NEET-JEE

3rd April shift 2

Q1 A magnetic dipole experiences a torque of $80\sqrt{3}\ \mathrm{N\ m}$ when placed in uniform magnetic field in such a way that dipole moment makes angle of 60° with magnetic field. The potential energy of the dipole is :

(A) $80\ \mathrm{J}$ (B) $-40\sqrt{3}\ \mathrm{J}$

(C) $-60\ \mathrm{J}$ (D) $-80\ \mathrm{J}$

Q2 In the resonance experiment, two air columns (closed at one end) of 100 cm and 120 cm long, give 15 beats per second when each one is sounding in the respective fundamental modes. The velocity of sound in the air column is :

(A) $335\ \mathrm{m/s}$ (B) $370\ \mathrm{m/s}$

(C) $340\ \mathrm{m/s}$ (D) $360\ \mathrm{m/s}$

Q3 Two cylindrical vessels of equal cross sectional area of $2\ \mathrm{m}^2$ contain water upto height 10 m and 6 m , respectively. If the vessels are connected at their bottom then the work done by the force of gravity is :

(Density of water is $10^3\ \mathrm{kg/m^3}$ and $\mathrm{g} = 10\ \mathrm{m/s^2}$)

(A) $1 \times 10^5\ \mathrm{J}$

(B) $4 \times 10^4\ \mathrm{J}$

(C) $6 \times 10^4\ \mathrm{J}$

(D) $8 \times 10^4\ \mathrm{J}$

Q4 Width of one of the two slits in a Young's double slit interference experiment is half of the other slit. The ratio of the maximum to the minimum intensity in the interference pattern is :

(A) $\left(2\sqrt{2}+1\right) : \left(2\sqrt{2}-1\right)$ (B) $\left(3+2\sqrt{2}\right) : \left(3-2\sqrt{2}\right)$

(C) $9 : 1$ (D) $3 : 1$

Q5 An ideal gas exists in a state with pressure $\mathrm{P_0}$, volume $\mathrm{V_0}$.It is isothermally expanded to 4 times of its initial volume $(\mathrm{V_0})$, then isobarically compressed to its original volume. Finally the system is heated isochorically to bring it to its initial state. The amount of heat exchanged in this process is :

(A) $\mathrm{P_0\ V_0}(2\ln 2 - 0.75)$

(B) $\mathrm{P_0\ V_0}(\ln 2 - 0.75)$

(C) $\mathrm{P_0\ V_0}(\ln 2 - 0.25)$

(D) $\mathrm{P_0 V_0}(2\ln 2 - 0.25)$

Q6 Two monochromatic light beams have intensities in the ratio 1:9. An interference pattern is obtained by these beams. The ratio of the intensities of maximum to minimum is

(A) $8 : 1$ (B) $9 : 1$

(C) $3 : 1$ (D) $4 : 1$

Q7 Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : The Bohr model is applicable to hydrogen and hydrogen-like atoms only.

Reason R : The formulation of Bohr model does not include repulsive force between electrons.

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

(A) Both A and R are true but R is NOT the correct explanation of A.

(B) A is false but R is true.

(C) Both A and R are true and R is the correct explanation of A.

(D) A is true but R is false.

Q8 Using a battery, a 100 pF capacitor is charged to 60 V and then the battery is removed. After that, a second uncharged capacitor is connected to the first capacitor in parallel. If the final voltage across the second capacitor is 20 V, its capacitance is : (in pF)

(A) 600 (B) 200

(C) 400 (D) 100

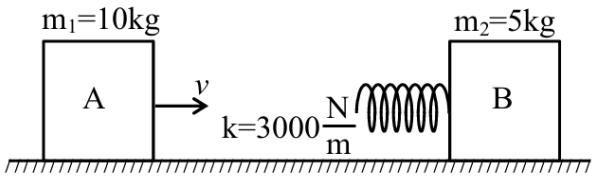
Q9

A monochromatic light of frequency 5×10^{14} Hz travelling through air, is incident on a medium of refractive index '2'. Wavelength of the refracted light will be :

(A) 300 nm (B) 600 nm

(C) 400 nm (D) 500 nm

Q10



Consider two blocks A and B of masses $\mathrm{m}_1 = 10$ kg and $m_2 = 5$ kg that are placed on a frictionless table. The block A moves with a constant speed $v = 3$ m/s towards the block B kept at rest. A spring with spring constant $\mathrm{k} = 3000$ N/m is attached with the block B as shown in the figure. After the collision, suppose that the blocks A and B, along with the spring in constant compression state, move together, then the compression in the spring is, (Neglect the mass of the spring)

(A) 0.2 m (B) 0.4 m

(C) 0.1 m (D) 0.3 m

Q11 A particle is projected with velocity u so that its horizontal range is three times the maximum height attained by it. The horizontal range of the projectile is given as $\frac{nu^2}{25g}$, where value of n is : (Given ' g ' is the acceleration due to gravity).

(A) 6 (B) 18

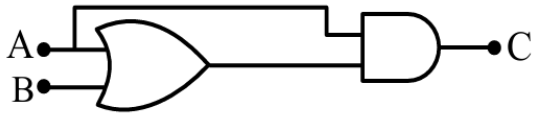
(C) 12 (D) 24

Q12 A solid steel ball of diameter 3.6 mm acquired terminal velocity 2.45×10^{-2} m/s while falling under gravity through an oil of density 925 kg m^{-3}. Take density of steel as 7825 kg m^{-3} and g as 9.8 m/s^2 . The viscosity of the oil in SI unit is

(A) 2.18 (B) 2.38

(C) 1.68 (D) 1.99

Q13 The truth table corresponding to the circuit given below is



(A)

A	B	C
0	0	0
1	0	0
0	1	0
1	1	1

(B)

A	B	C
0	0	0
0	1	0
1	0	1
1	1	1

(C)

A	B	C
0	0	1
1	0	0
0	1	0
1	1	0

(D)

A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

Q14 A particle moves along the x-axis and has its displacement x varying with time t according to the equation

$\mathrm{x} = \mathrm{c}_0\left(\mathrm{t}^2 - 2\right) + \mathrm{c}\left(\mathrm{t} - 2\right)^2$

where c_0 and c are constants of appropriate dimensions. Then, which of the following statements is correct?

(A) the acceleration of the particle is $2\mathrm{c}_0$

(B) the acceleration of the particle is $2\mathrm{c}$

(C) the initial velocity of the particle is $4\mathrm{c}$

(D) the acceleration of the particle is $2\left(c+c_0\right)$

Q15 An electric bulb rated as 100 W-220 V is connected to an ac source of rms voltage 220 V. The peak value of current through the bulb is :

(A) $0.64\ \mathrm{A}$ (B) $0.45\ \mathrm{A}$

(C) $2.2\ \mathrm{A}$ (D) $0.32\mathrm{A}$

Q16 Match the **LIST-I** with **LIST-II**

LIST-I		LIST-II	
A.	Boltzmann constant	I.	ML^2T^{-1}
B.	Coefficient of viscosity	II.	$MLT^{-3}K^{-1}$
C.	Planck's constant	III.	$ML^2T^{-2}K^{-1}$
D.	Thermal conductivity	IV.	$ML^{-1}T^{-1}$

Choose the ***correct*** answer from the options given below :

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

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

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

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

Q17 Pressure of an ideal gas, contained in a closed vessel, is increased by 0.4% when heated by 1°C. Its initial temperature must be :

(A) 25°C (B) 2500 K

(C) 250 K (D) 250°C

Q18 A motor operating on 100 V draws a current of 1 A. If the efficiency of the motor is 91.6%, then the loss of power in units of cal/s is

(A) 4 (B) 8.4

(C) 2 (D) 6.2

Q19 A block of mass 1 kg , moving along x with speed $\mathrm{v_i}=10\ \mathrm{m/s}$ enters a rough region ranging from $\mathrm{x}=0.1\ \mathrm{m}$ to $\mathrm{x}=1.9\ \mathrm{m}$. The retarding force acting on the block in this range is $\mathrm{F_r}=-\mathrm{kxN}$, with $\mathrm{k}=10\ \mathrm{N/m}$. Then the final speed of the block as it crosses rough region is

(A) $10\ \mathrm{m/s}$ (B) $4\ \mathrm{m/s}$

(C) $6\ \mathrm{m/s}$ (D) $8\ \mathrm{m/s}$

Q20 Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : If oxygen ion $\left(\mathrm{O}^{-2}\right)$ and Hydrogen ion $\left(\mathrm{H}^{+}\right)$enter normal to the magnetic field with equal momentum, then the path of O^{-2} ion has a smaller curvature than that of H^{+}.

Reason R:A proton with same linear momentum as an electron will form a path of smaller radius of curvature on entering a uniform magnetic field perpendicularly.

In the light of the above statement, choose the correct answer from the options given below

(A) A is true but R is false

(B) Both A and R are true but R is NOT the correct explanation of A

(C) A is false but R is true

(D) Both A and R are true and R is the correct explanation of A

Q21 Light from a point source in air falls on a spherical glass surface (refractive index, $\mu=1.5$ and radius of curvature $=50\ \mathrm{cm}$). The image is formed at a distance of 200 cm from the glass surface inside the glass. The magnitude of distance of the light source from the glass surface is _____ m.

Q22 The excess pressure inside a soap bubble A in air is half the excess pressure inside another soap bubble B in air. If the volume of the bubble A is n times the volume of the bubble B, then, the value of n is _____.

Q23 Two cells of emf $1\mathrm{V}$ and $2\mathrm{V}$ and internal resistance 2Ω and 1Ω, respectively, are connected in series with an external resistance of 6Ω. The total current in the circuit is $\mathrm{I_1}$. Now the same two cells in parallel configuration are connected to same external resistance. In this case, the total current drawn is $\mathrm{I_2}$. The value of $\left(\frac{I_1}{I_2}\right)$ is $\frac{x}{3}$. The value of x is _____ .

Q24 An electron in the hydrogen atom initially in the fourth excited state makes a transition to $\mathrm{n^{th}}$

energy state by emitting a photon of energy $2.86\ \text{eV}$. The integer value of n will be_____

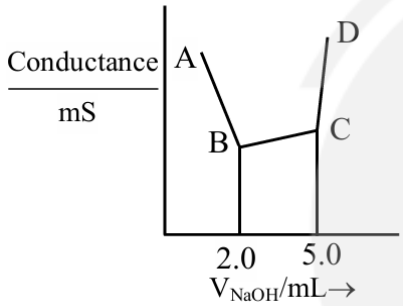
Q25 A physical quantity C is related to four other quantities p, q, r and s as follows

$$C = \frac{pq^2}{r^3\sqrt{s}}$$

The percentage errors in the measurement of p, q, r and s are $1\%,\ 2\%,\ 3\%$ and 2% respectively.

The percentage error in the measurement of C will be _____%.

Q26 40 mL of a mixture of CH_3COOH and HCl (aqueous solution) is titrated against 0.1 M $NaOH$ solution conductometrically. Which of the following statement is correct?



(A) The concentration of CH_3COOH in the original mixture is $0.005\ M$

(B) The concentration of HCl in the original mixture is 0.005 M

(C) CH_3COOH is neutralised first followed by neutralisation of HCl

(D) Point ' C ' indicates the complete neutralisation HCl

Q27 10 mL of 2 M NaOH solution is added to 20 mL of 1 M HCl solution kept in a beaker. Now, 10 mL of this mixture is poured into a volumetric flask of 100 mL containing 2 moles of HCl and made the volume upto the mark with distilled water. The solution in this flask is :

(A) 0.2 M NaCl solution

(B) 20 M HCl solution

(C) 10 M HCl solution

(D) Neutral solution

Q28 Fat soluble vitamins are :

A. Vitamin B_1

B. Vitamin C

C. Vitamin E

D. Vitamin B_{12}

E. Vitamin K

Choose the correct answer from the options given below:

(A) C and D Only (B) A and B only

(C) B and C only (D) C and E only

Q29 Match the **LIST-I** with **LIST-II**.

LIST-I (Family)		LIST-II (Symbol of Element)	
A.	Pnicogen (group 15)	I.	Ts
B.	Chalcogen	II.	Og
C.	Halogen	III.	Lv
D.	Noble gas	IV.	Mc

Choose the ***correct*** answer from the options given below :

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

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

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

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

Q30 For electron in ' 2 s ' and ' 2 p ' orbitals, the orbital angular momentum values, respectively are :

(A) $\sqrt{2}\frac{h}{2\pi}$ and 0

(B) $\frac{h}{2\pi}$ and $\sqrt{2}\frac{h}{2\pi}$

(C) 0 and $\sqrt{6}\frac{h}{2\pi}$

(D) 0 and $\sqrt{2}\frac{h}{2\pi}$

Q31 Compounds that should not be used as primary standards in titrimetric analysis are

A. $Na_2Cr_2O_7$

B. Oxalic acid

C. $NaOH$

D. $FeSO_4 \cdot 6H_2O$

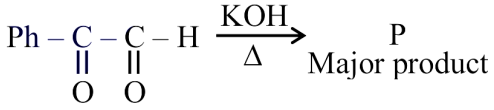
E. Sodium tetraborate

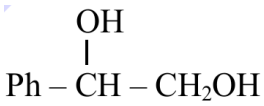
Choose the ***most appropriate*** answer from the options given below:

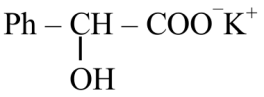
(A) B and D Only

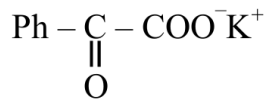
(B) D and E Only
(C) C, D and E Only
(D) A, C and D Only

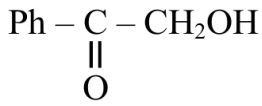
Q32 The major product (P) in the following reaction is :



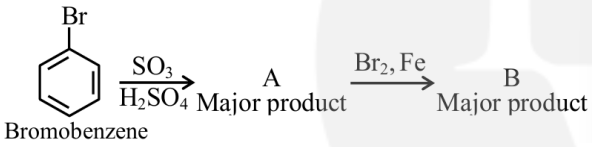
(A) 

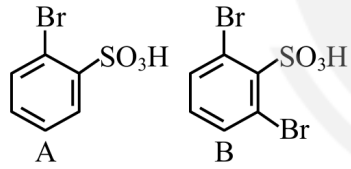
(B) 

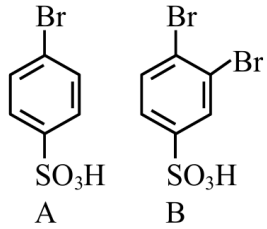
(C) 

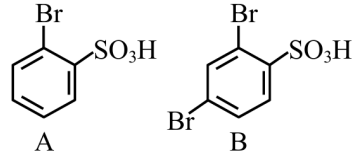
(D) 

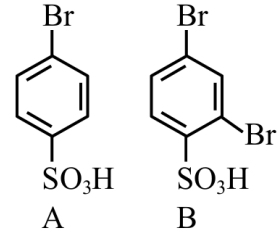
Q33 In the following series of reactions identify the major products A & B respectively.



(A) 

(B) 

(C) 

(D) 

Q34 The standard cell potential $\left(E_{cell}^{\ominus}\right)$ of a fuel cell based on the oxidation of methanol in air that has been used to power television relay station is measured as $1.21\ V$. The standard half cell reduction potential for O_2 $\left(E_{O_2/H_2O}^{O}\right)$ is $1.229\ V$ .Choose the correct statement:

(A) The standard half cell reduction potential for the reduction of CO_2 $\left(E_{CO_2\ /\ CH_3\ OH}^{o}\right)$ is 19 mV
(B) Oxygen is formed at the anode.
(C) Reactants are fed at one go to each electrode.
(D) Reduction of methanol takes place at the cathode.

Q35 Identify the diamagnetic octahedral complex ions from below

A. $[Mn(CN)_6]^{3-}$
B. $[Co\ (NH_3)_6]^{3+}$
C. $[Fe(CN)_6]^{4-}$
D. $[Co\ (H_2O)_3\ F_3]$

Choose the correct answer from the options given below :

(A) B and D Only
(B) A and D Only
(C) A and C Only
(D) B and C Only

Q36 In Dumas' method for estimation of nitrogen $0.4\ g$ of an organic compound gave $60\ mL$ of nitrogen collected at $300\ K$ temperature and $715\ mm$ Hg pressure. The percentage composition of nitrogen in the compound is (Given : Aqueous tension at $300\ K\ =\ 15\ mm\ Hg$)

(A) 15.71% (B) 20.95%
(C) 17.46% (D) 7.85%

Q37 Mass of magnesium required to produce $220\ mL$ of hydrogen gas at STP on reaction with excess of dil. HCl is
Given : Molar mass of Mg is $24\ g\ mol^{-1}$.

(A) $235.7\ g$ (B) $0.24\ mg$
(C) $236\ mg$ (D) $2.444\ g$

Q38 Given below are two statements :

Statement I : Wet cotton clothes made of cellulose based carbohydrate takes comparatively longer time to get dried than wet nylon polymer based clothes.

Statement II : Intermolecular hydrogen bonding with water molecule is more in nylon-based clothes than in the case of cotton clothes.

In the light of above statements, choose the Correct answer from the options given below

(A) Statement I is false but Statement II is true

(B) Statement I is true but Statement II is false

(C) Both Statement I and Statement II are true

(D) Both Statement I and Statement II are false

Q39 Given below are two statements :

Statement I : CrO_3 is a stronger oxidizing agent than MoO_3

Statement II : $Cr(VI)$ is more stable than $Mo(VI)$

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

(A) Statement I is false but Statement II is true

(B) Statement I is true but Statement II is false

(C) Both Statement I and Statement II are true

(D) Both Statement I and Statement II are false

Q40 Given below are two statements :

Statement I : Hyperconjugation is not a permanent effect.

Statement II : In general, greater the number of alkyl groups attached to a positively charged C - atom, greater is the hyperconjugation interaction and stabilization of the cation.

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

(A) Statement I is true but Statement II is false

(B) Both Statement I and Statement II are false

(C) Statement I is false but Statement II is true

(D) Both Statement I and Statement II are true

Q41 Given below are two statements :

Statement I : When a system containing ice in equilibrium with water (liquid) is heated, heat is absorbed by the system and there is no change in the temperature of the system until whole ice gets melted.

Statement II : At melting point of ice, there is absorption of heat in order to overcome intermolecular forces of attraction within the molecules of water in ice and kinetic energy of molecules is not increased at melting point.

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

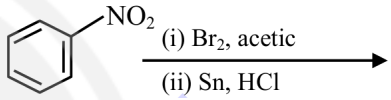
(A) Statement I is true but Statement II is false

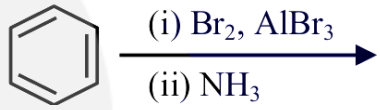
(B) Both Statement I and Statement II are false

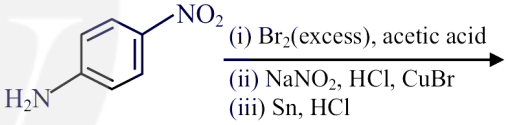
(C) Both Statement I and Statement II are true

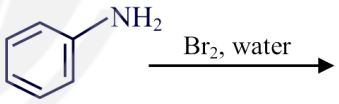
(D) Statement I is false but Statement II is true

Q42 The sequence from the following that would result in giving predominantly 3, 4, 5 – Tribromoaniline is

(A) 

(B) 

(C) 

(D) 

Q43 The correct orders among the following are

Atomic radius : $B < Al < Ga < In < Tl$

Electronegativity : $Al < Ga < In < Tl < B$

Density : $Tl < In < Ga < Al < B$

1st Ionisation Energy :

$In < Al < Ga < Tl < B$

Choose the correct answer from the options given below :

(A) B and D Only

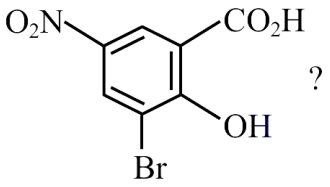
(B) A and C Only

(C) C and D Only

(D) A and B Only

Q44

What is the correct IUPAC name of

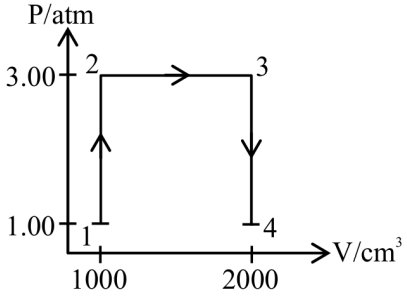


(A) 3-Bromo-2-hydroxy-5-nitrobenzoic acid
(B) 3-Bromo-4-hydroxy-1-nitrobenzoic acid
(C) 2-Hydroxy-3-bromo-5-nitrobenzoic acid
(D) 5-Nitro-3-bromo-2-hydroxybenzoic acid

Q45 Consider the following statements related to temperature dependence of rate constants.
Identify the correct statements,
A. The Arrhenius equation holds true only for an elementary homogenous reaction.
B. The unit of A is same as that of k in Arrhenius equation.
C. At a given temperature, a low activation energy means a fast reaction.
D. A and Ea as used in Arrhenius equation depend on temperature.
E. When Ea >> RT. A and Ea become interdependent.
Choose the **correct** answer from the options given below :
(A) A, C and D Only
(B) B, D and E Only
(C) B and C Only
(D) A and B Only

Q46 X g of nitrobenzene on nitration gave $4.2\ \mathrm{g}$ of m -dinitrobenzene.
X = _____ g. (nearest integer)
[Given : molar mass (in $\mathrm{gmol^{-1}}$) $\mathrm{C:12, H:1, O:16,\ N:14}$]

Q47



A perfect gas $(0.1\ \mathrm{mol})$ having $\overline{\mathrm{C}}_{\mathrm{v}} = 1.50\mathrm{R}$ (independent of temperature) undergoes the above transformation from point 1 to point 4. If each step is reversible, the total work done (w) while going from point 1 to point 4 is $(-)$ _____ J (nearest integer)
[Given : $\mathrm{R} = 0.082\ \mathrm{L\ atm\ K^{-1}\ mol^{-1}}$]

Q48 A sample of n-octane $(1.14\ \mathrm{g})$ was completely burnt in excess of oxygen in a bomb calorimeter, whose heat capacity is $5\ \mathrm{kJ\ K^{-1}}$. As a result of combustion reaction, the temperature of the calorimeter is increased by $5\ \mathrm{K}$. The magnitude of the heat of combustion of octane at constant volume is _____ $\mathrm{kJmol^{-1}}$ (nearest integer).

Q49 Among, Sc, Mn, Co and Cu, identify the element with highest enthalpy of atomisation. The spin only magnetic moment value of that element in its +2 oxidation state is _____ BM (in nearest integer).

Q50 The total number of structural isomers possible for the substituted benzene derivatives with the molecular formula $\mathrm{C_9H_{12}}$ is _____.

Q51 Let $f : R \to R$ be a function defined by $\mathrm{f(x) = ||x+2| - 2|x||}$. If m is the number of points of local minima and n is the number of points of local maxima of f, then $m + n$ is
(A) 5 (B) 3
(C) 2 (D) 4

Q52 Each of the angles β and γ that a given line makes with the positive $y-$ and $\mathrm{z-}$axes, respectively, is half of the angle that this line makes with the positive $\mathrm{x-}$axes. Then the sum of all possible values of the angle β is
(A) $\frac{3\pi}{4}$ (B) π
(C) $\frac{\pi}{2}$ (D) $\frac{3\pi}{2}$

Q53 If the four distinct points $(4,6),\ (-1,5),\ (0,0)$ and $(\mathrm{k},\ 3\mathrm{k})$ lie on a circle of radius r, then $10\mathrm{k} + \mathrm{r}^2$ is equal to
(A) 32 (B) 33
(C) 34 (D) 35

Q54 Let the Mean and Variance of five observations $x_1 = 1, x_2 = 3, x_3 = a, x_4 = 7$ and $x_5 = b, a > b$, be 5 and 10 respectively. Then the Variance of the observations $n + x_n, n = 1, 2, \ldots\ldots 5$ is

(A) 17 (B) 16. 4

(C) 17. 4 (D) 16

Q55 Consider the lines $x(3\lambda + 1) + y(7\lambda + 2) = 17\lambda + 5$, λ being a parameter, all passing through a point P. One of these lines (say L) is farthest from the origin. If the distance of L from the point $(3, 6)$ is d, then the value of d^2 is

(A) 20 (B) 30

(C) 10 (D) 15

Q56 Let $A = \{-2, -1, 0, 1, 2, 3\}$. let R be a relation on A defined by xRy if and only if $y = \max\{x, 1\}$. Let l be the number of elements in R. Let m and n be the minimum number of elements required to be added in R to make it reflexive and symmetric relations, respectively. Then $l + m + n$ is equal to

(A) 12 (B) 11

(C) 13 (D) 14

Q57 let the equation $x(x + 2)(12 - k) = 2$ have equal roots. Then the distance of the point $\left(k, \frac{k}{2}\right)$ from the line $3x + 4y + 5 = 0$ is

(A) 15 (B) $5\sqrt{3}$

(C) $15\sqrt{5}$ (D) 12

Q58 Line L_1 of slope 2 and line L_2 of slope $\frac{1}{2}$ intersect at the origin O . In the first quadrant, $P_1, P_2, \ldots . P_{12}$ are 12 points on line L_1 and $Q_1, Q_2, \ldots . . Q_9$ are 9 points on line L_2. Then the total number of triangles, that can be formed having vertices at three of the 22 points $O, P_1, P_2, \ldots P_{12}, Q_1, Q_2, \ldots . Q_9$, is:

(A) 1080 (B) 1134

(C) 1026 (D) 1188

Q59 The integral $\int_0^{\pi} \frac{8x dx}{4\cos^2 x + \sin^2 x}$ is equal to

(A) $2\pi^2$ (B) $4\pi^2$

(C) π^2 (D) $\frac{3\pi^2}{2}$

Q60 Let f be a function such that $f(x) + 3f\left(\frac{24}{x}\right) = 4x, x \neq 0$. Then $f(3) + f(8)$ is equal to

(A) 11 (B) 10

(C) 12 (D) 13

Q61 The area of the region $\{(x, y) : |x - y| \leq y \leq 4\sqrt{x}\}$ is

(A) 512 (B) $\frac{1024}{3}$

(C) $\frac{512}{3}$ (D) $\frac{2048}{3}$

Q62 If the domain of the function $f(x) = \log_7\left(1 - \log_4\left(x^2 - 9x + 18\right)\right)$ is $(\alpha, \beta) \cup (\gamma, \delta)$, then $\alpha + \beta + \gamma + \delta$ is equal to

(A) 18 (B) 16

(C) 15 (D) 17

Q63 If the probability that the random variable X takes the value x is given by $P(X = x) = k(x + 1)3^{-x}$, $x = 0, 1, 2, 3 \ldots . .$, where k is a constant, then $P(X \geq 3)$ is equal to

(A) $\frac{7}{27}$ (B) $\frac{4}{9}$

(C) $\frac{8}{27}$ (D) $\frac{1}{9}$

Q64 Let $y = y(x)$ be the solution of the differential equation $\frac{dy}{dx} + 3\left(\tan^2 x\right)y + 3y = \sec^2 x$, $y(0) = \frac{1}{3} + e^3$. Then $y\left(\frac{\pi}{4}\right)$ is equal to

(A) $\frac{2}{3}$ (B) $\frac{4}{3}$

(C) $\frac{4}{3} + e^3$ (D) $\frac{2}{3} + e^3$

Q65 If $z_1, z_2, z_3 \in C$ are the vertices of an equilateral triangle, whose centroid is z_0, then $\sum_{k=1}^{3}\left(z_k - z_0\right)^2$ is equal to

(A) 0 (B) 1

(C) i (D) $-i$

Q66 The number of solutions of equation $\left(4 - \sqrt{3}\right)\sin x - 2\sqrt{3}\cos^2 x = -\frac{4}{1+\sqrt{3}}, x \in \left[-2\pi, \frac{5\pi}{2}\right]$ is

(A) 4 (B) 3

(C) 6 (D) 5

Q67

Let C be the circle of minimum area enclosing the ellipse $\mathrm{E}: \frac{\mathrm{x}^2}{\mathrm{a}^2}+\frac{\mathrm{y}^2}{\mathrm{b}^2}=1$ with eccentricity $\frac{1}{2}$ and foci $(\pm 2,0)$. Let PQR be a variable triangle, whose vertex P is on the circle C and the side QR of length 29 is parallel to the major axis of E and contains the point of intersection of E with the negative y-axis. Then the maximum area of the triangle PQR is :

(A) $6(3+\sqrt{2})$ (B) $8(3+\sqrt{2})$

(C) $6(2+\sqrt{3})$ (D) $8(2+\sqrt{3})$

Q68 The shortest distance between the curves $\mathrm{y}^2=8\mathrm{x}$ and $x^2+y^2+12y+35=0$is :

(A) $2\sqrt{3}-1$ (B) $\sqrt{2}$

(C) $3\sqrt{2}-1$ (D) $2\sqrt{2}-1$

Q69 The distance of the point $(7,10,11)$ from the line $\frac{x-4}{1}=\frac{y-4}{0}=\frac{z-2}{3}$ along the line $\frac{x-9}{2}=\frac{y-13}{3}=\frac{z-17}{6}$ is

(A) 18 (B) 14

(C) 12 (D) 16

Q70 The sum $1+\frac{1+3}{2!}+\frac{1+3+5}{3!}+\frac{1+3+5+7}{4!}+\ldots$ upto ∞ terms, is equal to

(A) 6e (B) 4e

(C) 3e (D) 2e

Q71 Let I be the identity matrix of order 3×3 and for the matrix $\mathrm{A}=\begin{bmatrix}\lambda & 2 & 3\\ 4 & 5 & 6\\ 7 & -1 & 2\end{bmatrix}$, $|\mathrm{A}|=-1$. Let B be the inverse of the matrix $\operatorname{adj}\left(\mathrm{A}\operatorname{adj}\left(\mathrm{A}^2\right)\right)$. Then $|(\lambda B+I)|$ is equal to _____

Q72 Let $\left(1+\mathrm{x}+\mathrm{x}^2\right)^{10}=\mathrm{a}_0+\mathrm{a}_1\mathrm{x}+\mathrm{a}_2\mathrm{x}^2+\ldots..$ If $+\mathrm{a}_{20}\mathrm{x}^{20}$ $\left(\mathrm{a}_1+\mathrm{a}_3+\mathrm{a}_5+\ldots.+\mathrm{a}_{19}\right)-11\mathrm{a}_2=121\mathrm{k}$, then k is equal to _____.

Q73 If $\mathrm{Lim}_{x\to 0}\left(\frac{\tan x}{x}\right)^{\frac{1}{x^2}}=p$, then $96\log_e p$ is equal to _____

Q74 Let $\vec{\mathrm{a}}=\hat{\mathrm{i}}+2\hat{\mathrm{j}}+\hat{\mathrm{k}}$, $\vec{\mathrm{b}}=3\hat{\mathrm{i}}-3\hat{\mathrm{j}}+3\hat{\mathrm{k}}$, $\vec{\mathrm{c}}=2\hat{i}-\hat{j}+2\hat{k}$ and $\vec{d}$ be a vector such that $\vec{\mathrm{b}}\times\vec{\mathrm{d}}=\vec{\mathrm{c}}\times\vec{\mathrm{d}}$ and $\vec{\mathrm{a}}\cdot\vec{\mathrm{d}}=4$. Then $\left|\left(\vec{\mathrm{a}}\times\vec{\mathrm{d}}\right)\right|^2$ is equal to _____.

Q75 If the equation of the hyperbola with foci $(4,2)$ and $(8,2)$ is $3x^2-y^2-\alpha x+\beta y+\gamma=0$, then $\alpha+\beta+\gamma$ is equal to _____ .

Answer Key

Q1	(D)
Q2	(D)
Q3	(D)
Q4	(B)
Q5	(A)
Q6	(D)
Q7	(C)
Q8	(B)
Q9	(A)
Q10	(C)
Q11	(D)
Q12	(D)
Q13	(B)
Q14	(D)
Q15	(A)
Q16	(A)
Q17	(C)
Q18	(C)
Q19	(D)
Q20	(A)
Q21	4
Q22	8
Q23	4
Q24	2
Q25	15
Q26	(B)
Q27	(B)
Q28	(D)
Q29	(B)
Q30	(D)
Q31	(D)
Q32	(B)
Q33	(B)
Q34	(A)
Q35	(D)
Q36	(A)
Q37	(C)
Q38	(B)
Q39	(B)
Q40	(C)
Q41	(C)
Q42	(C)
Q43	(A)
Q44	(A)
Q45	(C)
Q46	3
Q47	304
Q48	2500
Q49	4
Q50	8
Q51	(B)
Q52	(A)
Q53	(D)
Q54	(D)
Q55	(A)
Q56	(A)
Q57	(A)
Q58	(B)
Q59	(A)
Q60	(A)

Q61 (B)

Q62 (A)

Q63 (D)

Q64 (B)

Q65 (A)

Q66 (D)

Q67 (D)

Q68 (D)

Q69 (B)

Q70 (D)

Q71 38

Q72 239

Q73 32

Q74 128

Q75 141

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Video Solution:

Q2 Video Solution:

Q3 Video Solution:

Q4 Video Solution:

Q5 Video Solution:

Q6 Video Solution:

Q7 Video Solution:

Q8 Video Solution:

Q9 Video Solution:

Q10 Video Solution:

Q11 Video Solution:

Q12 Video Solution:

Q13 Video Solution:

Q14 Video Solution:

Q15 Video Solution:

Q16 Video Solution:

Q17 Video Solution:

Q18 Video Solution:

Q19 Video Solution:

Q20 Video Solution:

Q21 Video Solution:

Q22 Video Solution:

Q23 Video Solution:

Q24 Video Solution:

Q25 Video Solution:

Q26 Video Solution:

Q27 Video Solution:

Q28 Video Solution:

Q29 Video Solution:

Q30 Video Solution:

Q31 Video Solution:

Q32 Video Solution:

Q33 Video Solution:

Q34 Video Solution:

Q35 Video Solution:

Q36 Video Solution:

Q37 Video Solution:

Q38 Video Solution:

Q39 Video Solution:

Q40 Video Solution:

Q41 Video Solution:

Q42 Video Solution:

Q43 Video Solution:

Q44 Video Solution:

Q45 Video Solution:

Q46 Video Solution:

Q47 Video Solution:

Q48 Video Solution:

Q49 Video Solution:

Q50 Video Solution:

Q51 Video Solution:

Q52 Video Solution:

Q53 Video Solution:

Q54 Video Solution:

Q55 Video Solution:

Q56 Video Solution:

Q57 Video Solution:

Q58 Video Solution:

Q59 Video Solution:

Q60 Video Solution:

Q61 Video Solution:

Q62 Video Solution:

Q63 Video Solution:

Q64 Video Solution:

Q65 Video Solution:

Q66 Video Solution:

Q67 Video Solution:

Q68 Video Solution:

Q69 Video Solution:

Q70 Video Solution:

Q71 Video Solution:

Q72 Video Solution:

Q73 Video Solution:

Q74 Video Solution:

Q75 Video Solution: