Q1. A quantity x is given by $\left(1Fv^2/WL^4\right)$ in terms of moment of inertia I, force F, velocity v, work W and length L. The dimensional formula for x is same as that of :

(1) planck's constant
(2) force constant
(3) energy density
(4) coefficient of viscosity

Q2. A particle of charge q and mass m is subjected to an electric field $E = E_0\left(1-ax^2\right)$ in the $x-$direction, where a and E_0 are constants. Initially the particle was at rest at $x = 0$. Other than the initial position the kinetic energy of the particle becomes zero when the distance of the particle from the origin is :

(1) a
(2) $\sqrt{\frac{2}{\mathrm{a}}}$
(3) $\sqrt{\frac{3}{\mathrm{a}}}$
(4) $\sqrt{\frac{1}{\mathrm{a}}}$

Q3. A small ball of mass m is thrown upward with velocity u from the ground. The ball experiences a resistive force mkv^2 where v is it speed. The maximum height attained by the ball is :

(1) $\frac{1}{2k}\tan^{-1}\frac{ku^2}{g}$
(2) $\frac{1}{k}\ln\left(1+\frac{ku^2}{2g}\right)$
(3) $\frac{1}{k}\tan^{-1}\frac{ku^2}{2g}$
(4) $\frac{1}{2k}\ln\left(1+\frac{ku^2}{g}\right)$

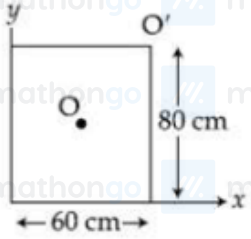
Q4. A person pushes a box on a rough horizontal plateform surface. He applies a force of 200 N over a distance of 15 m. Thereafter, he gets progressively tired and his applied force reduces linearly with distance to 100 N. The total distance through which the box has been moved is 30 m. What is the work done by the person during the total movement of the box?

(1) 3280 J
(2) 2780 J
(3) 5690 J
(4) 5250 J

Q5. Consider two uniform discs of the same thickness and different radii $R_1 = R$ and $R_2 = \alpha R$ made of the same material. If the ratio of their moments of inertia I_1 and I_2, respectively, about their axes is $I_1 : I_2 = 1 : 16$ then the value of α is :

(1) $2\sqrt{2}$
(2) $\sqrt{2}$
(3) 2
(4) 4

Q6.



For a uniform rectangular sheet shown in the figure, the ratio of moments of inertia about the axes perpendicular to the sheet and passing through O (the centre of mass) and O' (corner point) is:

(1) $2/3$
(2) $1/4$
(3) $1/8$
(4) $1/2$

Q7. A body is moving in a low circular orbit about a planet of mass M and radius R. The radius of the orbit can be taken to be R itself. Then the ratio of the speed of this body in the orbit to the escape velocity from the planet is:

(1) $\frac{1}{\sqrt{2}}$ (2) 2
(3) 1 (4) $\sqrt{2}$

Q8. A cube of metal is subjected to a hydrostatic pressure 4 GPa. The percentage change in the length of the side of the cube is close to : (Given bulk modulus of metal, $B = 8 \times 10^{10}\ Pa$)
(1) 5 (2) 0.6
(3) 20 (4) 1.67

Q9. Two identical cylindrical vessels are kept on the ground and each contain the same liquid of density d. The area of the base of both vessels is S but the height of liquid in one vessel is x_1 and in the other x_2. When both cylinders are connected through a pipe of negligible volume very close to the bottom, the liquid flows from one vessel to the other until it comes to equilibrium at a new height. The change in energy of the system in the process is :
(1) $gdS\left(x_2^2 + x_1^2\right)$ (2) $gdS(x_2 + x_1)^2$
(3) $\frac{3}{4}gdS(x_2 - x_1)^2$ (4) $\frac{1}{4}gdS(x_2 - x_1)^2$

Q10. Match the thermodynamics processes taking place in a system with the correct conditions. In the table : ΔQ is the heat supplied, ΔW is the work done and ΔU is change in internal energy of the system.

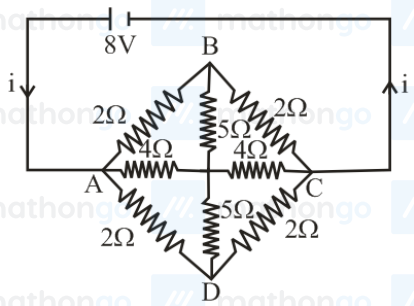
	Process	Condition
(I)	Adiabatic	(A) $\Delta W = 0$
(II)	Isothermal	(B) $\Delta Q = 0$
(III)	Isochoric	(C) $\Delta U \neq 0, \Delta W \neq 0, \Delta Q \neq 0$
(IV)	Isobaric	(D) $\Delta U = 0$

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

Q11. The driver of bus approaching a big wall notices that the frequency of his bus's horn changes from 420 Hz to 490 Hz when he hears it after it gets reflected from the wall. Find the speed of the bus if speed of the sound is 330 ms^{-1}:
(1) 91 kmh^{-1} (2) 81 kmh^{-1}
(3) 61 kmh^{-1} (4) 71 kmh^{-1}

Q12. A capacitor C is fully charged with voltage V_0. After disconnecting the voltage source, it is connected in parallel with another uncharged capacitor of capacitance $\frac{\text{C}}{2}$. The energy loss in the process after the charge is distributed between the two capacitors is :
(1) $\frac{1}{2}CV_0^2$ (2) $\frac{1}{3}CV_0^2$
(3) $\frac{1}{4}CV_0^2$ (4) $\frac{1}{6}CV_0^2$

Q13. The value of current i_1 flowing from A to C in the circuit diagram is :



(1) 5 A
(2) 2.25 A
(3) 0.75 A
(4) 1 A

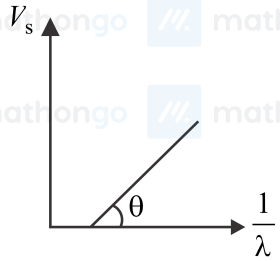
Q14. A paramagnetic sample shows a net magnetisation of 6 A/m when it is placed in an external magnetic field of 0.4 T at a temperature of 4 K. When the sample is placed in an external magnetic field of 0.3 T at a temperature of 24 K, then the magnetisation will be :
(1) 1 A/m
(2) 4 A/m
(3) 2.25 A/m
(4) 0.75 A/m

Q15. A circular coil has moment of inertia 0.8 kg m^2 around any diameter and is carrying current to produce a magnetic moment of 20 Am^2. The coil is kept initially in a vertical position and it can rotate freely around a horizontal diameter. When a uniform magnetic field of 4 T is applied along the vertical, it starts rotating around its horizontal diameter. The angular speed the coil acquires after rotating by 60° will be :
(1) 10 rad s^{-1}
(2) 10π rad s^{-1}
(3) 20π rad s^{-1}
(4) 20 rad s^{-1}

Q16. A series $L-R$ circuit is connected to a battery of emf V. If the circuit is switched on at $t=0$, then the time at which the energy stored in the inductor reaches $\left(\frac{1}{n}\right)$ times of its maximum value, is :
(1) $\frac{L}{R}\ln\left(\frac{\sqrt{n}}{\sqrt{n}-1}\right)$
(2) $\frac{L}{R}\ln\left(\frac{\sqrt{n}+1}{\sqrt{n}-1}\right)$
(3) $\frac{L}{R}\ln\left(\frac{\sqrt{n}}{\sqrt{n}+1}\right)$
(4) $\frac{L}{R}\ln\left(\frac{\sqrt{n}-1}{\sqrt{n}}\right)$

Q17. The electric field of a plane electromagnetic wave is given by $\vec{E}=E_0\left(\hat{x}+\hat{y}\right)\sin(kz-\omega t)$. Its magnetic field will be given by
(1) $\frac{E_0}{c}\left(-\hat{x}+\hat{y}\right)\sin(kz-\omega t)$
(2) $\frac{E_0}{c}\left(\hat{x}+\hat{y}\right)\sin(kz-\omega t)$
(3) $\frac{E_0}{c}\left(\hat{x}-\hat{y}\right)\sin(kz-\omega t)$
(4) $\frac{E_0}{c}\left(\hat{x}-\hat{y}\right)\cos(kz-\omega t)$

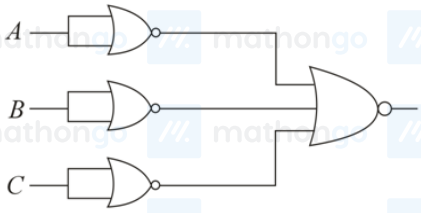
Q18. In a photoelectric effect experiment, the graph of stopping potential V versus reciprocal of wavelength obtained is shown in the figure. As the intensity of incident radiation is increased :



(1) Straight line shifts to right
(2) Slope of the straight line get more steep
(3) Straight line shifts to left
(4) Graph does not change

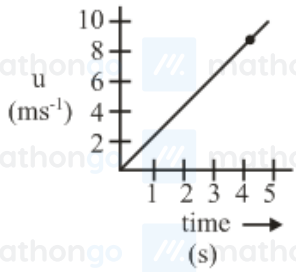
Q19. Find the Binding energy per nucleon for $^{120}_{50}\text{Sn}$. Mass of proton $m_p = 1.00783\ U$, mass of neutron $m_n = 1.00867\ U$ and mass of tin nucleus $m_{\text{sn}} = 119.902199\ U$. (take $1U = 931\ MeV$)
(1) $7.5\ MeV$
(2) $9.0 MeV$
(3) $8.0 MeV$
(4) $8.5\ MeV$

Q20. Identify the operation performed by the circuit given below :



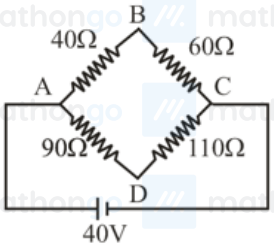
(1) NAND
(2) OR
(3) AND
(4) NOT

Q21. The speed verses time graph for a particle is shown in the figure. The distance travelled (in m) by the particle during the time interval $\text{t} = 0$ to $\text{t} = 5\ s$ will be _____



Q22. The change in the magnitude of the volume of an ideal gas when a small additional pressure ΔP is applied at a constant temperature, is the same as the change when the temperature is reduced by a small quantity ΔT at constant pressure. The initial temperature and pressure of the gas were 300 K and 2 atm respectively. If $|\Delta\text{T}| = \text{C}|\Delta\text{P}|$ then value of C in (K/atm) is _____

Q23. Four resistance $40\ \Omega, 60\ \Omega, 90\ \Omega$ $110\ \Omega$ and make the arms of a quadrilateral $ABCD$. Across AC is a battery of emf $40\ V$ and internal resistance negligible. The potential difference across BD in V is _____



Q24. The distance between an object and a screen is 100 cm. A lens can produce real image of the object on the screen for two different positions between the screen and the object. The distance between these two positions is 40 cm. If the power of the lens is close to $\left(\frac{\text{N}}{100}\right)\text{D}$ where N is an integer, the value of N is _____

Q25. Orange light of wavelength $6000 \times 10^{-10}\ m$ illuminates a single slit of width $0.6 \times 10^{-4}\ m$. The maximum possible number of diffraction minima produced on both sides of the central maximum is _____

Q26. The shortest wavelength of H atom in the Lyman series is λ_1. The longest wavelength in the Balmer series of He^+ is :

(1) $\frac{36\lambda_1}{5}$ (2) $\frac{5\lambda_1}{9}$

(3) $\frac{9\lambda_1}{5}$ (4) $\frac{27\lambda_1}{5}$

Q27. The process that is NOT endothermic in nature is :

(1) $Ar_{(g)} + e^- \rightarrow Ar^-_{(g)}$ (2) $H_{(g)} + e^- \rightarrow H^-_{(g)}$

(3) $O^-_{(g)} + e^- \rightarrow O^{2-}_{(g)}$ (4) $Na_{(g)} \rightarrow Na^+_{(g)} + e^-$

Q28. The reaction in which the hybridisation of the underlined atom is affected is

(1) $H_3\underline{P}O_2 \xrightarrow{\text{Disproportionation}}$ (2) $H_2\underline{S}O_4 + NaCl \xrightarrow{420\ K}$

(3) $\underline{N}H_3 \xrightarrow{H^+}$ (4) $\underline{X}eF_4 + SbF_5 \rightarrow$

Q29. The molecule in which hybrid MOs involve only one d-robital of the central atom is :

(1) $Ni(CN)_4]^{2-}$ (2) BrF_5

(3) XeF_4 (4) $[CrF_6]^{3-}$

Q30. Five moles of an ideal gas at 1 bar and 298 K is expanded into vacuum to double the volume. The work done is :

(1) $C_v(T_2 - T_1)$ (2) $-RT(V_2 - V_1)$

(3) $-RT\ \ln\ V_2/V_1$ (4) Zero

Q31. If the equilibrium constant for $A \rightleftharpoons B + C$ is $K^{(1)}_{eq}$ and that of $B + C \rightleftharpoons P$ is $K^{(2)}_{eq}$, the equilibrium constant for $A \rightleftharpoons P$ is :

(1) $K^{(1)}_{eq}/K^{(2)}_{eq}$ (2) $K^{(2)}_{eq} - K^{(1)}_{eq}$

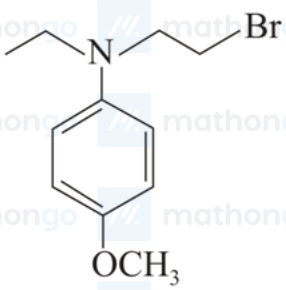
(3) $K^{(1)}_{eq} + K^{(2)}_{eq}$ (4) $K^{(1)}_{eq}K^{(2)}_{eq}$

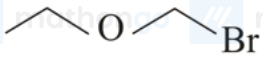
Q32. An alkaline earth metal 'M' readily forms water soluble sulphate and water insoluble hydroxide. Its oxide MO is very stable to heat and does not have rock-salt structure. M is

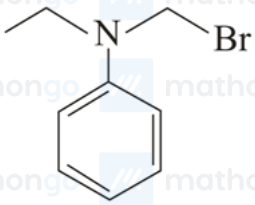
(1) Sr (2) Ca

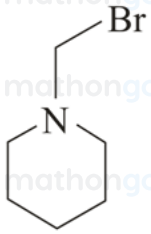
(3) Mg (4) Be

Q33. Which of the following compounds will form the precipitate with aq. $AgNO_3$ solution most readily?

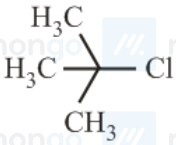
(1) 

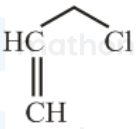
(2) 

(3) 

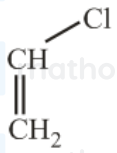
(4) 

Q34. Among the following compounds, which one has the shortest C– Cl bond?

(1) 

(2) 

(3) H_3C-Cl

(4) 

Q35. The processes of calcination and roasting in metallurgical industries, respectively, can lead to :

(1) Global warming and photochemical smog
(2) Global warming and acid rain
(3) Photochemical smog and ozone layer depletion
(4) Photochemical smog and global warming

Q36. 250 mL of a waste solution obtained from the workshop of a goldsmith contains 0.1 M $AgNO_3$ and 0.1M AuCl. The solution was electrolyzed at 2 V by passing a current of 1 A for 15 minutes. The metal/metals electrodeposited will be : $\left(E^0_{Ag^+/Ag} = 0.80V, E^0_{Au^+/Au} = 1.69V\right)$

(1) only gold
(2) silver and gold in proportion to their atomic weights
(3) only silver
(4) silver and gold in equal mass proportion

Q37. A sample of red ink (a colloidal suspension) is prepared by mixing eosine dye, egg white, HCHO and water. The component which ensures stability of the ink sample is :

(1) Egg white
(2) Water
(3) HCHO
(4) Eosin dye

Q38. The incorrect statement(s) among (a) - (c) is (are) :

(a) W(VI) is more stable than Cr(VI).

(b) in the presence of HCl, permanganate titrations provide satisfactory results.

(c) some lanthanoid oxides can be used as phosphors

(1) (b) and (c) only (2) (a) and (b) only

(3) (b) only (4) (a) only

Q39. The Crystal Field Stabilization Energy (CFSE) of $[CoF_3(H_2O)_3](\Delta_0 < P)$ is :

(1) $-0.8\,\Delta_0 + 2P$ (2) $-0.4\,\Delta_0$

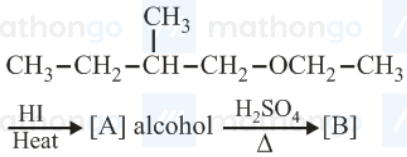
(3) $-0.8\,\Delta_0$ (4) $-0.4\,\Delta_0 + P$

Q40. The one that can exhibit highest paramagnetic behaviour among the following is : gly = glycinato; bpy = 2, 2' −bipyridine

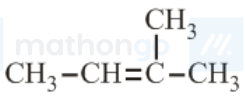
(1) $[Pd(gly)_2]$ (2) $[Fe(en)(bpy)(NH_3)_2]^{2*}$

(3) $[Co(OX)_2(OH)_2]^-(\Delta_0 > P)$ (4) $[Ti(NH_3)_6]^{3*}$

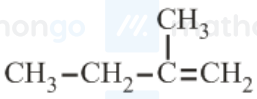
Q41. The major product [B] in the following reaction is :



(1) $CH_2 = CH_2$ (2)

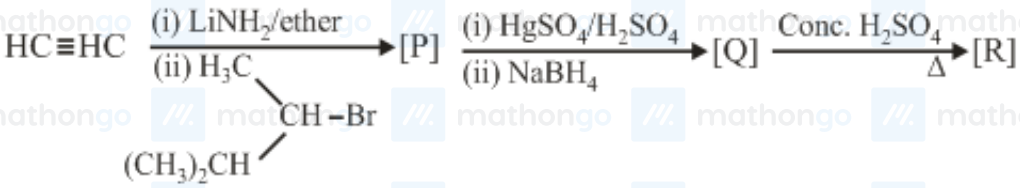


(3)

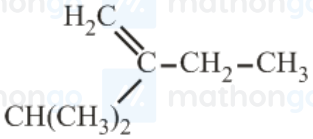


(4) $CH_3 - CH_2\,CH = CH - CH_3$

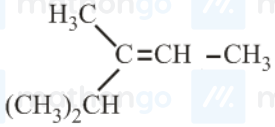
Q42. The major product [R] in the following sequence of reaction is :



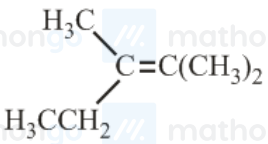
(1)



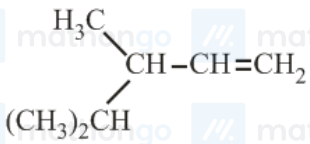
(2)



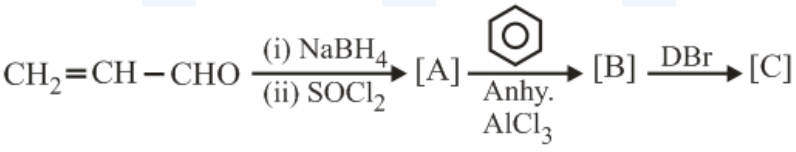
(3)

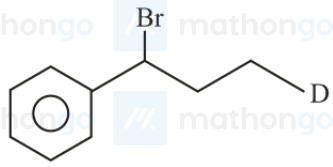


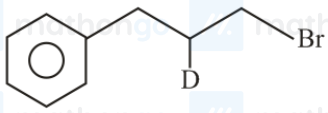
(4)

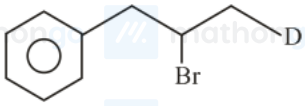


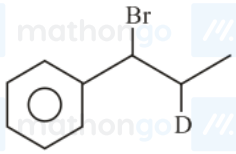
Q43. The major product [C] of the following reaction sequence will be :



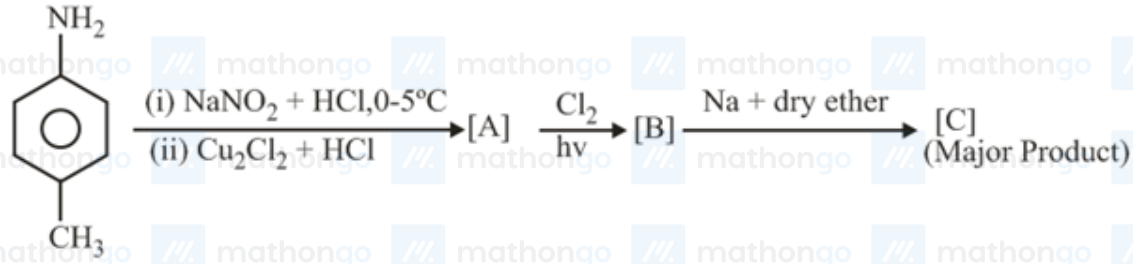
(1) 

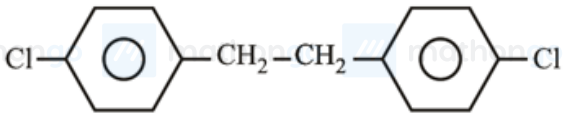
(2) 

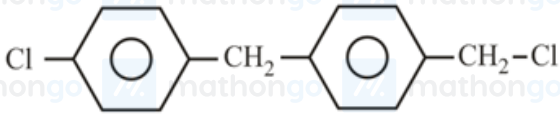
(3) 

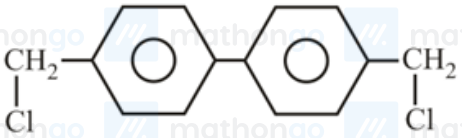
(4) 

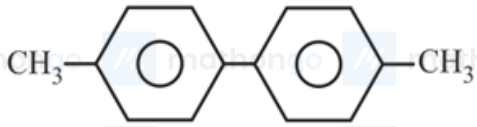
Q44. In the following reaction sequence, [C] is :



(1) 

(2) 

(3) 

(4) 

Q45. The mechanism of action of "Terfenadine" (Seldane) is :

(1) Activates the histamine receptor
(2) Inhibits the secretion of histamine
(3) Helps in the secretion of histamine
(4) Inhibits the action of histamine receptor

Q46. A 100 mL solution was made by adding 1.43 g of $Na_2CO_3.xH_2O$. The normality of the solution is 0.1 N. The value of x is _____

(The atomic mass of Na is 23g/ mol)

Q47. Consider the following equations :

$2\,Fe^{2+} + H_2O_2 \rightarrow xA + yB$

(in basic medium)

$2\,MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow x'C + y'D + z'E$

(in acidic medium)

The sum of the stoichiometric coefficients x, y, x', y' and z' for products A, B, C, D and E respectively, is _____

Q48. The osmotic pressure of a solution of NaCl is 0.10 atm and that of a glucose solution is 0.20 atm. The osmotic pressure of a solution formed by mixing 1 L of the sodium chloride solution with 2 L of the glucose solution is $x \times 10^{-3}$ atm. x is _____ (nearest integer)

Q49. The number of molecules with energy greater than the threshold energy for a reaction increases five fold by a rise of temperature from 27°C to 42°C. Its energy of activation in J/ mol is _____ (Take $\ln\ 5 = 1.6094;\ R = 8.314\ J\ mol^{-1}$)

Q50. The number of chiral centres present in threonine is _____

Q51. Let $\lambda \neq 0$ be in R. If α and β are the roots of the equation, $x^2 - x + 2\lambda = 0$ and α and γ are the roots of the equation, $3x^2 - 10x + 27\lambda = 0$, then $\frac{\beta\gamma}{\lambda}$ is equal to:

(1) 27 (2) 18

(3) 9 (4) 36

Q52. If a and b are real numbers such that $(2+\alpha)^4 = a + b\alpha$, where $\alpha = \frac{-1+i\sqrt{3}}{2}$, then $a + b$ is equal to:

(1) 9 (2) 24

(3) 33 (4) 57

Q53. Let $a_1, a_2, \ldots, a_n$ be a given A.P. whose common difference is an integer and $S_n = a_1 + a_2 + \ldots + a_n$. If $a_1 = 1, a_n = 300$ and $15 \leq n \leq 50$, then the ordered pair (S_{n-4}, a_{n-4}) is equal to:

(1) $(2490, 249)$ (2) $(2480, 249)$

(3) $(2480, 248)$ (4) $(2490, 248)$

Q54. If for some positive integer n, the coefficients of three consecutive terms in the binomial expansion of $(1+x)^{n+5}$ are in the ratio $5 : 10 : 14$, then the largest coefficient in the expansion is :

(1) 462 (2) 330

(3) 792 (4) 252

Q55. If the perpendicular bisector of the line segment joining the points $P(1, 4)$ and $Q(k, 3)$ has y-intercept equal to -4, then a value of k is;

(1) -2 (2) -4

(3) $\sqrt{14}$ (4) $\sqrt{15}$

Q56. The circle passing through the intersection of the circles, $x^2 + y^2 - 6x = 0$ and $x^2 + y^2 - 4y = 0$ having its centre on the line, $2x - 3y + 12 = 0$, also passes through the point :

(1) $(-1, 3)$ (2) $(-3, 6)$

(3) $(-3, 1)$ (4) $(1, -3)$

Q57. Let $x = 4$ be a directrix to an ellipse whose centre is at the origin and its eccentricity is $\frac{1}{2}$. If $P(1, \beta), \beta > 0$ is a point on this ellipse, then the equation of the normal to it at P is

(1) $4x-3y=2$ (2) $8x-2y=5$
(3) $7x-4y=1$ (4) $4x-2y=1$

Q58. Contrapositive of the statement :
'If a function f is differentiable at a, then it is also continuous at a', is
(1) If a function f is continuous at a, then it is not differentiable at a.
(2) If a function f is not continuous at a, then it is not differentiable at a.
(3) If a function f is not continuous at a. then it is differentiable at a.
(4) If a function f is continuous at a, then it is differentiable at a.

Q59. The angle of elevation of a cloud C from a point P, 200 m above a still take is 30°. If the angle of depression of the image of C in the lake from the point P is 60°, then PC (in m) is equal to
(1) 100 (2) $200\sqrt{3}$
(3) 400 (4) $400\sqrt{3}$

Q60. Let $\underset{i=1}{\overset{50}{\cup}} X_i = \underset{i=1}{\overset{n}{\cup}} Y_i = T$, where each X_i contains 10 elements and each Y_i contains 5 elements. If each element of the set T is an element of exactly 20 of sets X_i's and exactly 6 of sets Y_i's then n is equal to :
(1) 15 (2) 50
(3) 45 (4) 30

Q61. If the system of equations
$x+y+z=2$
$2\,x+4\,y-z=6$
$3x+2y+\lambda z=\mu$
has infinitely many solutions, then :
(1) $\lambda+2\mu=14$ (2) $2\lambda-\mu=5$
(3) $\lambda-2\mu=-5$ (4) $2\lambda+\mu=14$

Q62. Suppose the vectors x_1, x_2 and x_3 are the solutions of the system of linear equations, $Ax=b$ when the vector b on the right side is equal to b_1, b_2 and b_3 respectively. If $x_1=\begin{bmatrix}1\\1\\1\end{bmatrix}$, $x_2=\begin{bmatrix}0\\2\\1\end{bmatrix}$, $x_3=\begin{bmatrix}0\\0\\1\end{bmatrix}$;
$b_1=\begin{bmatrix}1\\0\\0\end{bmatrix}$, $b_2=\begin{bmatrix}0\\2\\0\end{bmatrix}$, $b_3=\begin{bmatrix}0\\0\\2\end{bmatrix}$, then the determinant of A is equal to
(1) 4 (2) 2
(3) $\frac{1}{2}$ (4) $\frac{3}{2}$

Q63. The minimum value of $2^{\sin x}+2^{\cos x}$ is :
(1) $2^{-1+\frac{1}{\sqrt{2}}}$ (2) $2^{-1+\sqrt{2}}$
(3) $2^{1-\sqrt{2}}$ (4) $2^{1-\frac{1}{\sqrt{2}}}$

Q64. The function $f(x)=\begin{cases}\frac{\pi}{4}+\tan^{-1}x, & |x|\le 1\\ \frac{1}{2}(|x|-1), & |x|>1\end{cases}$ is :

(1) continuous on $R-\{1\}$ and differentiable on $R-\{-1,1\}$.
(2) both continuous and differentiable on $R-\{1\}$
(3) continuous on $R-\{-1\}$and differentiable on $R-\{-1,1\}$
(4) both continuous and differentiable on $R-\{-1\}$

Q65. Let $f:(0,\infty)\to(0,\infty)$ be a differentiable function such that $f(1)=e$ and $\lim\limits_{t\to x}\frac{t^2f^2(x)-x^2f^2(t)}{t-x}=0$. If $f(x)=1$, then x is equal to:
(1) $\frac{1}{e}$
(2) $2e$
(3) $\frac{1}{2e}$
(4) e

Q66. The area (in sq. units) of the largest rectangle $ABCD$ whose vertices A and B lie on the x-axis and vertices C and D lie on the parabola, $y=x^2-1$ below the x-axis, is :
(1) $\frac{2}{3\sqrt{3}}$
(2) $\frac{1}{3\sqrt{3}}$
(3) $\frac{4}{3}$
(4) $\frac{4}{3\sqrt{3}}$

Q67. The integral $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}}\tan^3x\cdot\sin^2 3x\left(2\sec^2x\cdot\sin^2 3x+3\tan x\cdot\sin 6x\right)dx$ is equal to:
(1) $\frac{7}{18}$
(2) $-\frac{1}{9}$
(3) $-\frac{1}{18}$
(4) $\frac{9}{2}$

Q68. The solution of the differential equation $\frac{dy}{dx}-\frac{y+3x}{\log_e(y+3x)}+3=0$ is
(where C is a constant of integration)
(1) $x-\frac{1}{2}(\log_e(y+3x))^2=C$
(2) $x-\log_e(y+3x)=C$
(3) $y+3x-\frac{1}{2}(\log_e x)^2=C$
(4) $x-2\log_e(y+3x)=C$

Q69. The distance of the point $(1,-2,3)$ from the plane $x-y+z=5$ measured parallel to the line $\frac{x}{2}=\frac{y}{3}=\frac{z}{-6}$ is :
(1) $\frac{7}{5}$
(2) 1
(3) $\frac{1}{7}$
(4) 7

Q70. In a game two players A and B take turns in throwing a pair of fair dice starting with player A and total of scores on the two dice, in each throw is noted. A wins the game if he throws a total of 6 before B throws a total of 7 and B wins the game if he throws a total of 7 before A throws a total of six. The game stops as soon as either of the players wins. The probability of A winning the game is :
(1) $\frac{5}{31}$
(2) $\frac{31}{61}$
(3) $\frac{5}{6}$
(4) $\frac{30}{61}$

Q71. A test consists of 6 multiple choice questions, each having 4 alternative answers of which only one is correct. The number of ways, in which a candidate answers all six questions such that exactly four of the answers are correct, is _____

Q72. Let PQ be a diameter of the circle $x^2+y^2=9$. If α and β are the lengths of the perpendiculars from P and Q on the straight line, $x+y=2$ respectively, then the maximum value of $\alpha\beta$ is _____

Q73. If the variance of the following frequency distribution:

Class:	$10-20$	$20-30$	$30-40$
Frequency:	2	x	2

is 50, then x is equal to _____

Q74. Let $\{x\}$ and $[x]$ denote the fractional part of x and the greatest integer $\leq x$ respectively of a real number x. if $\int_0^n \{x\}dx$, $\int_0^n [x]dx$ and $10\left(n^2-n\right)$, $\left(n \in N, n > 1\right)$ are three consecutive terms of a G.P. then n is equal to__

Q75. If $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$, then, the value of $\left|\hat{i} \times \left(\vec{a} \times \hat{i}\right)\right|^2 + \left|\hat{j} \times \left(\vec{a} \times \hat{j}\right)\right|^2 + \left|\hat{k} \times \left(\vec{a} \times \hat{k}\right)\right|^2$, is equal to :

ANSWER KEYS

1. (3)	**2.** (3)	**3.** (4)	**4.** (4)	**5.** (3)	**6.** (2)	**7.** (1)	**8.** (4)
9. (4)	**10.** (4)	**11.** (1)	**12.** (4)	**13.** (4)	**14.** (4)	**15.** (1)	**16.** (1)
17. (1)	**18.** (4)	**19.** (4)	**20.** (3)	**21.** (20)	**22.** (150)	**23.** (2)	**24.** (476)
25. (200)	**26.** (3)	**27.** (2)	**28.** (4)	**29.** (1)	**30.** (4)	**31.** (4)	**32.** (4)
33. (4)	**34.** (4)	**35.** (2)	**36.** (1)	**37.** (1)	**38.** (3)	**39.** (2)	**40.** (3)
41. (2)	**42.** (3)	**43.** (1)	**44.** (1)	**45.** (4)	**46.** (10)	**47.** (19)	**48.** (167)
49. (84297)	**50.** (2)	**51.** (2)	**52.** (1)	**53.** (4)	**54.** (1)	**55.** (2)	**56.** (2)
57. (4)	**58.** (2)	**59.** (3)	**60.** (4)	**61.** (4)	**62.** (2)	**63.** (4)	**64.** (1)
65. (1)	**66.** (4)	**67.** (3)	**68.** (1)	**69.** (2)	**70.** (4)	**71.** (135)	**72.** (7)
73. (4)	**74.** (21)	**75.** (18)					