Competishun

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

Date: 09/12/2024

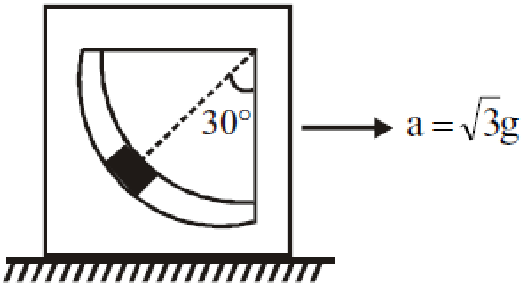
Time: 3 hours **Max. Marks:** 300

UTS-1 MT-8 (24-25)

Physics

Single Choice Question

Q1 A Wedge with a rough groove in the shape of a quarter of a circle is kept on a smooth table (see figure). A disc is placed in the groove with a small clearance. Friction exists between groove and disc. The wedge is moved with an acceleration $\sqrt{3}g$. If disc is to remain stationary relative to groove at the position shown, the coefficient of friction required can be.



a) $\frac{1}{3}$ **b)** $\frac{1}{4}$ **c)** $\frac{1}{5}$ **d)** $\frac{9}{10}$

Q2 The rod of constant cross section area but having different density of material along its length is moving with constant acceleration in horizontal direction (Figure-1). Stress verses distance x from left end of rod graph is shown (Figure-2). At two sections 1 & 2 angle of tangent in stress verses x graph are $\alpha_1 = 37^\circ$ and $\alpha_2 = 53^\circ$. If density of rod at section-1 is 9 gm/cm^3 then find the density of rod at section-2 in gm/cm^3.

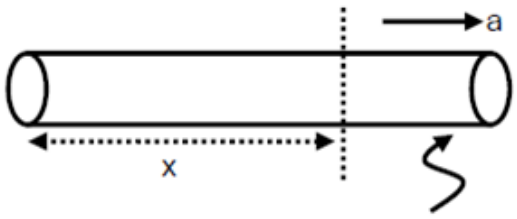


Figure-1

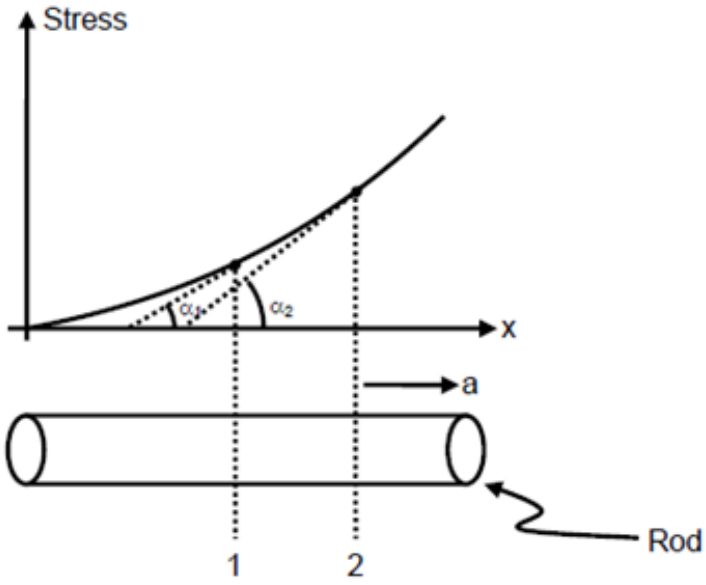


Figure-2

a) 12 **b)** 16 **c)** 2 **d)** 24

Q3 In a stack of three polarizing sheets the first and third are crossed while the middle one has its axis at 45° to the axes of the other two. The fraction of the intensity of an incident unpolarized beam of light that is transmitted by the stack is

a) 1/2 **b)** 1/3 **c)** 1/4 **d)** 1/8

Q4 Two uniform solid spheres A and B of same material, painted completely black and placed in free space separately where no radiation is incident on spheres. Their radii are R and 2R respectively and the dominating wavelengths (wavelength corresponding to which spectral emissive power is maximum) in their spectrum are observed to be in the ratio 1 : 2. Which of the following is **not correct**.

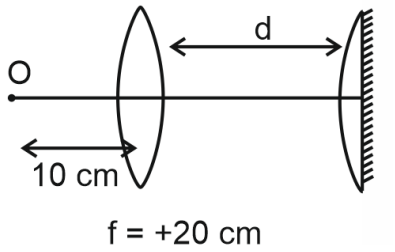
a) Ratio of their temperatures is 2 : 1 **b)** Ratio of their emissive powers is 4 : 1

c) Ratio of their rates of heat loss is 4 : 1 **d)** Ratio of their rates of cooling is 32 : 1

Q5 If the surface of a metal is successively exposed to radiation of $\lambda_1 = 350$ nm and $\lambda_2 = 450$ nm, the maximum speed of photoelectrons is halved. The work function of this metal is closest to (given h = 6.62×10^{-34} J- s)

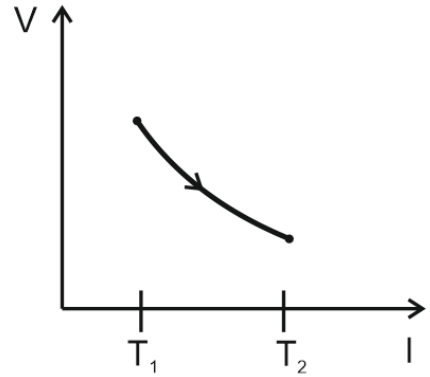
a) 1.8 eV **b)** 2.5 eV **c)** 4.8 eV **d)** 3.9 eV

Q6 A convex lens of focal length 20 cm and another planoconvex lens of focal length 40 cm are placed co-axially as shown in figure. The plano-convex lens is silvered on plane surface. What should be the distance d (in cm) so that final image of the object ' O ' is formed on O itself



a) 10 **b)** 15 **c)** 20 **d)** 25

Q7 The figure shows a process AB undergone by 2 moles of an ideal diatomic gas. The process AB is in such a way that VT = constant. $T_1 = 300\,K$ and $T_2 = 500\,K$ (R = gas constant)



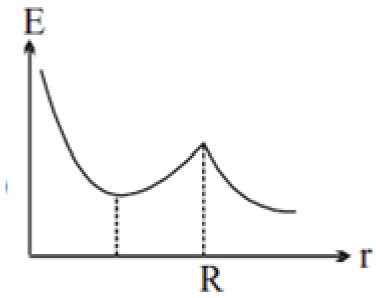
a) The molar heat capacity of gas in the process A → B is $5\frac{R}{2}\,J/mol-K$

b) The molar heat capacity of gas in the process A → B is $RJ/Jol-K$

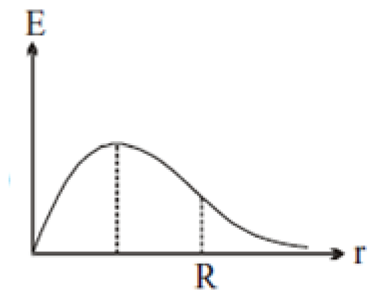
c) The work done by the gas is –400 RJ **d)** The work done by the gas is –200 RJ

Q8 A spherical insulator of radius R is charged uniformly with a charge Q uniformly distributed throughout its volume and contains a point charge $\frac{Q}{16}$ located at its centre. Which of the following graphs best represent qualitatively, the variation of electric field intensity E with distance r from the centre.

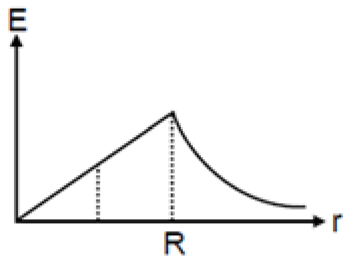
a)



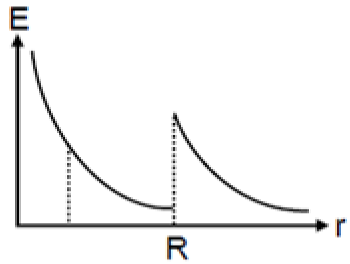
b)



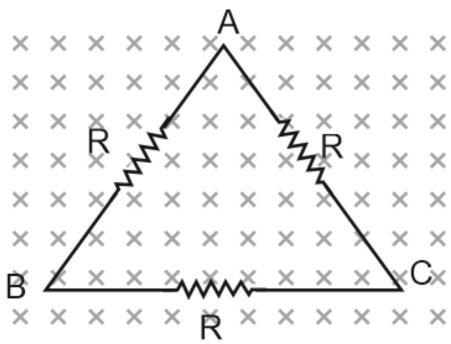
c)



d)



Q9 Three resistances of magnitude R each are connected in the form of an equilateral triangle of side a. The combination is placed in a magnetic field $B = B_0 e^{-\lambda t}$ perpendicular to its plane. The induced current in the circuit is given by:

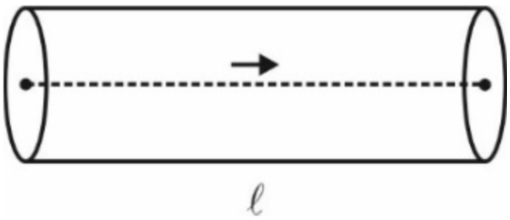


a) $\left(\frac{a^2\lambda}{2\sqrt{3}R}B_0\right)e^{-\lambda t}$ **b)** $\left(\frac{a^2\lambda}{4\sqrt{3}R}B_0\right)e^{-\lambda t}$ **c)** $\left(\frac{a^2 B_0}{\lambda 4\sqrt{3}R}\right)e^{-\lambda t}$ **d)** $\left(\frac{a^2 B_0 R}{\lambda 4\sqrt{3}}\right)e^{-\lambda t}$

Q10 The voltage of AC source is $E = 220\sin(\omega t + \pi/6)$ and the AC in the circuit is $I = 10\sin(\omega t - \pi/6)$. The average power dissipated is

a) 150 W **b)** 550 W **c)** 250 W **d)** 50 W

Q11 A cylindrical conductor of length ℓ and radius α has conductivity near its axis as σ. The conductivity of material increases linearly with the distance from axis and becomes 2σ near the surface. The resistance of conductor for longitudinal current is



a) $\frac{3\ell}{7\pi a^2\sigma}$ b) $\frac{3\ell}{5\pi a^2\sigma}$ c) $\frac{\ell}{2\pi a^2\sigma}$ d) $\frac{3\ell}{4\pi a^2\sigma}$

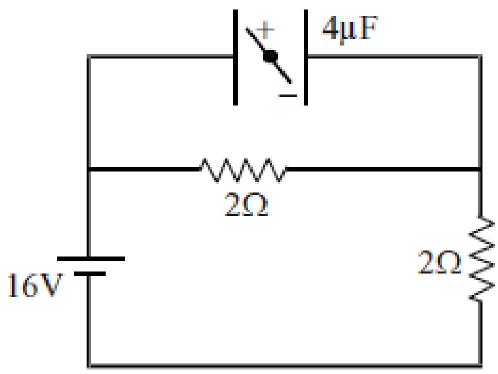
Q12 A plane electromagnetic wave travelling in vacuum is given by $E = E_0 \sin(\omega t - kx)$ where $E_0 = 50NC^{-1}$. The average energy density of the wave is nearly equal to:

a) $1.1\times10^{-5}\frac{J}{m^3}$ b) $2.2\times10^{-8}\frac{J}{m^3}$ c) $4.4\times10^{-8}\frac{J}{m^3}$ d) $1.1\times10^{-8}\frac{J}{m^3}$

Q13 An electron of mass m and magnitude of charge |e| initially at rest gets accelerated by a constant electric field E. The rate of change of de-Broglie wavelength of this electron at time t ignoring relativistic effects is

a) $-\frac{h}{|e|E\sqrt{t}}$ b) $\frac{-h}{|e|Et^2}$ c) $\frac{|e|Et^2}{h}$ d) $-\frac{h}{|e|Et}$

Q14 What is net force on the small dipole inside the capacitor if the plates are separated by 1 cm ?

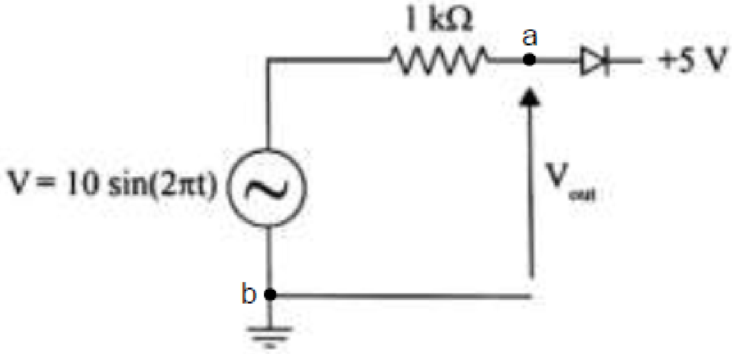


a) 0 N b) 4 N c) 8 N d) 16 N

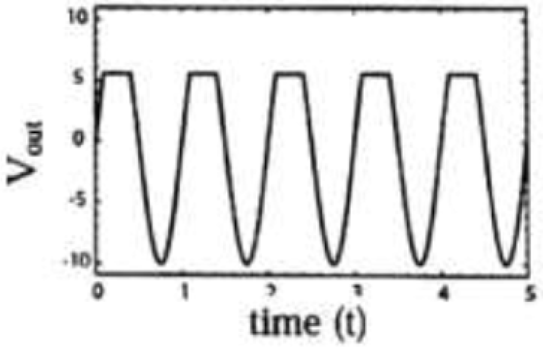
Q15 A uniform circular ring of radius R is fixed in plane. A particle is placed on the axis of the ring at a distance much greater than R and allowed to fall towards the ring under the influence of the ring's gravity. The particle achieves a maximum speed v. The ring is replaced with one of the same (linear) mass density but radius 2R, and the experiment is repeated. What is the new maximum speed of the particle?

a) $\frac{1}{2}v$ b) $\frac{1}{\sqrt{2}}v$ c) v d) $\sqrt{2}v$

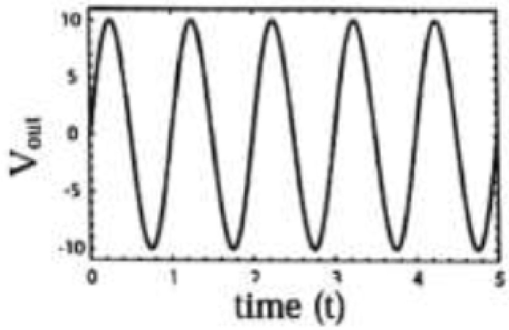
Q16 Consider the following ideal diode circuit. Which of the graph given below is a correct representation of V_{out} $(V_a - V_b)$? (Input and output voltage is in volt)



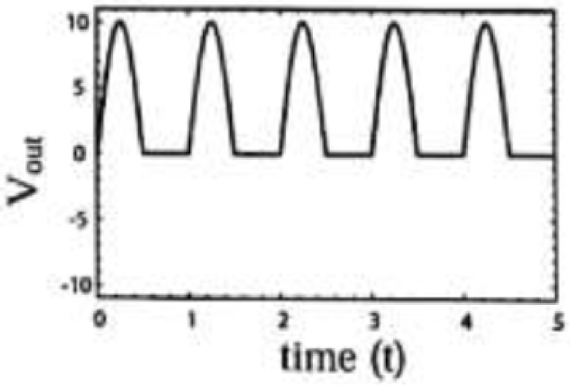
a)



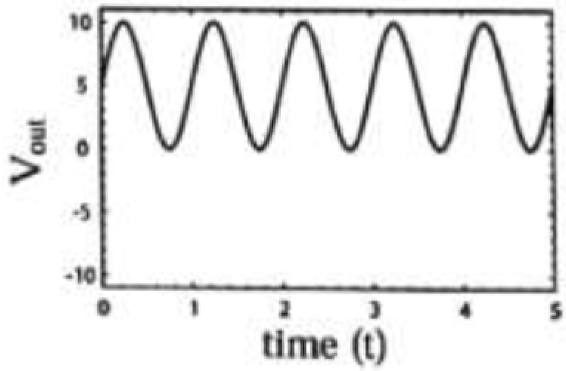
b)



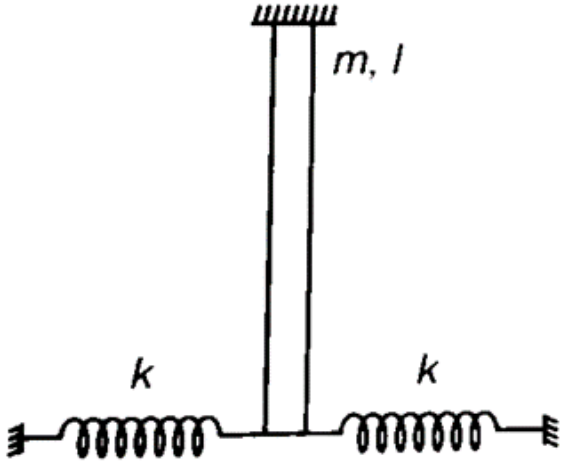
c)



d)



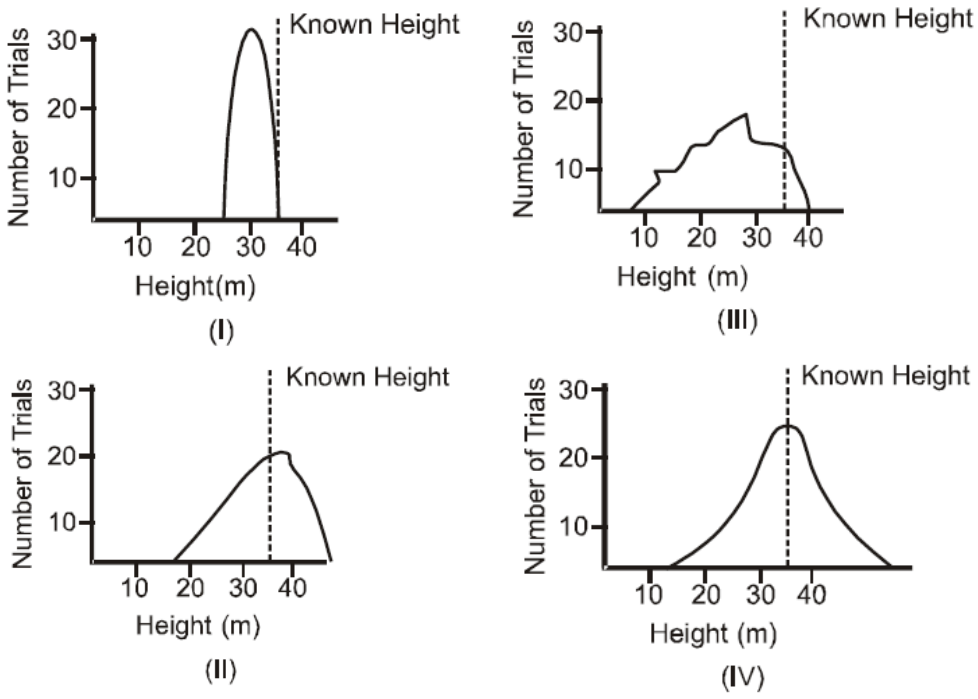
Q17 A rigid rod (m, n), pivoted at the upper end, is connected with two identical springs, as shown. The period of oscillation of rod in vertical plane (in the plane of system) is



a) $2\pi\sqrt{\frac{3ml}{2[mg+2kl]}}$ **b)** $2\pi\sqrt{\frac{2ml}{3[mg+4kl]}}$ **c)** $2\pi\sqrt{\frac{2ml}{3[mg+2kl]}}$

d) $2\pi\sqrt{\frac{3ml}{2[mg+4kl]}}$

Q18 Four students measure the height of a tower. Each student uses a different method and each measures the height many different times. The data for each are plotted below. The measurement with highest precision is :



a) IV **b)** II **c)** III **d)** I

Q19 The top of a water tank is open to air and its water level is maintained. It is giving out 0.74 m^3 water per minute through a circular opening of 2 cm radius in its wall. The depth of the centre of the opening from the level of water in the tank is close to:

a) 9.6 m **b)** 2.9 m **c)** 4.8 m **d)** 6.0 m

Q20 A steel rod is 4.000 cm in diameter at 30ºC. A brass ring has an inner diameter of 3.992 cm at 30ºC. In order that the ring just slides onto the steel rod, the common temperature of the two should be approximately (α_{steel}= 11 × 10^{-6}/ºC and α_{brass}= 19 × 10^{-6}/ºC)

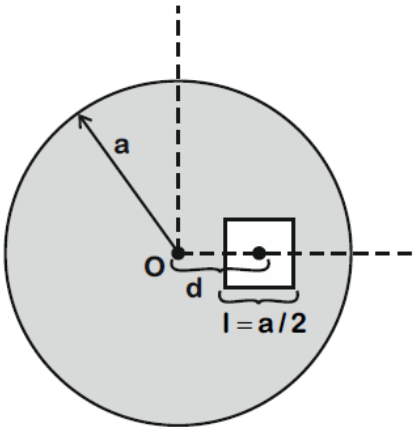
a) 250ºC **b)** 280ºC **c)** 300ºC **d)** 350ºC

Numerical

Q21 A ball is thrown obliquely into the air. At a certain moment, the ball's velocity has an angle of 60º with the horizontal, with an upwards motion. Four seconds later, the angle is of 30º with horizontal, with a downward motion. Determine the sum of magnitude of height (in m) ascended and descended during this time interval. Given g = 10 m/s^2. Ignore air drag on the ball.

Q22 If the earth suddenly shrinks to $\frac{1}{64}$ th of its original volume with its mass remaining the same, the period of rotation of earth becomes $\frac{24}{x}$ h. The value of x is____.

Q23 A square shaped hole of side $l = \frac{a}{2}$ is carved out at a distance $d = \frac{a}{2}$ from the centre 'O' of a uniform circular disk of radius a. If the distance of the centre of mass of the remaining portion from O is $-\frac{a}{x}$, value of X (to the nearest integer) is_____.



Q24 A wire of density 9 g cm^{-3} is stretched between two clamps 1 m apart. The resulting strain in the wire is 4.9 × 10^{-4}. The lowest frequency of the transverse vibrations in the wire is (Young's modulus of wire = 9 × 10^{10} Nm^{-2}), (to the nearest integer), _____.

Q25 A galvanometer coil has 500 turns and each turn has an average area of 3 × 10^{-4} m^2. If a torque of 1.5 Nm is required to keep this coil parallel to a magnetic field when a current of 0.5 A is flowing through it, the strength of the field (in T) is _____.

Chemistry

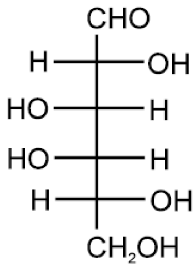
Single Choice Question

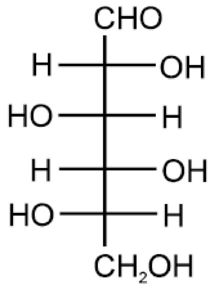
Q26 [X] + $H_2SO_4 \longrightarrow$ [Y] a colourless gas with irritating smell.
[Y] + $K_2Cr_2O_7$ + $H_2SO_4 \longrightarrow$ green colour solution : [X] and [Y] are :

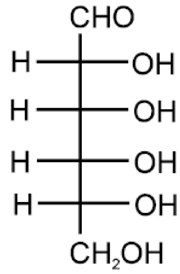
a) SO_3^{2-}, SO_2 **b)** Cl^-, HCl **c)** S^{2-}, H_2S **d)** SO_3^{2-}, CO_2

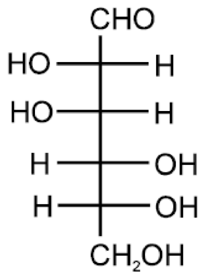
Q27 Which of the following is not a pyrimidine base?
a) Uracil **b)** Guanine **c)** Cytosine **d)** Thymine

Q28 Which of the following is a C-3 epimer of D-glucose.

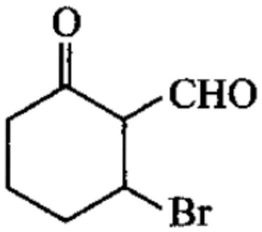
a)


b)


c)


d)


Q29 Correct IUPAC name of the following compound is



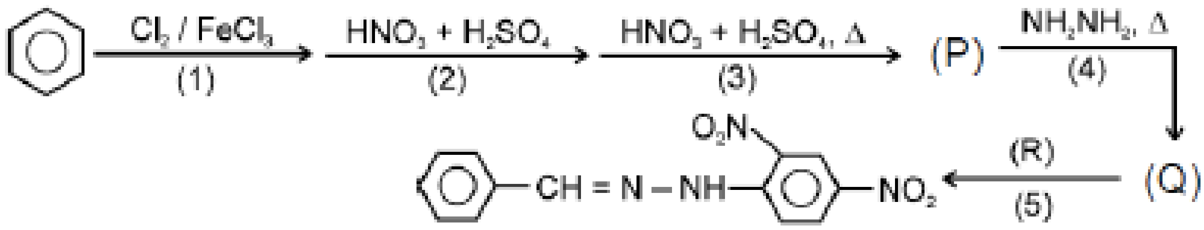
a) 2-bromo-6-oxocyclohexanecarbaldehyde
b) 6-bromo-2-oxocyclohexanecarbaldehyde **c)** 3-bromo-2-fomylcyclohexanone
d) 6-bromo-2-oxocyclohexylmethanal

Q30 In order to oxidise a mixture of one mole of each of FeC_2O_4, $Fe_2(C_2O_4)_3$, $FeSO_4$ and $Fe_2(SO_4)_3$ in acidic medium, the number of moles of $KMnO_4$ required is
a) 1.5 **b)** 2 **c)** 3 **d)** 1

Q31 If first dissociation of $X(OH)_3$ is 100% where as second dissociation is 50% and third dissociation is negligible then the pH of 4×10^{-3} M $X(OH)_3$ is :

a) 11.78 **b)** 10.78 **c)** 2.5 **d)** 2.22

Q32 The correct statement/s about the following reaction sequence is / are



a) 'R' gives an aldol condensation reaction on heating with NaOH solution

b) The compound 'Q' gives a white precipitate in acetone

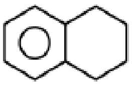
c) Step '4' is an aromatic nucleophilic substitution reaction

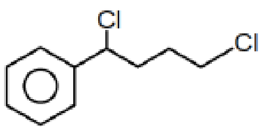
d) The end product is a mixture of three compounds

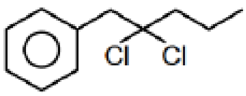
Q33 Ammonium molybdate is used for detection of which element in organic compound:

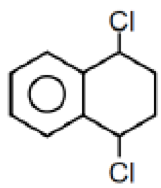
a) C **b)** N **c)** P **d)** S

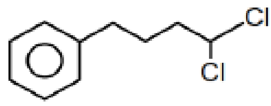
Q34 An aromatic compound (P) $C_{10}H_{12}Cl_2$ on hydrolysis with aqueous KOH gives (Q). Compound Q on reduction with $NaBH_4$ gives (R). R in acidic medium gives a bicyclic product “S'.

If product “S'  is then compound “P' will be –

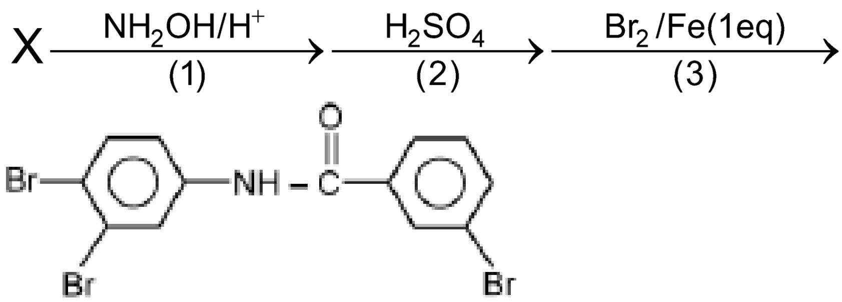
a) 

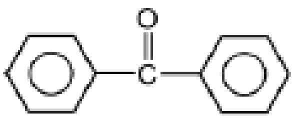
b) 

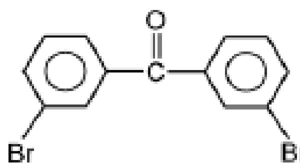
c) 

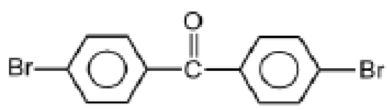
d) 

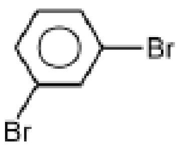
Q35 Observe the following reactions. In this series the compound 'X' can be :



a) 

b) 

c) 

d) 

Q36 Reaction-I :

$$\text{Phenol} \xrightarrow{\text{NaOH}} X \xrightarrow[140^\circ C]{CO_2} Y \xrightarrow{\text{HCl}} Z \xrightarrow[\Delta]{\text{sodalime}} P$$

Reaction- II :

$$\text{Phenol} \xrightarrow[\text{NaOH}]{CCl_4} X \xrightarrow{\text{HCl}} Y \xrightarrow[\Delta]{\text{sodalime}} Q$$

Wrong statement about P and Q is –

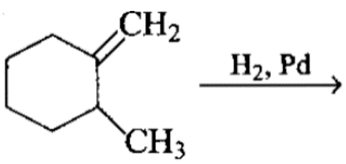
a) Both the compounds give violet colour with $FeCl_3$

b) Both the compounds on deoxygenation give benzene

c) Both the compounds contain phenolic -OH group

d) Compound P is phenol and Q is cresol

Q37



Products of the above reaction will be :

a) racemic mixture **b)** diastereomers **c)** meso **d)** structural isomer

Q38 Give the correct order of initials T or F for following statements. Use T if statement is true and F if it is false.

I. Me–CH=C=C=CH–Br is optically active.

II. All optically active compound are chiral.

III. All chiral pyramidal molecules are optically inactive.

IV. $CH_3–CH_2–CH_2–COOH$ and $CH_3-\underset{\large COOH}{\underset{|}{CH}}-CH_3$ are positional isomers.

a) TTTF **b)** FTFT **c)** FTFF **d)** TFTT

Q39 Calculate ΔS for following process :

$$\underset{\text{at}100\text{K}}{X(s)} \longrightarrow \underset{\text{at } 200\text{ K}}{X(l)}$$

Given : Melting point of

$$X_{(s)} = 100\text{K}; \Delta H_{\text{Fusion}} = 20\text{kJ/mol}; C_{p,\text{m}}(X,l) = 10\text{J/mol.K}$$

a) 26.93J/K **b)** 206.93J/K **c)** 203J/K **d)** 206.93kJ/K

Q40 When an ideal diatomic gas is a heated at a constant pressure, the fraction of heat energy supplied which increases the internal energy of the gas is

a) $\frac{2}{5}$ **b)** $\frac{3}{5}$ **c)** $\frac{5}{7}$ **d)** $\frac{3}{7}$

Q41 The equilibrium, SO_2Cl_2 (g) $\rightleftharpoons$ SO_2 (g) + Cl_2 (g) is attained at 298 K in a closed container and an inert gas, He is introduced. Which of the following is/are correct ?

a) Concentration of SO_2 (g), Cl_2 (g) and SO_2 Cl_2 (g) remain unchanged

b) More Cl_2 (g) is formed **c)** Concentration of SO_2 (g) is reduced

d) More SO_2Cl_2 (g) is formed

Q42 Which one of the following statements is correct?

a) The elements having large negative values of electron gain enthalpy generally act as strong oxidising agents.

b) The elements having low values of ionisation enthalpies act as strong reducing agents

c) The formation of S^{2-}(g) from S(g) is an endothermic process. **d)** All of these

Q43 If the equilibrium constant for the reaction $H^+(aq) + OH^-(aq) \rightleftharpoons H_2O(l)$ is 10^{13} at certain temperature then what is the E° for the reaction,

$2H_2O(l) + 2e^- \rightleftharpoons H_2(g) + 2OH^-(aq)$ Given : $\frac{2.303RT}{F} = 0.066$

a) 1.230 V **b)** -0.858 V **c)** -0.80 V **d)** -0.8274 V

Q44 The species that can have a trans-isomer is :
(en = ethane-1, 2-diamine, ox = oxalate)

a) $[Zn(en)Cl_2]$ **b)** $[Pt(en)Cl_2]$ **c)** $[Cr(en)_2(ox)]^+$ **d)** $[Pt(en)_2Cl_2]^{2+}$

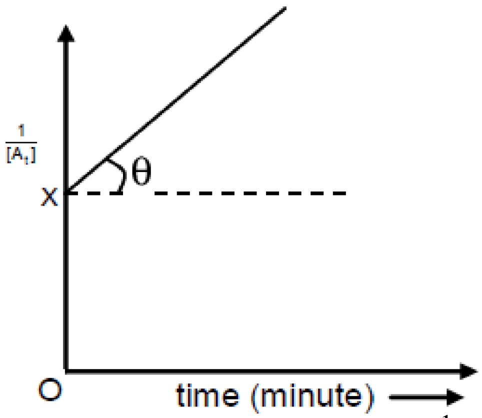
Q45 The ONO angle is maximum in :

a) HNO_3 **b)** NO_2^+ **c)** HNO_2 **d)** NO_2

Numerical

Q46

For a second order reaction $A \longrightarrow$Product, the graph is plotted against $\frac{1}{[A_t]}$ and time 't'



tan θ = 1 and OX = 3L $mole^{-1}$. The rate of reaction (in M min–1) at beginning is X then 9X is

Q47 A 1.0 g sample of $Co(NH_2CH_2CH_2NH_2)_3\ CI_3$ is dissolved in 25.0 g of water and the freezing point of the solution is –0.87°C. How may ions are produced per mole of compound? The K_f of water is 1.86°C/ molal

Q48 How many of the following are mixed anhydride ?
Cl_2O_7 , Cl_2O_3 , ClO_2 , Cl_2O_5, SO_2, NO_2, N_2O_5, I_2O_5, Cl_2O

Q49 A perfect gas undergoes a reversible adiabatic expansion from (300K, 200atm) to (90K,10 atm). Find the atomicity of gas.

Q50 In Tollen's test for aldehyde, the overall number of electron(s) transferred to the Tollen's reagent formula $[Ag(NH_3)_2]^+$ per aldehyde group to form silver mirror is________.(Round off to the Nearest integer)

Mathematics

Single Choice Question

Q51 Let x = sin 1°, then the value of the expression $\frac{1}{\cos 0^\circ \cdot \cos 1^\circ}+\frac{1}{\cos 1^\circ \cdot \cos 2^\circ}+\frac{1}{\cos 2^\circ \cdot \cos 3^\circ}+\ldots+\frac{1}{\cos 44^\circ \cdot \cos 45^\circ}$ is equal to

a) x
b) $\frac{1}{x}$
c) $\frac{\sqrt{2}}{x}$
d) $\frac{x}{\sqrt{2}}$

Q52 The value of k so that the lines
x + ky + 2 = 0
3x + 2y + 1 = 0
2x + y + 2 = 0 form a triangle is

a) $k \in \left\{\frac{2}{5}, \frac{2}{3}, \frac{3}{4}\right\}$
b) $k \in \left\{\frac{1}{4}, \frac{2}{3}, \frac{3}{4}\right\}$
c) $k \in \left\{\frac{1}{4}, \frac{2}{3}, \frac{1}{2}\right\}$
d) $k \in R - \left\{\frac{1}{4}, \frac{2}{3}, \frac{1}{2}\right\}$

Q53 If $f(x) = x^3 + 2x^2 + 3x + 4$ and g (x) is the inverse of f(x) then g'' (4) is equal to

a) $\frac{1}{4}$
b) 0
c) $\frac{1}{3}$
d) $-\frac{4}{27}$

Q54 z_1, z_2, z_3, z_4 are distinct complex numbers representing the vertices of a quadrilateral ABCD taken in order. If $z_1 - z_4 = z_2 - z_3$ and $\arg \frac{z_4 - z_1}{z_2 - z_1} = \frac{\pi}{2}$, then the quadrilateral is

a) rectangle
b) rhombus
c) trapezium
d) parallelogram but not rectangle

Q55 A coin is tossed 7 times. Then the probability that at least 4 consecutive heads appear is

a) 3/16
b) 5/32
c) -3/16
d) 1/8

Q56 x_1 and x_2 are the roots of $ax^2 + bx + c = 0$ and $x_1x_2 < 0$. Roots of $x_1(x - x_2)^2 + x_2(x - x_1)^2 = 0$ are

a) real and of opposite sign
b) negative
c) positive
d) non-real

Q57 If $\lim_{x\to 0}\left(x^{-3}\sin 3x + ax^{-2} + b\right)$ exists and is equal to 0, then

a) a = –3 and b = 9/2
b) a = 3 and b = 9/2
c) a = –3 and b = –9/2
d) a = 3 and b = –9/2

Q58 The value of $\cos^{-1}\left[\cot\left\{\sin^{-1}\left(\sqrt{\frac{2-\sqrt{3}}{4}}\right)+\cos^{-1}\left(\frac{\sqrt{12}}{4}\right)+\sec^{-1}(\sqrt{2})\right\}\right]$ is

a) 0
b) $\frac{\pi}{4}$
c) $\frac{\pi}{3}$
d) $\frac{\pi}{2}$

Q59 Let $f(x)=\lim_{n\to\infty}\frac{\log(2+x)-x^{2n}\sin x}{1+x^{2n}}$. Then

a) f is continuous at x = 1
b) $\lim_{x\to1^+} f(x)=\log 3$
c) $\lim_{x\to1^+} f(x)=-\sin 1$
d) $\lim_{x\to1^-} f(x)$ does not exist

Q60 If $I=\int_0^x \frac{t^2}{(x-\sin x)\sqrt{a+t}}$ and $\lim_{x\to0} I=1$, then a is equal to

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

Q61 The area of the region whose boundaries are defined by the curves y = 2 cos x, y = 3 tan x, and the y-axis is

a) $1+3\ln\left(\frac{2}{\sqrt{3}}\right)$ sq. units
b) $1+\frac{3}{2}\ln 3-3\ln 2$ sq. units
c) $1+\frac{3}{2}$ In 3 – In 2 sq. units
d) In 3 – In 2 sq. units

Q62 A relation R is defined on the set of circles such that "$C_1RC_2 \Rightarrow$ circle C_1 and circle C_2 touch each other externally", then relation R is

a) Reflexive and symmetric but not transitive
b) Symmetric only
c) Symmetric and transitive but not reflexive
d) Equivalence

Q63 The point on the line $\frac{x-2}{1}=\frac{y+3}{-2}=\frac{z+5}{-2}$ at a distance of 6 from the point $(2,-3,-5)$ is

a) $(3,-5,-3)$ **b)** $(4,-7,-9)$ **c)** $(0,2,-1)$ **d)** $(-3,5,3)$

Q64 Solution of the differential equation y (axy + e^x) dx – e^xdy = 0 where y (0) = 1 is

a) $y(2-ax^2)=2e^x$
b) $ax^2y-2e^x=2y$
c) $ax^2y+2+2ye^x=0$
d) $x(2-ax)=2y^2$

Q65 The focal distance of a point on the parabola $y^2 = 4x$, which lies above its axis, is 10 units. If coordinates of the point are (h, k), then h + k is equal to

a) 10 **b)** 12 **c)** 15 **d)** 18

Q66 Find the absolute value of parameter t for which the area of the triangle whose vertices are A (–1,1,2); B (1,2,3) and C (t, 1,1) is minimum.

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

Q67 An ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1\,(a>b)$ passes through the point (–3, 1) and its eccentricity is $\sqrt{\frac{2}{5}}$. Then length of latus rectum is

a) $\frac{8}{5}\sqrt{6}$ **b)** $\frac{9}{5}\sqrt{6}$ **c)** $\frac{8}{3}\sqrt{6}$ **d)** $\frac{9}{5}\sqrt{3}$

Q68 The coefficient of x^{65} in the expansion of $(1 + x)^{131}\,(x^2 – x + 1)^{130}$ is

a) ${}^{130}C_{65} + {}^{129}C_{66}$ **b)** ${}^{130}C_{65} + {}^{129}C_{55}$ **c)** ${}^{130}C_{66} + {}^{129}C_{65}$ **d)** None of these

Q69 The Range of f(x) = (x + 1) (x + 2)(x + 3) (x + 4) + 5 for x ∈ [–6, 6] is

a) [4, 5045] **b)** [0, 5045] **c)** [–20, 5045] **d)** none of these

Q70 $\int \frac{\sqrt{x}\left(2x^2+3\right)dx}{\left(x^3+2x^2+1\right)^{3/2}} =$ (where c is arbitrary constant)

a) $\frac{2x\sqrt{x}}{\sqrt{x^3+2x^2+1}}+c$ **b)** $\frac{2\sqrt{x}}{\sqrt{x^3+2x^2+1}}+c$ **c)** $\frac{2x\sqrt{x}}{(x^3+2x^2+1)^{3/2}}+c$

d) $\frac{2\sqrt{x}}{(x^3+2x^2+1)^{3/2}}+c$

Numerical

Q71 Let $a + ar_1 + ar_1^2 + \ldots + \infty$ and $a + ar_2 + ar_2^2 + \ldots + \infty$ be two infinite series of positive numbers with the same first term. The sum of the first series is r_1 and the sum of the second series is r_2. Then the value of $(r_1 + r_2)$ is.

Q72 A boy has 3 library tickets and 8 books of his interest in the library including mathematics part-I and mathematics part-II. Of these 8, he does not want to borrow mathematics part II, unless mathematics part I is also borrowed. Then number of ways of borrowing the three books are.

Q73 The extremities of the diagonal of rectangle are (–4, 4) and (6, –1). A circle cirumscribes the rectangle and cuts intercept of length AB on they y-axis. The length of AB is

Q74 Let three matrices $A=\begin{bmatrix}2 & 1\\ 4 & 1\end{bmatrix}; B=\begin{bmatrix}3 & 4\\ 2 & 3\end{bmatrix}$ and $C=\begin{bmatrix}3 & -4\\ -2 & 3\end{bmatrix}$ the

$$t_r(A)+t_r\left(\frac{ABC}{2}\right)+t_r\left(\frac{A(BC)^2}{4}\right)+t_r\left(\frac{A(BC)^3}{8}\right)+\ldots\ldots=$$

Q75 For a certain curve y = f (x) satisfying $\frac{d^2y}{dx^2} = 6x - 4, f(x)$ has a local minimum value 5 when x = 1. Then global maximum value of f(x), if $0 \le x \le 2$, is

Answer Key

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