below are two statements : Consider the following reaction



Statement (I) : In the case of formaldehyde



(H H), K is about 2280, due to small substituents, hydration is faster.

Statement (II) : In the case of trichloro acetaldehyde  , K is about 2000 due to – I effect of – Cl.

In the light of the above statements, choose the **correct** answer from the options given below:

(1)Both Statement I and Statement II are false
(2)Statement I is true but Statement II is false
(3)Statement I is false but Statement II is true
(4)Both Statement I and Statement II are true

Q57. Given below are two statements : Statement (I) : For a given shell, the total number of allowed orbitals is given by n2. Statement (II) : For any subshell, the spatial orientation of the orbitals is given by $-l$ to $+l$ values including zero. In the light of the above statements, choose the correct answer from the options given below :

(1)Both Statement I and Statement II are false
(2)Statement I is true but Statement II is false
(3)Both Statement I and Statement II are true
(4)Statement I is false but Statement II is true

Q58. Standard electrode potentials for a few half cells are mentioned below :
$E^{\circ}_{Cu^{2+}/Cu} = 0.34V, E^{\circ}_{Zn^{2+}/Zn} = -0.76_7$ V
$E^{\circ}_{Ag^{+}/Ag} = 0.80V, E^{\circ}_{Mg^{2+}} = -2.3$
W hich one of the following cells gives the most negative value of ΔG° ?

(1) Zn Zn2+(1M) Ag+(1M) Ag
(2) Zn Zn2+(1M) Mg2+(1M) Mg
(3) Ag Ag+(1M) Mg2+(1M) Mg
(4) Cu Cu2+(1M) // Ag+(1M) Ag

Q59. The α-Helix and β - Pleated sheet structures of protein are associated with its :

(1)tertiary structure
(2)quaternary structure
(3)secondary structure
(4)primary structure

Q60. Given below are the atomic numbers of some group 14 elements. The atomic number of the element with lowest melting point is :

(1) 6 (2) 82

(3) 14 (4) 50

Given below are two statements about X-ray spectra of elements : Statement (I) : A plot of $\sqrt{\nu}$ (ν= frequency of *X*-rays emitted) vs atomic mass is a straight line. Statement (II) : A plot of ν(ν= frequency of *X*-rays emitted) vs atomic number is a straight line. In the light of the above statements, choose the correct answer from the options given below :

(1)Both Statement I and Statement II are true (2)Statement I is false but Statement II is true

(3)Both Statement I and Statement II are false (4)Statement I is true but Statement II is false

Q62. Identify A, B and C in the given below reaction sequence $A \xrightarrow{HNO_3} Pb(NO_3)_2 \xrightarrow{H_2SO_4} B \xrightarrow[(2)\ Acetic\ acid]{(1)\ Ammonium\ acetate} (3)\ K_2CrO_4 \rightarrow$

(1) $PbCl_2, PbSO_4, PbCrO_4$ (2) $PbS, PbSO_4, Pb(CH_3COO)_2$

(3) $PbCl_2, Pb(SO_4)_2, PbCrO_4$ (4) $PbS, PbSO_4, PbCrO_4$

Q63. Given below are two statements : Statement (I) : The boiling points of alcohols and phenols increase with increase in the number of C-atoms. Statement (II) : The boiling points of alcohols and phenols are higher in comparison to other class of compounds such as ethers, haloalkanes. In the light of the above statements, choose the correct answer from the options given below :

(1)Both Statement I and Statement II are false (2)Both Statement I and Statement II are true

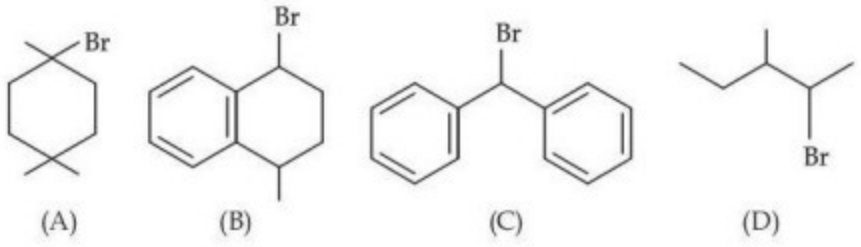
(3)Statement I is false but Statement II is true (4)Statement I is true but Statement II is false

Q64. Consider a binary solution of two volatile liquid components 1 and 2.x_1 and y_1 are the mole fractions of component 1 in liquid and vapour phase, respectively. The slope and intercept of the linear plot of $\frac{1}{x_1}$ vs $\frac{1}{y_1}$ are given respectively as:

(1) $\frac{P_1^0}{P_2^0}, \frac{P_2^0 - P_1^0}{P_2^0}$ (2) $\frac{P_1^0}{P_2^0}, \frac{P_2^0 - P_1^0}{P_2^0}$

(3) $\frac{P_1^0}{P_2^0}, \frac{P_1^0 - P_2^0}{P_2^0}$ (4) $\frac{P_2^0}{P_1^0}, \frac{P_1^0 - P_2^0}{P_2^0}$

Q65. The ascending order of relative rate of solvolysis of following compounds is :



(1) (C) < (B) < (A) < (D) (D) (2) (D) < (A) < (B) < (C) (C)

(3) < (B) < (A) < (C) (4) < (D) < (B) < (A)

Match List - I with List - II.

	List – I		List – II
(A)	Bronze	(I)	Cu, Ni Fe,
(B)	Brass	(II)	Cr, Ni, C Cu,
(C)	U Ksilvercoin	(III)	Zn
(D)	S tainlesssteel	(IV)	Cu, Sn

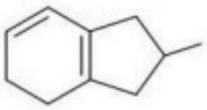
Choose the correct answer from the options given below :

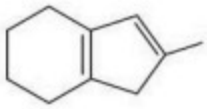
(1)(A)-(IV), (B)-(II), (C)-(III), (D)-(I) (3) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

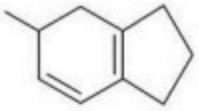
(2)(A)-(IV), (B)-(III), (C)-(I), (D)-(II) (4) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

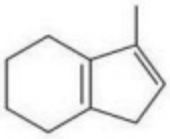
Match **List - I** with **List - II.**

List - I
(Isomers of $C_{10}H_{14}$)

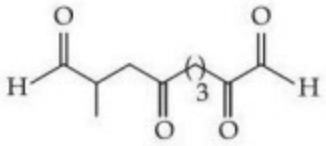
(A) 

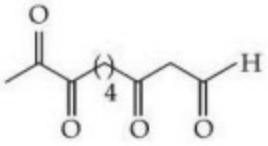
(B) 

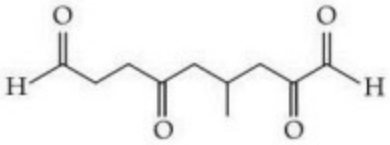
(C) 

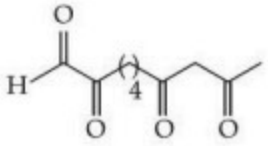
(D) 

List - II
(Ozonolysis product)

(I) 

(II) 

(III) 

(IV) 

Choose the correct answer from the options given below :

(1)(A)-(I), (B)-(IV), (C)-(III), (D)-(II) (3) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(2)(A)-(III), (B)-(II), (C)-(I), (D)-(IV) (4) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

Q68. pH of water is 7 at 25∘C. If water is heated to 80∘C., it's pH will :

(1)Decrease

(2)H+concentration increases, OH−concentration decreases

(3)Remains the same

(4)Increase

Q69. Identify the coordination complexes in which the central metal ion has d^4 configuration.

(A) $[FeO_4]^{2-}$

(B) $[Mn(CN)_6]^{3-}$

(C) $[Fe(CN)_6]^{3-}$

(D) $Cr_2(O-\overset{\overset{O}{\|}}{C}-Me)_4(H_2O)_2$

(E) $[NiF_6]^{2-}$

Choose the correct answer from the options given below :

(1)(B), (C) and (D) only (2)(C) and (E) only

(3)(B) and (D) only (4)(A), (B) and (E) only

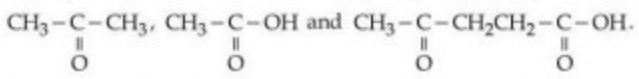
Q70. When a non-volatile solute is added to the solvent, the vapour pressure of the solvent decreases by 10 mm of Hg . The mole fraction of the solute in the solution is 0.2 . What would be the mole fraction of the solvent if decrease in vapour pressure is 20 mm of Hg ?

(1) 0.8 (2) 0.4

(3) 0.2 (4) 0.6

Q71. 0.01 mole of an organic compound (*X*) containing 10% hydrogen, on complete combustion produced 0.9 gH2O. Molar mass of (X) is _____ gmol−1 .

A compound ' X′ absorbs 2 moles of hydrogen and ' X′ upon oxidation with KMnO I +



The total number of σ bonds present in the compound ' X′ is_____

Q73. When 81.0 g of aluminium is allowed to react with 128.0 g of oxygen gas, the mass of aluminium oxide produced in grams is_____ - (Nearest integer) Given : Molar mass of Al is 27.0 g mol−1 Molar mass of O is 16.0 g mot1

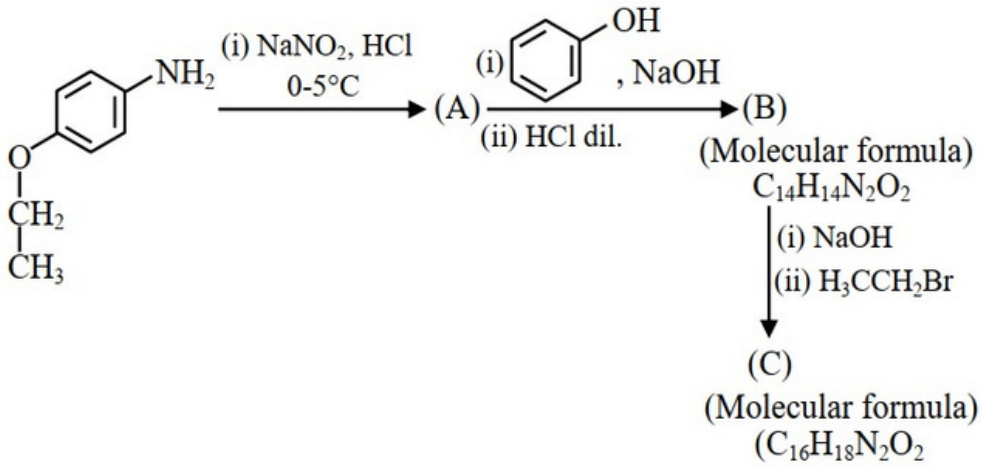
Q74. The bond dissociation enthalpy of XΔH 2 bond calculated from the given data is kJmol−1. (Nearest integer) MX(s)→M(g)+X(g)ΔHlattice =800 kJ mol −1

M(s)→M(g)ΔH∘ sub = 100 kJ mol−1

M(g)→M+(g)+e−(g)ΔH i=500kJmol X(g)+e(g)→X(g)ΔH − eg = −300 kJ mol −1

M(s)+1 2X2(g)→MX(s)ΔH=−400kJmol −1 [Given : MX is a pure ionic compound and X forms a diatomic molecule X2 in gaseous state]

Q75. Consider the following sequence of reactions.



Total number of sp^3 hybridised carbon atoms in the major product C formed is_____

1. (3) 2. (4) 3. (2) 4. (2) 5. (3) 6. (2) 7. (3) 8. (4)
9. (3) 10. 11. (1) 12. (4) 13. (2) 14. (2) 15. (1) 16. (3)
17. (2) 18. 19. (2) 20. (1) 21. (2) 22. (3) 23. (1) 24. (4)
25. (2) 26. 27. (4) 28. (2) 29. (1) 30. (100) 31. (2) 32. (2190)
33. (3) 34. 35. (1) 36. (4) 37. (3) 38. (4) 39. (2) 40. (2)
41. (2) 42. 43. (1) 44. 45. 46. 47. 48.
49. 50. 51. (2) 52. 53. 54. 55. 56.
57. 58. 59. (3) 60. 61. 62. 63. 64.
65. 66. 67. (3) 68. 69. 70. 71. 72.
73. 74. 75. (4)