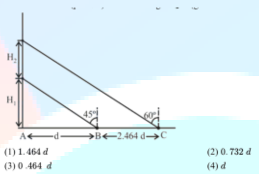
Q1. A physical quantity z depends on four observables a, b, c and d, as $z=\frac{a^2 b^{2/3}}{\sqrt{c} d^3}$. The percentage of error in the measurement of a, b, c and d are $2\%, 1.5\%, 4\%$ and 2.5% respectively. The percentage of error in z is :
(1) 12.25%
(2) 16.5%
(3) 13.5%
(4) 14.5%

Q2. A balloon is moving up in air vertically above a point A on the ground. When it is a height h_1, a girl standing at a distance d (point B) from A (see figure) sees it at an angle 45° with respect to the vertical. When the balloon climbs up a further height h_2, it is seen at an angle 60° with respect to the vertical if the girl moves further by a distance 2.464 d (point C). Then the height h_2 is (given $\tan 30^{\circ}=0.5774$):



Q3. A helicopter rises from rest on the ground vertically upwards with a constant acceleration g. A food packet is dropped from the helicopter when it is at a height h . The time taken by the packet to reach the ground is close to [g is the acceleration due to gravity]:
(1) $t=\frac{2}{3} \sqrt{\left(\frac{h}{g}\right)}$
(2) $t=1.8 \sqrt{\left(\frac{h}{g}\right)}$
(3) $t=3.4 \sqrt{\left(\frac{h}{g}\right)}$
(4) $t=\sqrt{\frac{2h}{3g}}$

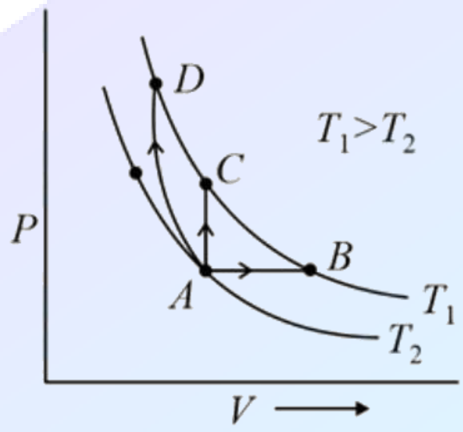
Q4. A wheel is rotating freely with an angular speed ω on a shaft. The moment of inertia of the wheel is I and the moment of inertia of the shaft is negligible. Another wheel of moment of inertia $3I$ initially at rest is suddenly coupled to the same shaft. The resultant fractional loss in the kinetic energy of the system is:
(1) $\frac{5}{6}$
(2) $\frac{1}{4}$
(3) 0
(4) $\frac{3}{4}$

Q5. The value of the acceleration due to gravity is g_1 at a height $h=\frac{R}{2}$ ($R=$ radius of the earth) from the surface of the earth. It is again equal to g_1 at a depth d below the surface the earth. The ratio $\left(\frac{d}{R}\right)$ equals:
(1) $\frac{4}{9}$
(2) $\frac{5}{9}$
(3) $\frac{1}{3}$
(4) $\frac{7}{9}$

Q6. A hollow spherical shell at outer radius R floats just submerged under the water surface. The inner radius of the shell is r. If the specific gravity of the shell material is $\frac{27}{8}$ with respect to water, the value of r is:
(1) $\frac{8}{9} R$
(2) $\frac{4}{9} R$
(3) $\frac{2}{3} R$
(4) $\frac{1}{3} R$

Q7. Three different processes that can occur in an ideal monoatomic gas are shown in the P vs diagram. The paths are labelled as $A \rightarrow B, A \rightarrow C$ and $A \rightarrow D$. The change in internal energies during these process are taken as E_{AB}, E_{AC} and E_{AD} and the work done as W_{AB}, W_{AC} and W_{AD}. The correct relation between these parameters are:

Question Paper



(1) $E_{AB} = E_{AC} < E_{AD}, W_{AB} > 0, W_{AC} = 0, W_{AD} < 0$
(2) $E_{AB} = E_{AC} = E_{AD}, W_{AB} > 0, W_{AC} = 0, W_{AD} < 0$
(3) $E_{AB} < E_{AC} < E_{AD}, W_{AB} > 0, W_{AC} > W_{AD}$
(4) $E_{AB} > E_{AC} > E_{AD}, W_{AB} < W_{AC} < W_{AD}$

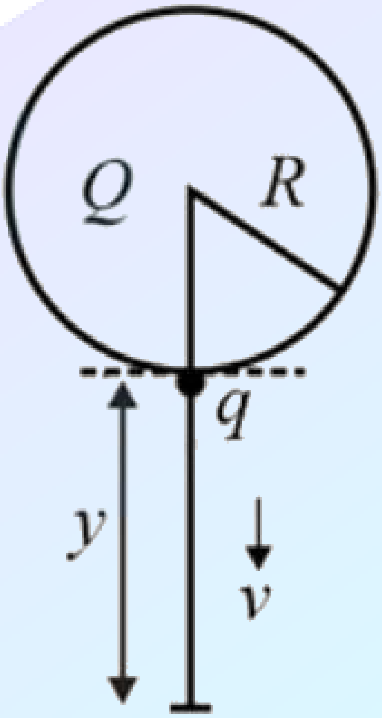
Q8. Number of molecules in a volume of $4\ \mathrm{cm}^3$ of a perfect monoatomic gas at some temperature T and at a pressure of 2 cm of mercury is close to? (Given, mean kinetic energy of a molecule (at T) is $4 \times 10^{-14}\mathrm{erg}, \mathrm{g} = 980\ \mathrm{cm\ s}^{-2}$ density of mercury $= 13.6\ \mathrm{g\ cm}^{-3}$)
(1) 4.8×10^{18}
(2) 4.0×10^{16}
(3) 5.8×10^{16}
(4) 5.8×10^{18}

Q9. A bullet of mass 5 gram , travelling with a speed of $210\ \mathrm{m\ s}^{-1}$ strikes a fixed wooden target. One half of its kinetic energy is converted into heat in the wood. The rise of temperature of the bullet if the specific heat of its material is $0.030(\text{ gram } ^\circ\mathrm{C})^{-1}(1 \text{ calorie} = 4.2 \times 10^7 \text{ergs})$ close to :
(1) $87.5^\circ\mathrm{C}$
(2) $83.3^\circ\mathrm{C}$
(3) $119.2^\circ\mathrm{C}$
(4) $38.4^\circ\mathrm{C}$

Q10. Assume that the displacement (s) of air is proportional to the pressure difference (Δp) created by a sound wave. Displacement (s) further depends on the speed of sound (v), density of air(ρ) and the frequency (f). If $\Delta p \sim 10$ Pa, $n \sim 300\ \mathrm{m/s}, p \sim 1\ \mathrm{kg/m}^3 f \sim$ 1000 Hz, then s will be of the order of (take the multiplicative constant to be 1)
(1) $\frac{3}{100}$ mm
(2) 10 mm
(3) $\frac{1}{10}$ mm
(4) 1 mm

Q11. In a resonance tube experiment when the tube is filled with water up to a height of 17.0 cm , from bottom, it resonates with a given tuning fork. When the water level is raised the next resonance with the same tuning fork occurs at a height of 24.5 cm . If the velocity of sound in air is $330\ \mathrm{m\ s}^{-1}$, the tuning fork frequency is :
(1) 2200 Hz
(2) 550 Hz
(3) 1100 Hz
(4) 3300 Hz

Q12. A solid sphere of radius R carries a charge $Q + q$ distributed uniformly over its volume. A very small point like piece of it of mass m gets detached from the bottom of the sphere and falls down vertically under gravity. This piece carries charge q. If it acquires a speed v when it has fallen through a vertical height y (see figure), then (assume the remaining portion to be spherical)



(1) $v^2 = y\left[\frac{qQ}{4\pi\epsilon_0 R^2 ym} + g\right]$
(2) $v^2 = y\left[\frac{qQ}{4\pi\epsilon_0 R(R+y)m} + g\right]$
(3) $v^2 = 2y\left[\frac{QqR}{4\pi\epsilon_0 (R+y)^3 m} + g\right]$
(4) $v^2 = 2y\left[\frac{qQ}{4\pi\varepsilon_0 R(R+y)m} + g\right]$

Q13. Two capacitors of capacitances C and $2C$ are charged to potential differences V and $2V$, respectively. These are then connected in parallel in such a manner that the positive terminal of one is connected to the negative terminal of the other. The final energy of this configuration is :
(1) $\frac{25}{6}CV^2$
(2) $\frac{3}{2}CV^2$
(3) zero
(4) $\frac{9}{2}CV^2$

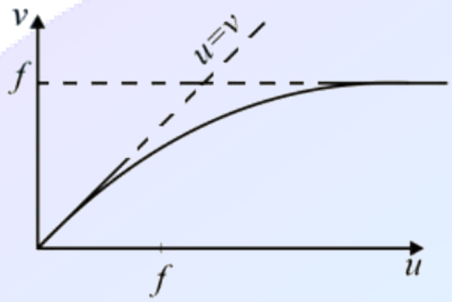
Q14. A galvanometer of resistance G is converted into a voltameter of range $0-1$ V by connecting a resistance R in series with it. The additional resistance that should be connected in series with R_1 to increase the range of the voltmeter to $0-2$ V will be :
(1) G
(2) R_1
(3) $R_1 - G$
(4) $R_1 + G$

Q15. An electrical power line, having a total resistance of 2Ω, delivers 1 kW at 220 V . The efficiency of the transmission line is approximately :
(1) 72%
(2) 91%
(3) 85%
(4) 96%

Q16. An electron is constrained to move along the y-axis with a speed of $0.1c$ (c is the speed of light) in the presence of electromagnetic wave, whose electric field is $\vec{E} = 30\hat{j}\sin(1.5\times10^7\mathrm{t} - 5\times10^{-2}\mathrm{x})\mathrm{Vm}^{-1}$. where t in in seconds and x is im meters.The maximum magnetic force experienced by the electron will be: (given $\mathrm{c} = 3\times10^8\ \mathrm{m\ s}^{-1}$ and electron charge $= 1.6\times10^{-19}$ Coloumbs
(1) 3.2×10^{-18} N
(2) 2.4×10^{-18} N
(3) 4.8×10^{-19} N
(4) 1.6×10^{-19} N

Q17. A square loop of side $2a$, and carrying current I is kept in XZ plane with its centre at origin. A long wire carrying the same current I is placed parallel to the z-axis and passing through the point $(0, b, 0), (b \gg a)$. The magnitude of the torque on the loop about z-axis is given by.
(1) $\frac{\mu_0 I^2 a^2}{2\pi b}$
(2) $\frac{\mu_0 I^2 a^3}{2\pi b^2}$
(3) $\frac{2\mu_0 I^2 a^2}{\pi b}$
(4) $\frac{2\mu_0 I^2 a^3}{\pi b^2}$

Q18. For a concave lens of focal length f, the relation between object and image distance u and v, respectively, from its pole can best be represented by ($u = v$ is the reference line):
(1)



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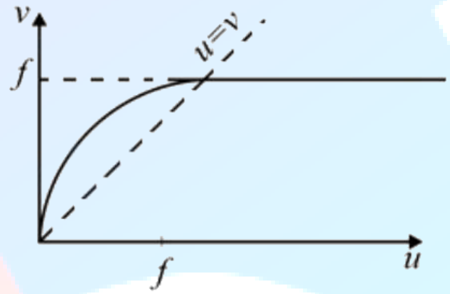

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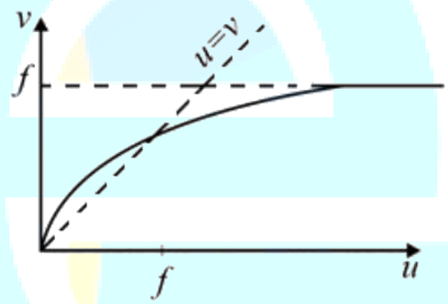

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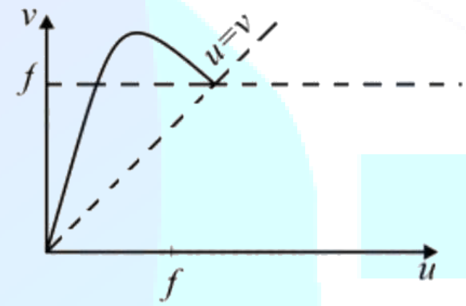
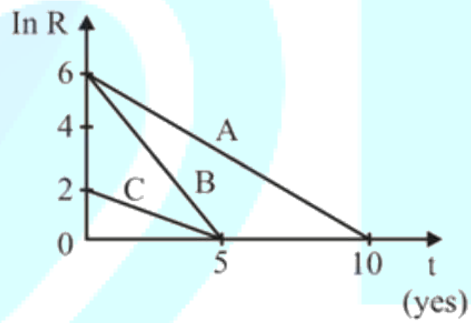


Q19. Activities of three radioactive substances A, B and C are represented by the curves A, B and C, in the figure. Then their half-lives $T_{\frac{1}{2}}(A): T_{\frac{1}{2}}(B): T_{\frac{1}{2}}(C)$ are in the ratio:



(1) $2: 1: 1$
(2) $3: 2: 1$
(3) $2: 1: 3$
(4) $4: 3: 1$

Q20. With increasing biasing voltage of a photo diode, the photocurrent magnitude:
(1) remains constant
(2) increases initially and after attaining certain value, it decreases
(3) increases linearly
(4) increases initially and saturates finally

Q21. A particle of mass $200 \mathrm{MeVc}^{-2}$ collides with a hydrogen atom at rest. Soon after the collision, the particle comes to rest, and the atom recoils and goes to its first excited state. The initial kinetic energy of the particle (in eV) is $\frac{N}{4}$. The value of N is: (Given the mass of the hydrogen atom to be $1 \mathrm{GeVc}^{-2}$).
Q22. A force $\vec{F}=(\hat{\imath}+2 \hat{\jmath}+3 \hat{k}) \mathrm{N}$ acts at a point

$(4\hat{i}+3\hat{j}-\hat{k})$m. Then the magnitude of torque about the point $(\hat{i}+2\hat{j}+\hat{k})$m will be $\sqrt{x}$ N − m. The value of x is.

Q23. Two concentric circular coils, C_1 and C_2, are placed in the XY plane. C_1 has 500 turns , and a radius of 1 cm . C_2 has 200 turns and radius of 20 cm. C_2 carries a time dependent current $I(t)=(5t^2-2t+3)$A where t is in s. The emf induced in C_1(in mV) at the instant $t=1$ s is $\frac{4}{x}$. The value of x is

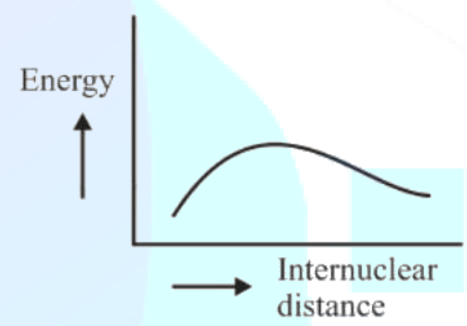
Q24. A compound microscope consists of an objective lens of focal length 1 cm and an eye piece of focal length 5 cm with a separation of 10 cm . The distance between an object and the objective lens, at which the strain on the eye is minimum is $\frac{n}{40}$ cm. The value of n is.

Q25. A beam of electrons of energy E scatters from a target having atomic spacing of 1Å. The first maximum intensity occurs at $\theta=60°$. Then E(in eV) is.
(Planck's constant $h=6.64\times10^{-34}$Js, 1eV $=1.6\times10^{-19}$ J, electron mass m $=9.1\times10^{-31}$ kg)

Q26. The difference between the radii of 3rd and 4th orbits of L_i^{2+} is ΔR_1. The difference between the radii of 3rd and 4th orbits of He^+ ΔR_2. Ratio $\Delta R_1:\Delta R_2$ is :
(1) 8: 3
(2) 3: 8
(3) 2: 3
(4) 3: 2

Q27. In the sixth period, the orbitals that are filled are :
(1) 6 s, 4f, 5 d, 6p
(2) 6 s, 5 d, 5f, 6p
(3) 6 s, 5f, 6 d, 6p
(4) $6s, 6p, 6d, 6f$

Q28. The potential energy curve for the H_2 molecule as a function of internuclear distance is:
(1)



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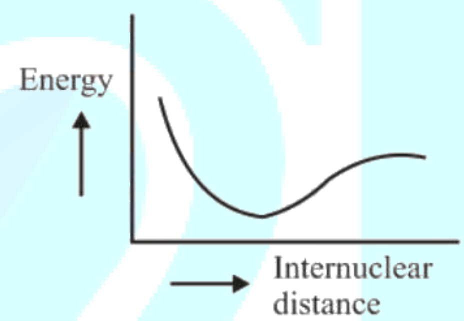

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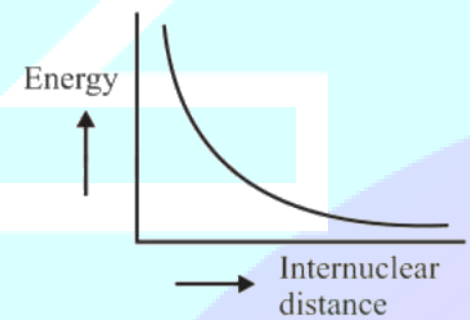

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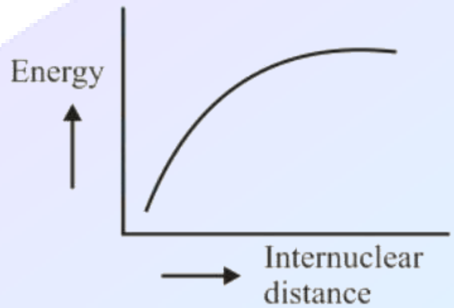


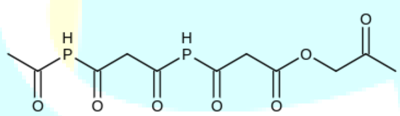
Q29. Consider the following reaction:

$$N_2O_4(g) = 2NO_2(g): \Delta H^0 = +58k$$

For each of the following cases (a, b), the direction in which the equilibrium shifts is:
(a) Temperature is decreased.
(b) Pressure is increased by adding N_2 at constant T .
(1) (a) towards product, (b) towards reactant
(2) (a) towards reactant, (b) towards product
(3) (a) towards reactant, (b) no change
(4) (a) towards product, (b) no change

Q30. The equation that represents the water-gas shift reaction is :
(1) $CH_4(g) + H_2O(g) \xrightarrow[Ni]{1270\ K} CO(g) + 3H_2(g)$
(2) $2C(s) + O_2(g) + 4N_2(g) \xrightarrow{1273\ K} 2CO(g) + 4N_2(g)$
(3) $C(s) + H_2O(g) \xrightarrow{1270\ K} CO(g) + H_2(g)$
(4) $CO(g) + H_2O(g) \xrightarrow[catalyst]{673\ K} CO_2(g) + H_2(g)$

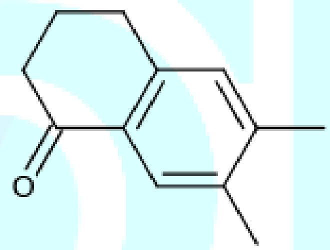
Q31. The increasing order of the acidity of the α-hydrogen of the following compounds is:



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

Q32. In the following reaction sequence the major products A and B are :

(1)



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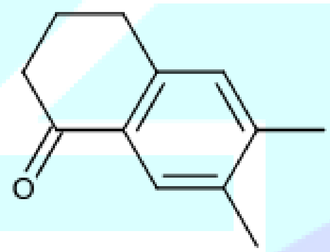

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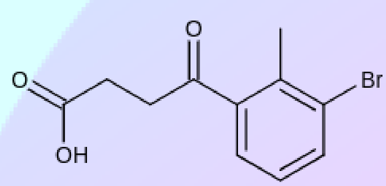


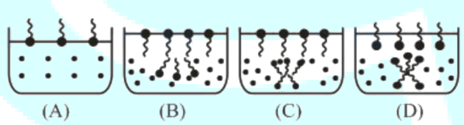
(4)

Q33. The condition that indicates a polluted environment is:
(1) eutrophication
(2) 0.03% of CO_2 in the atmosphere
(3) BOD value of 5 ppm
(4) pH of rain water to be 5.6

Q34. A diatomic molecule X_2 has a body-centred cubic (bcc) structure with a cell edge of 300 pm . The density of the molecule is $6.17 gcm^{-3}$. The number of molecules present in 200 gof^{X_2} is : (Avogadro constant $(N_A) = 6 \times 10^{23}$ mol^{-1})
(1) 40 N_A
(2) 8 N_A
(3) 4 N_A
(4) 2 N_A

Q35. A flask contains a mixture of compounds A and B . Both compounds decompose by first-order kinetics. The half-lives for A and B are 300 s and 180 s , respectively. If the concentrations of A and B are equal initially, the time required for the concentration of A to be four times that of B(ins) is : (Use $\ln 2 = 0.693$)
(1) 180
(2) 900
(3) 300
(4) 120

Q36. Identify the correct molecular picture showing what happens at the critical micellar concentration (CMC) of an aqueous solution of a surfactant
(ब polar head; wnon-polar tail · water)



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

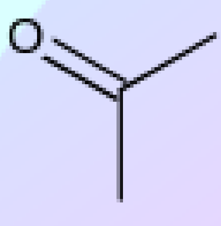
Q37. An Ellingham diagram provides information about:
(1) the conditions of pH and potential under which a species is thermodynamically stable.
(2) the temperature dependence of the standard Gibbs energies of formation of some metal oxides.
(3) the pressure dependence of the standard electrode potentials of reduction reactions involved in the extraction of metals.
(4) the kinetics of the reduction process.

Q38. The structure of PCl_5 in the solid state is :
(1) tetrahedral $[PC_4]^+$and octahedral $[PCl_6]^-$
(2) square planar $[PCl_4]^+$and octahedral $[PCl_6]^-$
(3) square pyramidal
(4) trigonal bipyramidal

Q39. The correct electronic configuration and spin-only magnetic moment (BM) of $Gd^{3+}(Z = 64)$, respectively, are :
(1) $[Xe]4f^7$ and 8.9
(2) $[Xe]4f^7$ and 7.9
(3) $[Xe]5f^7$ and 8.9
(4) $[Xe]5f^7$ and 7.9

Q40. The values of the crystal field stabilization energies for a high spin d^6 metal ion in octahedral and tetrahedral fields, respectively, are:
(1) $-0.4\Delta_o$ and $-0.6\Delta_t$
(2) $-2.4\Delta_o$ and $-0.6\Delta_t$
(3) $-1.6\Delta_o$ and $-0.4\Delta_t$
(4) - 0.4Δ_o and -0.27 Δ_t

Q41. Which of the following derivatives of alcohols is unstable in an aqueous base?
(1)



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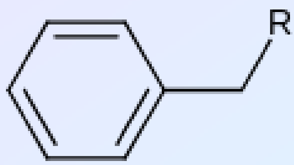
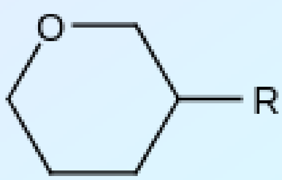


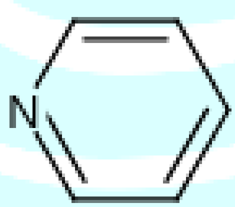
(3)



(4) $RO - CMe_3$

Q42. The most appropriate reagent for conversion of C_2H_5CN into $CH_3CH_2CH_2NH_2$ is :
(1) $NaBH_4$
(2) CaH_2
(3) $LiAlH_4$
(4) $Na(CN)BH_3$

Q43. The increasing order of basicity of the following compounds is :



(A)

(B)

(C)

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

Q44. If a person is suffering from the deficiency of nor-adrenaline, what kind of drug can be suggested?
(1) Anti-inflammatory
(2) Antidepressant
(3) Antihistamine
(4) Analgesic

Q45. Which of the following is not an essential amino acid?
(1) Tyrosine
(2) Leucine

(3) Valine
(4) Lysine

Q46. A soft drink was bottled with a partial pressure of CO_2 of 3 bar over the liquid at room temperature. The partial pressure of CO_2 over the solution approaches a value of 30 bar when 44 g of CO_2 is dissolved in 1 kg of water at room temperature. The approximate pH of the soft drink is $\times 10^{-1}$.
(First dissociation constant of $H_2CO_3 = 4.0 \times 10^{-7}$; $\log 2 = 0.3$; density of the soft drink $= 1 \text{ g mL}^{-1}$)

Q47. The minimum number of moles of O_2 required for complete combustion of 1 mole of propane and 2 moles of butane is.
Q48. An oxidation-reduction reaction in which 3 electrons are transferred has a ΔG^0 of $17.37 \text{ kJ mol}^{-1}$ at 25°C. The value of E^o_{cell} (in V) is $\times 10^{-2}$.
($1 \text{ F} = 96500 \text{Cmol}^{-1}$)
Q49. The total number of coordination sites in ethylenediaminetetraacetate ($EDTA^{4-}$) is
Q50. The number of chiral carbon(s) present in peptide, lle-Arg-Pro, is ..

Q51. The product of the roots of the equation $9x^2 - 18|x| + 5 = 0$ is :
(1) $\frac{5}{9}$
(2) $\frac{25}{81}$
(3) $\frac{5}{27}$
(4) $\frac{25}{9}$

Q52. If the four complex numbers $z, \bar{z}, \bar{z} - 2\text{Re}(\bar{z})$ and $z - 2\text{Re}(z)$ represent the vertices of a square of side 4 units in the Argand plane, then $|z|$ is equal to :
(1) $4\sqrt{2}$
(2) 4
(3) $2\sqrt{2}$
(4) 2

Q53.If $2^{10} + 2^9 \cdot 3^1 + 2^8 \cdot 3^2 + \cdots \ldots + 2 \cdot 3^9 + 3^{10} = S - 2^{11}$, then S is equal to
(1) $3^{11} - 2^{12}$
(2) 3^{11}
(3) $\frac{3^{11}}{2} + 2^{10}$
(4) 2.3^{11}

Q54. If $3^{2\sin 2\alpha - 1}$, 14 and $3^{4 - 2\sin 2\alpha}$ are the first three terms of an A.P. for some α, then the sixth term of this A.P. is
(1) 66
(2) 81
(3) 65
(4) 78

Q55. If the common tangent to the parabolas, $y^2 = 4x$ and $x^2 = 4y$ also touches the circle, $x^2 + y^2 = c^2$, then c is equal to :
(1) $\frac{1}{2\sqrt{2}}$
(2) $\frac{1}{\sqrt{2}}$
(3) $\frac{1}{4}$
(4) $\frac{1}{2}$

Q56. If the co-ordinates of two points A and B are $(\sqrt{7}, 0)$ and $(-\sqrt{7}, 0)$ respectively and P is any point on the conic, $9x^2 + 16y^2 = 144$, then $PA + PB$ is equal to :
(1) 16
(2) 8
(3) 6
(4) 9

Q57. If the point P on the curve, $4x^2 + 5y^2 = 20$ is farthest from the point $Q(0, -4)$, then PQ^2 is equal to
(1) 36
(2) 48
(3) 21
(4) 29

Q58. If α is the positive root of the equation, $p(x) = x^2 - x - 2 = 0$, then
$\lim_{x \to \alpha^+} \frac{\sqrt{1 - \cos p(x)}}{x + \alpha - 4}$ is equal to
(1) $\frac{3}{2}$
(2) $\frac{3}{\sqrt{2}}$
(3) $\frac{1}{\sqrt{2}}$
(4) $\frac{1}{2}$

Q59. The negation of the Boolean expression $x \leftrightarrow \sim y$ is equivalent to:

(1) $(\sim x \wedge y) \vee (\sim x \wedge \sim y)$
(2) $(x \wedge y) \vee (\sim x \wedge \sim y)$
(3) $(x \wedge \sim y) \vee (\sim x \wedge y)$
(4) $(x \wedge y) \wedge (\sim x \vee \sim y)$

Q60. The mean and variance of 7 observations are 8 and 16 , respectively. If five observations are 2,4,10,12,14 then the absolute difference of the remaining two observations is :
(1) 1
(2) 4
(3) 2
(4) 3

Q61. A survey shows that 73% of the persons working in an office like coffee, whereas 65% like tea. If x denotes the percentage of them, who like both coffee and tea, then x cannot be:
(1) 63
(2) 36
(3) 54
(4) 38

Q62. If the minimum and the maximum values of the function $f:\left[\frac{\pi}{4},\frac{\pi}{2}\right] \rightarrow R$, defined by $f(\theta)=\begin{vmatrix} -\sin^2\theta & -1-\sin^2\theta & 1 \\ -\cos^2\theta & -1-\cos^2\theta & 1 \\ 12 & 10 & -2 \end{vmatrix}$ are m and M respectively, then the ordered pair (m, M) is equal to :
(1) $(0,2\sqrt{2})$
(2) $(-4,0)$
(3) $(-4,4)$
(4) $(0,4)$

Q63. Let $\lambda \in$ R. The system of linear equations

$$2x_1-4x_2+\lambda x_3=1$$
$$x_1-6x_2+x_3=2$$
$$\lambda x_1-10x_2+4x_3=3$$

is inconsistent for :
(1) exactly one positive value of λ
(2) exactly one negative value of λ
(3) every value of λ
(4) exactly two values of λ

Q64. If S is the sum of the first 10 terms of the series, $\tan^{-1}\left(\frac{1}{3}\right)+\tan^{-1}\left(\frac{1}{7}\right)+\tan^{-1}\left(\frac{1}{13}\right)+\tan^{-1}\left(\frac{1}{21}\right)+\cdots$ .... then $\tan(S)$ is equal to :
(1) $\frac{5}{6}$
(2) $\frac{5}{11}$
(3) $-\frac{5}{6}$
(4) $\frac{10}{11}$

Q65. If the function $f(x)=\begin{cases} k_1(x-\pi)^2-1, & x\le\pi \\ k_2\cos x, & x>\pi \end{cases}$ is twice differentiable, then the ordered pair (k_1,k_2) is equal to:
(1) $\left(\frac{1}{2},1\right)$
(2) $(1,0)$
(3) $\left(\frac{1}{2},-1\right)$
(4) $(1,1)$

Q66. If $\int (e^{2x}+2e^x-e^{-x}-1)e^{(e^x+e^{-x})}dx = g(x)e^{(e^x+e^{-x})}+c$, where c is a constant of integration, then $g(0)$ is
(1) e
(2) e^2
(3) 1
(4) 2

Q67. The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{1}{1+e^{\sin x}}dx$ is :
(1) $\frac{\pi}{4}$
(2) π
(3) $\frac{\pi}{2}$
(4) $\frac{3\pi}{2}$

Q68. If $y=y(x)$ is the solution of the differential equation $\frac{5+e^x}{2+y}\cdot\frac{dy}{dx}+e^x=0$ satisfying $y(0)=1$ then value of $y(\log_e 13)$ is
(1) 1
(2) -1
(3) 0
(4) 2

Q69. If the volume of a parallelopiped, whose coterminous edges are given by the vectors $\vec{a}=\hat{\imath}+\hat{\jmath}+n\hat{k}$, $\vec{b}=2\hat{\imath}+4\hat{\jmath}-n\hat{k}$ and, $\vec{c}=\hat{\imath}+n\hat{\jmath}+3\hat{k}$ $(n\ge 0)$ is 158 cubic units, then :
(1) $\vec{a}\cdot\vec{c}=17$
(2) $\vec{b}\cdot\vec{c}=10$
(3) $n=7$
(4) $n=9$

Q70. If (a, b, c) is the image of the point $(1,2,-3)$ in the line, $\frac{x+1}{2}=\frac{y-3}{-2}=\frac{z}{-1}$, then $a+b+c$ is equal to:
(1) 2
(2) -1
(3) 3
(4) 1

Q71. The number of words, with or without meaning, that can be formed by taking 4 letters at a time from the letters of the word 'SYLLABUS' such that two letters are distinct and two letters are alike, is

Q72. The natural number m, for which the coefficient of x in the binomial expansion of $\left(x^m+\frac{1}{x^2}\right)^{22}$ is 1540 , is

Q73. If the line, $2x-y+3=0$ is at a distance $\frac{1}{\sqrt{5}}$ and $\frac{2}{\sqrt{5}}$ from the lines $4x-2y+\alpha=0$ and $6x-3y+\beta=0$ respectively, then the sum of all possible values of α and β is -.

Q74. Let $f(x)=x\cdot\left[\frac{x}{2}\right]$, for $-10<x<10$, where $[t]$ denotes the greatest integer function. Then the number of points of discontinuity of $f(x)$ is equal to

Q75. Four fair dice are thrown independently 27 times. Then the expected number of times, at least two dice show up a three or a five, is

ANSWER KEYS

1. (4) atho	2. (4)	3. (3)	4. (4)	5. (2) [a] athoi	6. (1)	7. 7 (2)	8. (1)
9. (1)	10. (1)	11. (1)	12. (4)	13. (2)	14. (4)	15. (4)	16. (3)
17. (3)	18. (1)	19. (3)	20. (4)	21. (51)	22. (195)	23. (5)	24. (50)
25. (50)	26. (3)	27. (1)	28. (2)	29. (3)	30. (4)	31. (1)	32. (2)
33. (1)	34. (3)	35. (2)	36. (1)	37. (2)	38. (1)	39. (2)	40. (1)
41. (1)	42. (3)	43. (2)	44. (2)	45. (1)	46. (37)	47. (18)	48. (-6)
49. (6)	50. (4)	51. (2)	52. (3)	53. (2)	54. (1)	55. (2)	56. (2)
57. (1)	58. (2)	59. (2)	60. (3)	61. (2)	62. (2)	mo63. (2)	64. (1) m_{co}
65. (1)	66. (4)	67. (3)	68. (2)	69. (2)	70. (1)	71. (240)	72. (13)
73. (30)	74. (8)	75. (11)					