

Q.2 When photon of energy 4.0 eV strikes the surface of a metal A, the ejected photoelectrons have maximum kinetic energy T_A eV and de-Broglie wavelength λ_A . The maximum kinetic energy of photoelectrons liberated from another metal B by photon of energy 4.50 eV is $T_B = (T_A - 1.5)$ eV. If the de-Broglie wavelength of these photoelectrons $\lambda_B = 2\lambda_A$, then the work function of metal B is :

- Options**
1. 3 eV
 2. 2 eV
 3. 4 eV
 4. 1.5 eV

Question Type : **MCQ**
Question ID : **4050361485**
Option 1 ID : **4050365432**
Option 2 ID : **4050365433**
Option 3 ID : **4050365431**
Option 4 ID : **4050365430**
Status : **Answered**
Chosen Option : **3**

Q.3 The length of a potentiometer wire is 1200 cm and it carries a current of 60 mA. For a cell of emf 5 V and internal resistance of 20Ω , the null point on it is found to be at 1000 cm. The resistance of whole wire is :

- Options**
1. 120Ω
 2. 60Ω
 3. 80Ω
 4. 100Ω

Question Type : **MCQ**
Question ID : **4050361488**
Option 1 ID : **4050365445**
Option 2 ID : **4050365442**
Option 3 ID : **4050365443**
Option 4 ID : **4050365444**
Status : **Answered**
Chosen Option : **4**

Q.4 Proton with kinetic energy of 1 MeV moves from south to north. It gets an acceleration of 10^{12} m/s^2 by an applied magnetic field (west to east). The value of magnetic field : (Rest mass of proton is $1.6 \times 10^{-27} \text{ kg}$)

Options

1. 71 mT
2. 7.1 mT
3. 0.071 mT
4. 0.71 mT

Question Type : **MCQ**

Question ID : **4050361480**

Option 1 ID : **4050365410**

Option 2 ID : **4050365411**

Option 3 ID : **4050365413**

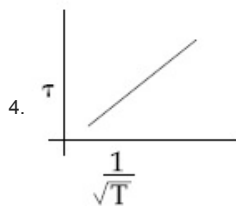
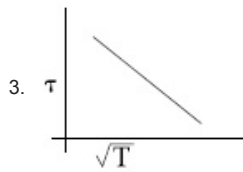
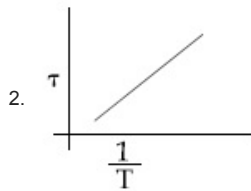
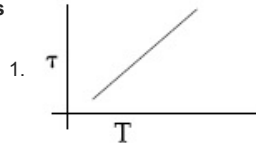
Option 4 ID : **4050365412**

Status : **Answered**

Chosen Option : **4**

Q.5 The plot that depicts the behavior of the mean free time τ (time between two successive collisions) for the molecules of an ideal gas, as a function of temperature (T), qualitatively, is: (Graphs are schematic and not drawn to scale)

Options



Question Type : MCQ

Question ID : 4050361477

Option 1 ID : 4050365398

Option 2 ID : 4050365401

Option 3 ID : 4050365399

Option 4 ID : 4050365400

Status : Answered

Chosen Option : 4

Q.6 Consider a uniform rod of mass $M=4m$ and length l pivoted about its centre. A mass m moving with velocity v making angle $\theta = \frac{\pi}{4}$ to the rod's long axis collides with one end of the rod and sticks to it. The angular speed of the rod-mass system just after the collision is :

- Options
1. $\frac{3}{7\sqrt{2}} \frac{v}{l}$
 2. $\frac{3\sqrt{2}}{7} \frac{v}{l}$
 3. $\frac{4}{7} \frac{v}{l}$
 4. $\frac{3}{7} \frac{v}{l}$

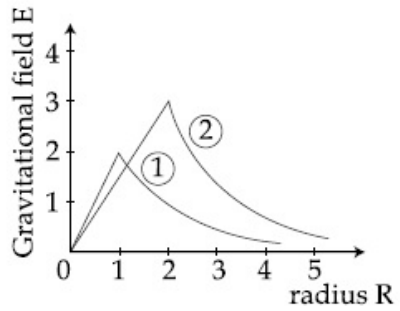
Question Type : **MCQ**
 Question ID : **4050361472**
 Option 1 ID : **4050365379**
 Option 2 ID : **4050365380**
 Option 3 ID : **4050365381**
 Option 4 ID : **4050365378**
 Status : **Answered**
 Chosen Option : **2**

Q.7 The dimension of stopping potential V_0 in photoelectric effect in units of Planck's constant 'h', speed of light 'c' and Gravitational constant 'G' and ampere A is :

- Options
1. $h^2 G^{3/2} c^{1/3} A^{-1}$
 2. $h^{-2/3} c^{-1/3} G^{4/3} A^{-1}$
 3. $h^{1/3} G^{2/3} c^{1/3} A^{-1}$
 4. $h^{2/3} c^{5/3} G^{1/3} A^{-1}$

Question Type : **MCQ**
 Question ID : **4050361469**
 Option 1 ID : **4050365366**
 Option 2 ID : **4050365369**
 Option 3 ID : **4050365367**
 Option 4 ID : **4050365368**
 Status : **Marked For Review**
 Chosen Option : **4**

Q.8 Consider two solid spheres of radii $R_1=1\text{m}$, $R_2=2\text{m}$ and masses M_1 and M_2 , respectively. The gravitational field due to sphere (1) and (2) are shown. The value of $\frac{M_1}{M_2}$ is :



- Options
1. $\frac{1}{2}$
 2. $\frac{2}{3}$
 3. $\frac{1}{3}$
 4. $\frac{1}{6}$

Question Type : MCQ

Question ID : 4050361473

Option 1 ID : 4050365384

Option 2 ID : 4050365385

Option 3 ID : 4050365383

Option 4 ID : 4050365382

Status : Answered

Chosen Option : 4

Q.9 In finding the electric field using Gauss law

the formula $|\vec{E}| = \frac{q_{enc}}{\epsilon_0 A}$ is applicable. In

the formula ϵ_0 is permittivity of free space, A is the area of Gaussian surface and q_{enc} is charge enclosed by the Gaussian surface.

This equation can be used in which of the following situation ?

- Options
1. Only when the Gaussian surface is an equipotential surface.
 2. Only when $|\vec{E}| = \text{constant}$ on the surface.
 3. For any choice of Gaussian surface.
Only when the Gaussian surface is an
 4. equipotential surface and $|\vec{E}|$ is constant on the surface.

Question Type : MCQ

Question ID : 4050361481

Option 1 ID : 4050365415

Option 2 ID : 4050365417

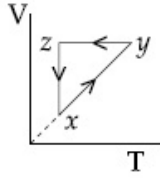
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Option 4 ID : 4050365416

Status : Answered

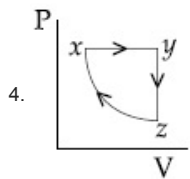
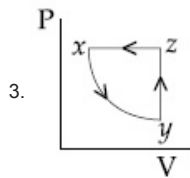
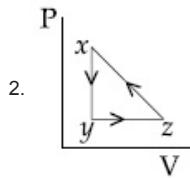
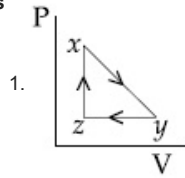
Chosen Option : 3

Q.10 A thermodynamic cycle $xyzx$ is shown on a V-T diagram.



The P-V diagram that best describes this cycle is : (Diagrams are schematic and not to scale)

Options



Question Type : MCQ

Question ID : 4050361476

Option 1 ID : 4050365397

Option 2 ID : 4050365396

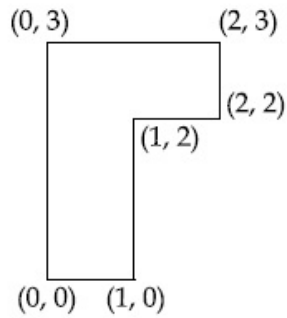
Option 3 ID : 4050365394

Option 4 ID : 4050365395

Status : Answered

Chosen Option : 4

Q.11 The coordinates of centre of mass of a uniform flag shaped lamina (thin flat plate) of mass 4 kg. (The coordinates of the same are shown in figure) are :



- Options**
1. (1.25 m, 1.50 m)
 2. (1 m, 1.75 m)
 3. (0.75 m, 0.75 m)
 4. (0.75 m, 1.75 m)

Question Type : **MCQ**
Question ID : **4050361471**
Option 1 ID : **4050365377**
Option 2 ID : **4050365376**
Option 3 ID : **4050365375**
Option 4 ID : **4050365374**
Status : **Answered**
Chosen Option : **4**

Q.12 The magnifying power of a telescope with tube length 60 cm is 5. What is the focal length of its eye piece ?

- Options**
1. 30 cm
 2. 40 cm
 3. 20 cm
 4. 10 cm

Question Type : **MCQ**
Question ID : **4050361484**
Option 1 ID : **4050365428**
Option 2 ID : **4050365429**
Option 3 ID : **4050365427**
Option 4 ID : **4050365426**
Status : **Answered**
Chosen Option : **4**

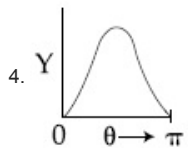
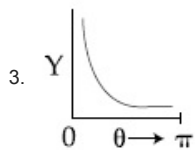
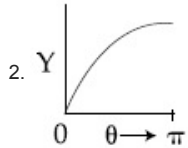
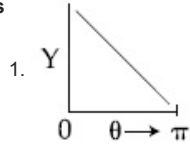
Q.13 The graph which depicts the results of Rutherford gold foil experiment with α -particles is :

θ : Scattering angle

Y : Number of scattered α -particles detected

(Plots are schematic and not to scale)

Options



Question Type : MCQ

Question ID : 4050361486

Option 1 ID : 4050365434

Option 2 ID : 4050365435

Option 3 ID : 4050365437

Option 4 ID : 4050365436

Status : Answered

Chosen Option : 3

Q.14 A particle of mass m is fixed to one end of a light spring having force constant k and unstretched length l . The other end is fixed. The system is given an angular speed ω about the fixed end of the spring such that it rotates in a circle in gravity free space. Then the stretch in the spring is :

Options

1. $\frac{m\omega^2}{k + m\omega^2}$

2. $\frac{m\omega^2}{k - m\omega^2}$

3. $\frac{m\omega^2}{k - \omega m}$

4. $\frac{m\omega^2}{k + m\omega}$

Question Type : MCQ

Question ID : 4050361470

Option 1 ID : 4050365370

Option 2 ID : 4050365371

Option 3 ID : 4050365373

Option 4 ID : 4050365372

Status : Answered

Chosen Option : 2

Q.15 The critical angle of a medium for a specific wavelength, if the medium has relative permittivity 3 and relative permeability $\frac{4}{3}$ for this wavelength, will be :

Options 1. 60°

2. 15°

3. 45°

4. 30°

Question Type : MCQ

Question ID : 4050361483

Option 1 ID : 4050365424

Option 2 ID : 4050365425

Option 3 ID : 4050365423

Option 4 ID : 4050365422

Status : Answered

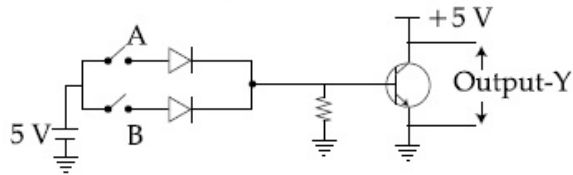
Chosen Option : 4

Q.16 A leak proof cylinder of length 1 m, made of a metal which has very low coefficient of expansion is floating vertically in water at 0°C such that its height above the water surface is 20 cm. When the temperature of water is increased to 4°C , the height of the cylinder above the water surface becomes 21 cm. The density of water at $T=4^{\circ}\text{C}$, relative to the density at $T=0^{\circ}\text{C}$ is close to :

- Options**
1. 1.01
 2. 1.04
 3. 1.03
 4. 1.26

Question Type : **MCQ**
 Question ID : **4050361475**
 Option 1 ID : **4050365391**
 Option 2 ID : **4050365390**
 Option 3 ID : **4050365393**
 Option 4 ID : **4050365392**
 Status : **Answered**
 Chosen Option : 1

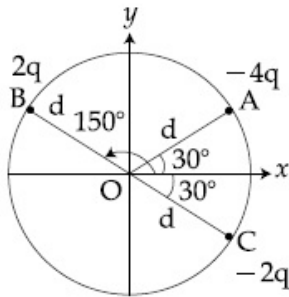
Q.17 Boolean relation at the output stage-Y for the following circuit is :



- Options**
1. $A + B$
 2. $\bar{A} + \bar{B}$
 3. $\bar{A} \cdot \bar{B}$
 4. $A \cdot B$

Question Type : **MCQ**
 Question ID : **4050361487**
 Option 1 ID : **4050365438**
 Option 2 ID : **4050365440**
 Option 3 ID : **4050365441**
 Option 4 ID : **4050365439**
 Status : **Answered**
 Chosen Option : 1

- Q.18 Three charged particles A, B and C with charges $-4q$, $2q$ and $-2q$ are present on the circumference of a circle of radius d . The charged particles A, C and centre O of the circle formed an equilateral triangle as shown in figure. Electric field at O along x -direction is :



Options

1. $\frac{2\sqrt{3}q}{\pi\epsilon_0 d^2}$
2. $\frac{\sqrt{3}q}{4\pi\epsilon_0 d^2}$
3. $\frac{3\sqrt{3}q}{4\pi\epsilon_0 d^2}$
4. $\frac{\sqrt{3}q}{\pi\epsilon_0 d^2}$

Question Type : MCQ

Question ID : 4050361478

Option 1 ID : 4050365404

Option 2 ID : 4050365402

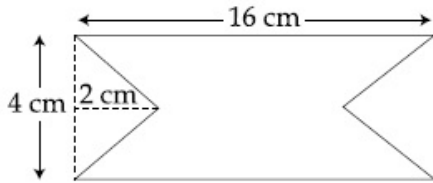
Option 3 ID : 4050365403

Option 4 ID : 4050365405

Status : Answered

Chosen Option : 4

Q.19 At time $t=0$ magnetic field of 1000 Gauss is passing perpendicularly through the area defined by the closed loop shown in the figure. If the magnetic field reduces linearly to 500 Gauss, in the next 5 s, then induced EMF in the loop is :



- Options
1. $36 \mu\text{V}$
 2. $48 \mu\text{V}$
 3. $56 \mu\text{V}$
 4. $28 \mu\text{V}$

Question Type : MCQ

Question ID : 4050361482

Option 1 ID : 4050365419

Option 2 ID : 4050365420

Option 3 ID : 4050365421

Option 4 ID : 4050365418

Status : Answered

Chosen Option : 3

Q.20 Effective capacitance of parallel combination of two capacitors C_1 and C_2 is $10 \mu\text{F}$. When these capacitors are individually connected to a voltage source of 1 V, the energy stored in the capacitor C_2 is 4 times that of C_1 . If these capacitors are connected in series, their effective capacitance will be :

- Options
1. $3.2 \mu\text{F}$
 2. $8.4 \mu\text{F}$
 3. $1.6 \mu\text{F}$
 4. $4.2 \mu\text{F}$

Question Type : MCQ

Question ID : 4050361479

Option 1 ID : 4050365408

Option 2 ID : 4050365406

Option 3 ID : 4050365409

Option 4 ID : 4050365407

Status : Answered

Chosen Option : 3

Q.21 Four resistances of $15\ \Omega$, $12\ \Omega$, $4\ \Omega$ and $10\ \Omega$ respectively in cyclic order to form Wheatstone's network. The resistance that is to be connected in parallel with the resistance of $10\ \Omega$ to balance the network is _____ Ω .

Given 10.00
Answer :

Question Type : SA
Question ID : 4050361492
Status : Answered

Q.22 A point object in air is in front of the curved surface of a *plano-convex* lens. The radius of curvature of the curved surface is 30 cm and the refractive index of the lens material is 1.5, then the focal length of the lens (in cm) is _____.

Given 60.00
Answer :

Question Type : SA
Question ID : 4050361493
Status : Answered

Q.23 A body A, of mass $m = 0.1\ \text{kg}$ has an initial velocity of $3\hat{i}\ \text{ms}^{-1}$. It collides elastically with another body, B of the same mass which has an initial velocity of $5\hat{j}\ \text{ms}^{-1}$. After collision, A moves with a velocity $\vec{v} = 4(\hat{i} + \hat{j})$. The energy of B after collision is written as $\frac{x}{10}\ \text{J}$. The value of x is _____.

Given 1.00
Answer :

Question Type : SA
Question ID : 4050361490
Status : Answered

Q.24 A particle is moving along the x -axis with its coordinate with time ' t ' given by $x(t) = 10 + 8t - 3t^2$. Another particle is moving along the y -axis with its coordinate as a function of time given by $y(t) = 5 - 8t^3$. At $t = 1$ s, the speed of the second particle as measured in the frame of the first particle is given as \sqrt{v} . Then v (in m/s) is _____.

Given **580.00**

Answer :

Question Type : SA
Question ID : 4050361489
Status : Answered

Q.25 A one metre long (both ends open) organ pipe is kept in a gas that has double the density of air at STP. Assuming the speed of sound in air at STP is 300 m/s, the frequency difference between the fundamental and second harmonic of this pipe is _____ Hz.

Given **106.05**

Answer :

Question Type : SA
Question ID : 4050361491
Status : Answered

Section : Chemistry

Q.1 A flask contains a mixture of isohexane and 3-methylpentane. One of the liquids boils at 63 °C while the other boils at 60 °C. What is the best way to separate the two liquids and which one will be distilled out first ?

- Options**
1. simple distillation, 3-methylpentane
 2. simple distillation, isohexane
 3. fractional distillation, isohexane
 4. fractional distillation, 3-methylpentane

Question Type : **MCQ**

Question ID : **4050361508**

Option 1 ID : **4050365510**

Option 2 ID : **4050365509**

Option 3 ID : **4050365507**

Option 4 ID : **4050365508**

Status : **Answered**

Chosen Option : **4**

Q.2 The first ionization energy (in kJ/mol) of Na, Mg, Al and Si respectively, are :

- Options**
1. 496, 737, 577, 786
 2. 786, 737, 577, 496
 3. 496, 577, 737, 786
 4. 496, 577, 786, 737

Question Type : **MCQ**

Question ID : **4050361500**

Option 1 ID : **4050365477**

Option 2 ID : **4050365476**

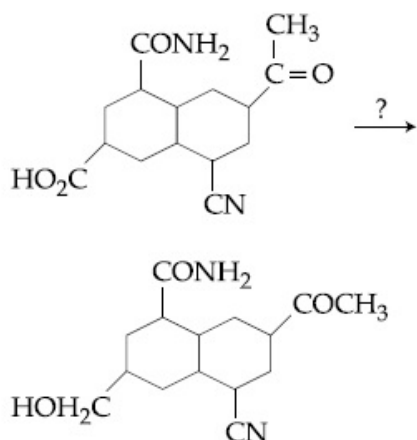
Option 3 ID : **4050365475**

Option 4 ID : **4050365478**

Status : **Answered**

Chosen Option : **1**

Q.3 The most suitable reagent for the given conversion is :



- Options
1. LiAlH₄
 2. NaBH₄
 3. H₂/Pd
 4. B₂H₆

Question Type : MCQ

Question ID : 4050361507

Option 1 ID : 4050365503

Option 2 ID : 4050365506

Option 3 ID : 4050365505

Option 4 ID : 4050365504

Status : Answered

Chosen Option : 4

Q.4 The third ionization enthalpy is minimum for :

- Options
1. Fe
 2. Ni
 3. Co
 4. Mn

Question Type : MCQ

Question ID : 4050361504

Option 1 ID : 4050365493

Option 2 ID : 4050365491

Option 3 ID : 4050365494

Option 4 ID : 4050365492

Status : Answered

Chosen Option : 1

Q.5 The predominant intermolecular forces present in ethyl acetate, a liquid, are :

- Options**
1. hydrogen bonding and London dispersion
 2. Dipole-dipole and hydrogen bonding
 3. London dispersion and dipole-dipole
 4. London dispersion, dipole-dipole and hydrogen bonding

Question Type : **MCQ**
Question ID : **4050361497**
Option 1 ID : **4050365463**
Option 2 ID : **4050365465**
Option 3 ID : **4050365466**
Option 4 ID : **4050365464**
Status : **Answered**
Chosen Option : **3**

Q.6 The strength of an aqueous NaOH solution is *most accurately* determined by titrating :
(Note : consider that an appropriate indicator is used)

- Options**
1. Aq. NaOH in a volumetric flask and concentrated H_2SO_4 in a conical flask
 2. Aq. NaOH in a pipette and aqueous oxalic acid in a burette
 3. Aq. NaOH in a burette and concentrated H_2SO_4 in a conical flask
 4. Aq. NaOH in a burette and aqueous oxalic acid in a conical flask

Question Type : **MCQ**
Question ID : **4050361501**
Option 1 ID : **4050365479**
Option 2 ID : **4050365482**
Option 3 ID : **4050365480**
Option 4 ID : **4050365481**
Status : **Answered**
Chosen Option : **1**

Q.7 The complex that can show *fac*- and *mer*- isomers is :

- Options
1. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 2. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$
 3. $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$
 4. $[\text{CoCl}_2(\text{en})_2]$

Question Type : MCQ

Question ID : 4050361505

Option 1 ID : 4050365498

Option 2 ID : 4050365497

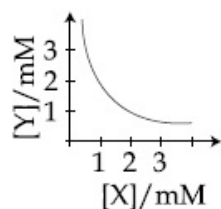
Option 3 ID : 4050365495

Option 4 ID : 4050365496

Status : Answered

Chosen Option : 3

Q.8 The stoichiometry and solubility product of a salt with the solubility curve given below is, respectively :



- Options
1. $\text{X}_2\text{Y}, 2 \times 10^{-9} \text{M}^3$
 2. $\text{XY}_2, 1 \times 10^{-9} \text{M}^3$
 3. $\text{XY}_2, 4 \times 10^{-9} \text{M}^3$
 4. $\text{XY}, 2 \times 10^{-6} \text{M}^3$

Question Type : MCQ

Question ID : 4050361494

Option 1 ID : 4050365453

Option 2 ID : 4050365454

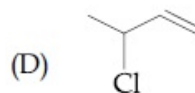
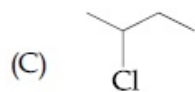
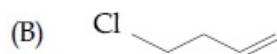
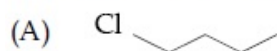
Option 3 ID : 4050365452

Option 4 ID : 4050365451

Status : Answered

Chosen Option : 4

Q.9 The decreasing order of reactivity towards dehydrohalogenation (E_1) reaction of the following compounds is :



- Options
1. $B > D > A > C$
 2. $B > D > C > A$
 3. $D > B > C > A$
 4. $B > A > D > C$

Question Type : MCQ

Question ID : 4050361512

Option 1 ID : 4050365526

Option 2 ID : 4050365523

Option 3 ID : 4050365524

Option 4 ID : 4050365525

Status : Answered

Chosen Option : 2

Q.10 The number of bonds between sulphur and oxygen atoms in $S_2O_8^{2-}$ and the number of bonds between sulphur and sulphur atoms in rhombic sulphur, respectively, are :

- Options
1. 4 and 8
 2. 4 and 6
 3. 8 and 8
 4. 8 and 6

Question Type : MCQ

Question ID : 4050361503

Option 1 ID : 4050365488

Option 2 ID : 4050365487

Option 3 ID : 4050365490

Option 4 ID : 4050365489

Status : Answered

Chosen Option : 3

Q.11 The rate of a certain biochemical reaction at physiological temperature (T) occurs 10^6 times faster with enzyme than without. The change in the activation energy upon adding enzyme is :

- Options**
1. $-6RT$
 2. $+6RT$
 3. $+6(2.303)RT$
 4. $-6(2.303)RT$

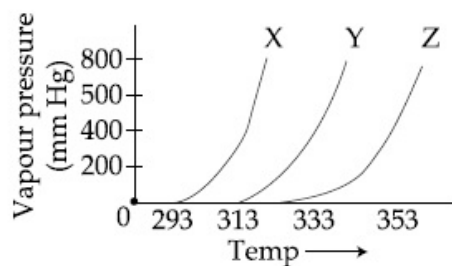
Question Type : **MCQ**
Question ID : **4050361495**
Option 1 ID : **4050365455**
Option 2 ID : **4050365457**
Option 3 ID : **4050365458**
Option 4 ID : **4050365456**
Status : **Answered**
Chosen Option : **4**

Q.12 Which of the following statement is not true for glucose ?

- Options** The pentaacetate of glucose does not
1. react with hydroxylamine to give oxime
 2. Glucose gives Schiff's test for aldehyde
 3. Glucose exists in two crystalline forms α and β
 4. Glucose reacts with hydroxylamine to form oxime

Question Type : **MCQ**
Question ID : **4050361510**
Option 1 ID : **4050365515**
Option 2 ID : **4050365517**
Option 3 ID : **4050365518**
Option 4 ID : **4050365516**
Status : **Answered**
Chosen Option : **2**

Q.13 A graph of vapour pressure and temperature for three different liquids X, Y, and Z is shown below :



The following inferences are made :

- (A) X has higher intermolecular interactions compared to Y.
- (B) X has lower intermolecular interactions compared to Y.
- (C) Z has lower intermolecular interactions compared to Y.

The correct inference(s) is/are :

- Options
1. (A)
 2. (C)
 3. (B)
 4. (A) and (C)

Question Type : MCQ

Question ID : 4050361499

Option 1 ID : 4050365471

Option 2 ID : 4050365473

Option 3 ID : 4050365472

Option 4 ID : 4050365474

Status : Answered

Chosen Option : 3

Q.14 Among the gases (a) - (e), the gases that cause greenhouse effect are :

- (a) CO_2
- (b) H_2O
- (c) CFCs
- (d) O_2
- (e) O_3

- Options
1. (a), (b), (c) and (d)
 2. (a), (c), (d) and (e)
 3. (a) and (d)
 4. (a), (b), (c) and (e)

Question Type : MCQ

Question ID : 4050361506

Option 1 ID : 4050365502

Option 2 ID : 4050365500

Option 3 ID : 4050365499

Option 4 ID : 4050365501

Status : Answered

Chosen Option : 4

Q.15 As per Hardy-Schulze formulation, the flocculation values of the following for ferric hydroxide sol are in the order :

- Options
1. $\text{AlCl}_3 > \text{K}_3[\text{Fe}(\text{CN})_6] > \text{K}_2\text{CrO}_4 > \text{KBr} = \text{KNO}_3$
 2. $\text{K}_3[\text{Fe}(\text{CN})_6] < \text{K}_2\text{CrO}_4 < \text{AlCl}_3 < \text{KBr} < \text{KNO}_3$
 3. $\text{K}_3[\text{Fe}(\text{CN})_6] > \text{AlCl}_3 > \text{K}_2\text{CrO}_4 > \text{KBr} > \text{KNO}_3$
 4. $\text{K}_3[\text{Fe}(\text{CN})_6] < \text{K}_2\text{CrO}_4 < \text{KBr} = \text{KNO}_3 = \text{AlCl}_3$

Question Type : MCQ

Question ID : 4050361496

Option 1 ID : 4050365460

Option 2 ID : 4050365461

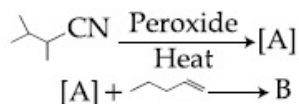
Option 3 ID : 4050365459

Option 4 ID : 4050365462

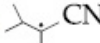
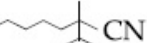
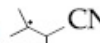
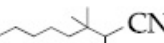

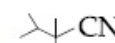

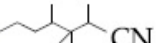
Status : Answered

Chosen Option : 4

Q.16 The major products A and B in the following reactions are :



Options

1. A =  and B = 
2. A =  and B = 
3. A =  and B = 
4. A =  and B = 

Question Type : MCQ

Question ID : 4050361511

Option 1 ID : 4050365521

Option 2 ID : 4050365522

Option 3 ID : 4050365519

Option 4 ID : 4050365520

Status : Answered

Chosen Option : 1

Q.17 For the Balmer series in the spectrum of H

atom, $\bar{\nu} = R_H \left\{ \frac{1}{n_1^2} - \frac{1}{n_2^2} \right\}$, the correct

statements among (I) to (IV) are :

- (I) As wavelength decreases, the lines in the series converge
- (II) The integer n_1 is equal to 2
- (III) The lines of longest wavelength corresponds to $n_2=3$
- (IV) The ionization energy of hydrogen can be calculated from wave number of these lines

Options

1. (II), (III), (IV)
2. (I), (II), (III)
3. (I), (III), (IV)
4. (I), (II), (IV)

Question Type : MCQ

Question ID : 4050361498

Option 1 ID : 4050365468

Option 2 ID : 4050365467

Option 3 ID : 4050365469

Option 4 ID : 4050365470

Status : Answered

Chosen Option : 2

Q.18 Arrange the following compounds in increasing order of C – OH bond length :

methanol, phenol, p-ethoxyphenol

- Options**
1. phenol < methanol < p-ethoxyphenol
 2. phenol < p-ethoxyphenol < methanol
 3. methanol < p-ethoxyphenol < phenol
 4. methanol < phenol < p-ethoxyphenol

Question Type : **MCQ**

Question ID : **4050361509**

Option 1 ID : **4050365513**

Option 2 ID : **4050365512**

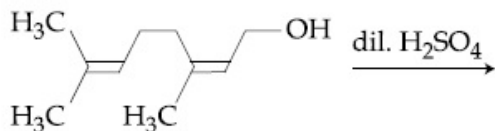
Option 3 ID : **4050365514**

Option 4 ID : **4050365511**

Status : **Answered**

Chosen Option : **2**

Q.19 The major product of the following reaction is :



Options

- 1.
- 2.
- 3.
- 4.

Question Type : MCQ

Question ID : 4050361513

Option 1 ID : 4050365530

Option 2 ID : 4050365528

Option 3 ID : 4050365529

Option 4 ID : 4050365527

Status : Answered

Chosen Option : 2

Q.20 When gypsum is heated to 393 K, it forms :

- Options
1. Dead burnt plaster
 2. Anhydrous CaSO_4
 3. $\text{CaSO}_4 \cdot 5 \text{H}_2\text{O}$
 4. $\text{CaSO}_4 \cdot 0.5 \text{H}_2\text{O}$

Question Type : MCQ

Question ID : 4050361502

Option 1 ID : 4050365484

Option 2 ID : 4050365483

Option 3 ID : 4050365486

Option 4 ID : 4050365485

Status : Answered

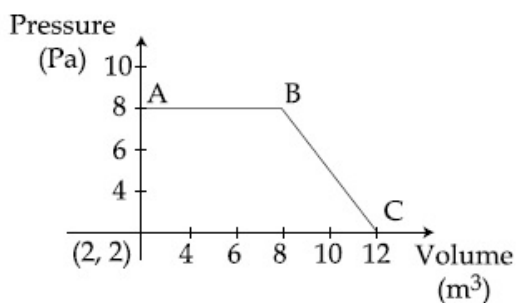
Chosen Option : 1

Q.21 The number of chiral centres in penicillin is _____.

Given 3.00
Answer :

Question Type : SA
Question ID : 4050361518
Status : Answered

Q.22 The magnitude of work done by a gas that undergoes a reversible expansion along the path ABC shown in the figure is _____.



Given 48.00
Answer :

Question Type : SA
Question ID : 4050361515
Status : Answered

Q.23 The volume (in mL) of 0.125 M AgNO₃ required to quantitatively precipitate chloride ions in 0.3 g of [Co(NH₃)₆]Cl₃ is _____.

$$M[\text{Co}(\text{NH}_3)_6]\text{Cl}_3 = 267.46 \text{ g/mol}$$

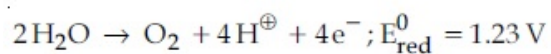
$$M\text{AgNO}_3 = 169.87 \text{ g/mol}$$

Given 26.92
Answer :

Question Type : SA
Question ID : 4050361517
Status : Answered

Q.24 What would be the electrode potential for the given half cell reaction at pH= 5 ?

_____.



($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$; Temp = 298 K;
oxygen under std. atm. pressure of 1 bar)

Given -0.935

Answer :

Question Type : SA

Question ID : 4050361516

Status : Answered

Q.25 Ferrous sulphate heptahydrate is used to fortify foods with iron. The amount (in grams) of the salt required to achieve 10 ppm of iron in 100 kg of wheat is

_____.

Atomic weight : Fe = 55.85; S = 32.00;
O = 16.00

Given 4.98

Answer :

Question Type : SA

Question ID : 4050361514

Status : Answered

Q.1 Let the line $y = mx$ and the ellipse $2x^2 + y^2 = 1$ intersect at a point P in the first quadrant. If the normal to this ellipse at P meets the co-ordinate axes at $\left(-\frac{1}{3\sqrt{2}}, 0\right)$ and $(0, \beta)$, then β is equal to :

- Options
1. $\frac{2}{\sqrt{3}}$
 2. $\frac{2\sqrt{2}}{3}$
 3. $\frac{2}{3}$
 4. $\frac{\sqrt{2}}{3}$

Question Type : MCQ
Question ID : 4050361532
Option 1 ID : 4050365590
Option 2 ID : 4050365591
Option 3 ID : 4050365589
Option 4 ID : 4050365588
Status : Answered
Chosen Option : 4

Q.2 Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be such that for all $x \in \mathbb{R}$ $(2^{1+x} + 2^{1-x}), f(x)$ and $(3^x + 3^{-x})$ are in A.P., then the minimum value of $f(x)$ is :

- Options
1. 0
 2. 3
 3. 2
 4. 4

Question Type : MCQ
Question ID : 4050361524
Option 1 ID : 4050365556
Option 2 ID : 4050365558
Option 3 ID : 4050365557
Option 4 ID : 4050365559
Status : Answered
Chosen Option : 2

Q.3 Let the volume of a parallelepiped whose coterminous edges are given by

$$\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}, \vec{v} = \hat{i} + \hat{j} + 3\hat{k} \text{ and}$$

$$\vec{w} = 2\hat{i} + \hat{j} + \hat{k} \text{ be 1 cu. unit. If } \theta \text{ be the}$$

angle between the edges \vec{u} and \vec{w} , then $\cos\theta$ can be :

Options

1. $\frac{7}{6\sqrt{3}}$

2. $\frac{5}{7}$

3. $\frac{7}{6\sqrt{6}}$

4. $\frac{5}{3\sqrt{3}}$

Question Type : MCQ

Question ID : 4050361534

Option 1 ID : 4050365598

Option 2 ID : 4050365596

Option 3 ID : 4050365597

Option 4 ID : 4050365599

Status : Answered

Chosen Option : 1

Q.4 If a, b and c are the greatest values of ${}^{19}C_p$, ${}^{20}C_q$ and ${}^{21}C_r$ respectively, then :

Options

1. $\frac{a}{11} = \frac{b}{22} = \frac{c}{21}$

2. $\frac{a}{10} = \frac{b}{11} = \frac{c}{21}$

3. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

4. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$

Question Type : MCQ

Question ID : 4050361523

Option 1 ID : 4050365552

Option 2 ID : 4050365554

Option 3 ID : 4050365553

Option 4 ID : 4050365555

Status : Answered

Chosen Option : 4

Q.5 Let

$$f(x) = (\sin(\tan^{-1}x) + \sin(\cot^{-1}x))^2 - 1$$

$$|x| > 1. \text{ If } \frac{dy}{dx} = \frac{1}{2} \frac{d}{dx} (\sin^{-1}(f(x))) \text{ and}$$

$$y(\sqrt{3}) = \frac{\pi}{6}, \text{ then } y(-\sqrt{3}) \text{ is equal to :}$$

Options

1. $\frac{5\pi}{6}$

2. $-\frac{\pi}{6}$

3. $\frac{\pi}{3}$

4. $\frac{2\pi}{3}$

Question Type : MCQ

Question ID : 4050361537

Option 1 ID : 4050365610

Option 2 ID : 4050365608

Option 3 ID : 4050365611

Option 4 ID : 4050365609

Status : Answered

Chosen Option : 1

Q.6

$$\lim_{x \rightarrow 0} \left(\frac{3x^2 + 2}{7x^2 + 2} \right)^{\frac{1}{x^2}} \text{ is equal to :}$$

Options

1. $\frac{1}{e}$

2. e^2

3. e

4. $\frac{1}{e^2}$

Question Type : MCQ

Question ID : 4050361525

Option 1 ID : 4050365562

Option 2 ID : 4050365561

Option 3 ID : 4050365560

Option 4 ID : 4050365563

Status : Answered

Chosen Option : 4

Q.7 Let two points be A(1, -1) and B(0, 2). If a point P(x', y') be such that the area of $\Delta PAB = 5$ sq. units and it lies on the line, $3x + y - 4\lambda = 0$, then a value of λ is :

- Options
1. 1
 2. 4
 3. 3
 4. -3

Question Type : **MCQ**
Question ID : **4050361522**
Option 1 ID : **4050365548**
Option 2 ID : **4050365549**
Option 3 ID : **4050365551**
Option 4 ID : **4050365550**
Status : **Answered**
Chosen Option : **3**

Q.8 The mean and the standard deviation (s.d.) of 10 observations are 20 and 2 respectively. Each of these 10 observations is multiplied by p and then reduced by q, where $p \neq 0$ and $q \neq 0$. If the new mean and new s.d. become half of their original values, then q is equal to :

- Options
1. -20
 2. 10
 3. -10
 4. -5

Question Type : **MCQ**
Question ID : **4050361535**
Option 1 ID : **4050365603**
Option 2 ID : **4050365601**
Option 3 ID : **4050365602**
Option 4 ID : **4050365600**
Status : **Answered**
Chosen Option : **4**

Q.9 Let $y = y(x)$ be a solution of the differential equation,

$$\sqrt{1-x^2} \frac{dy}{dx} + \sqrt{1-y^2} = 0, |x| < 1.$$

If $y\left(\frac{1}{2}\right) = \frac{\sqrt{3}}{2}$, then $y\left(\frac{-1}{\sqrt{2}}\right)$ is equal to :

Options

1. $-\frac{\sqrt{3}}{2}$

2. $\frac{1}{\sqrt{2}}$

3. $\frac{\sqrt{3}}{2}$

4. $-\frac{1}{\sqrt{2}}$

Question Type : MCQ

Question ID : 4050361530

Option 1 ID : 4050365583

Option 2 ID : 4050365581

Option 3 ID : 4050365582

Option 4 ID : 4050365580

Status : Answered

Chosen Option : 2

Q.10 If the equation, $x^2 + bx + 45 = 0$ ($b \in \mathbb{R}$) has conjugate complex roots and they satisfy

$$|z + 1| = 2\sqrt{10}, \text{ then :}$$

Options

1. $b^2 - b = 42$

2. $b^2 + b = 12$

3. $b^2 + b = 72$

4. $b^2 - b = 30$

Question Type : MCQ

Question ID : 4050361520

Option 1 ID : 4050365541

Option 2 ID : 4050365540

Option 3 ID : 4050365543

Option 4 ID : 4050365542

Status : Answered

Chosen Option : 4

Q.11 For $a > 0$, let the curves $C_1 : y^2 = ax$ and $C_2 : x^2 = ay$ intersect at origin O and a point P. Let the line $x = b$ ($0 < b < a$) intersect the chord OP and the x -axis at points Q and R, respectively. If the line $x = b$ bisects the area bounded by the curves, C_1 and C_2 , and the area of $\Delta OQR = \frac{1}{2}$, then 'a' satisfies the equation :

- Options
1. $x^6 - 12x^3 + 4 = 0$
 2. $x^6 - 12x^3 - 4 = 0$
 3. $x^6 + 6x^3 - 4 = 0$
 4. $x^6 - 6x^3 + 4 = 0$

Question Type : **MCQ**
Question ID : **4050361529**
Option 1 ID : **4050365577**
Option 2 ID : **4050365578**
Option 3 ID : **4050365576**
Option 4 ID : **4050365579**
Status : **Answered**
Chosen Option : 1

Q.12 Which one of the following is a tautology ?

- Options
1. $P \wedge (P \vee Q)$
 2. $P \vee (P \wedge Q)$
 3. $Q \rightarrow (P \wedge (P \rightarrow Q))$
 4. $(P \wedge (P \rightarrow Q)) \rightarrow Q$

Question Type : **MCQ**
Question ID : **4050361538**
Option 1 ID : **4050365612**
Option 2 ID : **4050365613**
Option 3 ID : **4050365615**
Option 4 ID : **4050365614**
Status : **Answered**
Chosen Option : 4

Q.13 The locus of a point which divides the line segment joining the point $(0, -1)$ and a point on the parabola, $x^2 = 4y$, internally in the ratio $1 : 2$, is :

- Options
1. $9x^2 - 3y = 2$
 2. $9x^2 - 12y = 8$
 3. $x^2 - 3y = 2$
 4. $4x^2 - 3y = 2$

Question Type : MCQ
Question ID : 4050361531
Option 1 ID : 4050365587
Option 2 ID : 4050365586
Option 3 ID : 4050365585
Option 4 ID : 4050365584
Status : Answered
Chosen Option : 2

Q.14 If c is a point at which Rolle's theorem holds for the function,
 $f(x) = \log_e \left(\frac{x^2 + \alpha}{7x} \right)$ in the interval $[3, 4]$, where $\alpha \in \mathbb{R}$, then $f'(c)$ is equal to :

- Options
1. $\frac{\sqrt{3}}{7}$
 2. $\frac{1}{12}$
 3. $-\frac{1}{24}$
 4. $-\frac{1}{12}$

Question Type : MCQ
Question ID : 4050361527
Option 1 ID : 4050365568
Option 2 ID : 4050365569
Option 3 ID : 4050365570
Option 4 ID : 4050365571
Status : Answered
Chosen Option : 2

Q.15 For which of the following ordered pairs (μ, δ) , the system of linear equations

$$x + 2y + 3z = 1$$

$$3x + 4y + 5z = \mu$$

$$4x + 4y + 4z = \delta$$

is inconsistent ?

- Options
1. (1, 0)
 2. (4, 6)
 3. (3, 4)
 4. (4, 3)

Question Type : MCQ

Question ID : 4050361521

Option 1 ID : 4050365544

Option 2 ID : 4050365547

Option 3 ID : 4050365545

Option 4 ID : 4050365546

Status : Answered

Chosen Option : 4

Q.16 Let A and B be two independent events

such that $P(A) = \frac{1}{3}$ and $P(B) = \frac{1}{6}$. Then,

which of the following is TRUE ?

- Options
1. $P(A/B) = \frac{2}{3}$
 2. $P(A/(A \cup B)) = \frac{1}{4}$
 3. $P(A/B') = \frac{1}{3}$
 4. $P(A'/B') = \frac{1}{3}$

Question Type : MCQ

Question ID : 4050361536

Option 1 ID : 4050365605

Option 2 ID : 4050365604

Option 3 ID : 4050365606

Option 4 ID : 4050365607

Status : Answered

Chosen Option : 3

Q.17 The inverse function of

$$f(x) = \frac{8^{2x} - 8^{-2x}}{8^{2x} + 8^{-2x}}, x \in (-1, 1), \text{ is}$$

_____.

Options

1. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1-x}{1+x} \right)$
2. $\frac{1}{4} \log_e \left(\frac{1-x}{1+x} \right)$
3. $\frac{1}{4} (\log_8 e) \log_e \left(\frac{1+x}{1-x} \right)$
4. $\frac{1}{4} \log_e \left(\frac{1+x}{1-x} \right)$

Question Type : MCQ

Question ID : 4050361519

Option 1 ID : 4050365537

Option 2 ID : 4050365538

Option 3 ID : 4050365539

Option 4 ID : 4050365536

Status : Answered

Chosen Option : 3

Q.18 If

$$\int \frac{\cos x \, dx}{\sin^3 x (1 + \sin^6 x)^{2/3}} = f(x) (1 + \sin^6 x)^{1/\lambda} + c$$

where c is a constant of integration, then

$\lambda f\left(\frac{\pi}{3}\right)$ is equal to :

- Options
1. -2
 2. $-\frac{9}{8}$
 3. 2
 4. $\frac{9}{8}$

Question Type : MCQ

Question ID : 4050361528

Option 1 ID : 4050365575

Option 2 ID : 4050365573

Option 3 ID : 4050365574

Option 4 ID : 4050365572

Status : Answered

Chosen Option : 1

Q.19 The shortest distance between the lines

$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1} \text{ and}$$

$$\frac{x+3}{-3} = \frac{y+7}{2} = \frac{z-6}{4} \text{ is :}$$

Options

1. $\frac{7}{2}\sqrt{30}$
2. $3\sqrt{30}$
3. 3
4. $2\sqrt{30}$

Question Type : MCQ

Question ID : 4050361533

Option 1 ID : 4050365595

Option 2 ID : 4050365593

Option 3 ID : 4050365594

Option 4 ID : 4050365592

Status : Answered

Chosen Option : 2

Q.20

$$\text{Let } f(x) = x \cos^{-1}(-\sin|x|), \quad x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right],$$

then which of the following is true ?

Options

f' is decreasing in $\left(-\frac{\pi}{2}, 0\right)$ and

1. increasing in $\left(0, \frac{\pi}{2}\right)$
2. f is not differentiable at $x=0$
3. $f'(0) = -\frac{\pi}{2}$
4. f' is increasing in $\left(-\frac{\pi}{2}, 0\right)$ and decreasing in $\left(0, \frac{\pi}{2}\right)$

Question Type : MCQ

Question ID : 4050361526

Option 1 ID : 4050365566

Option 2 ID : 4050365564

Option 3 ID : 4050365565

Option 4 ID : 4050365567

Status : Answered

Chosen Option : 4

Q.21 The number of all 3×3 matrices A, with entries from the set $\{-1, 0, 1\}$ such that the sum of the diagonal elements of AA^T is 3, is _____.

Given 672.00
Answer :

Question Type : SA
Question ID : 4050361540
Status : Answered

Q.22 The least positive value of 'a' for which the equation, $2x^2 + (a - 10)x + \frac{33}{2} = 2a$ has real roots is _____.

Given 8.00
Answer :

Question Type : SA
Question ID : 4050361539
Status : Answered

Q.23 Let the normal at a point P on the curve $y^2 - 3x^2 + y + 10 = 0$ intersect the y-axis at $(0, \frac{3}{2})$. If m is the slope of the tangent at P to the curve, then |m| is equal to _____.

Given 4.00
Answer :

Question Type : SA
Question ID : 4050361542
Status : Answered

Q.24 The sum $\sum_{k=1}^{20} (1 + 2 + 3 + \dots + k)$ is _____.

Given 1540.00
Answer :

Question Type : SA
Question ID : 4050361541
Status : Answered

Q.25 An urn contains 5 red marbles, 4 black marbles and 3 white marbles. Then the number of ways in which 4 marbles can be drawn so that at the most three of them are red is _____.

Given **13.00**

Answer :

Question Type : **SA**

Question ID : **4050361543**

Status : **Answered**