Test Date	08/01/2020
Test Time	9:30 AM - 12:30 PM
Subject	BTECH

Section : **Physics**

Q.1 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. $15°$
2. $30°$
3. $45°$
4. $60°$

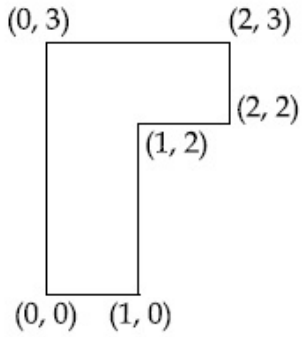
Question Type : **MCQ**
Question ID : **4050361483**
Option 1 ID : **4050365425**
Option 2 ID : **4050365422**
Option 3 ID : **4050365423**
Option 4 ID : **4050365424**
Status : **Answered**
Chosen Option : **2**

Q.2 Effective capacitance of parallel combination of two capacitors C_1 and C_2 is 10 μF. 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. 4.2 μF
2. 3.2 μF
3. 1.6 μF
4. 8.4 μF

Question Type : **MCQ**
Question ID : **4050361479**
Option 1 ID : **4050365407**
Option 2 ID : **4050365408**
Option 3 ID : **4050365409**
Option 4 ID : **4050365406**
Status : **Answered**
Chosen Option : **1**

Q.3 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. (0.75 m, 1.75 m)
3. (0.75 m, 0.75 m)
4. (1 m, 1.75 m)

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

Q.4 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. $\frac{m l \omega^2}{k - \omega m}$

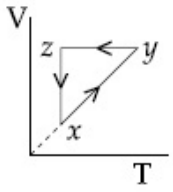
2. $\frac{m l \omega^2}{k - m\omega^2}$

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

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

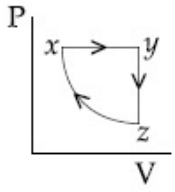
Question Type : **MCQ**
Question ID : **4050361470**
Option 1 ID : **4050365373**
Option 2 ID : **4050365371**
Option 3 ID : **4050365370**
Option 4 ID : **4050365372**
Status : **Answered**
Chosen Option : **3**

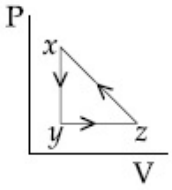
Q.5 A thermodynamic cycle $xyzx$ is shown on a V-T diagram.

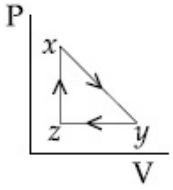


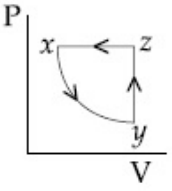
The P-V diagram that best describes this cycle is : (Diagrams are schematic and not to scale)

Options

1. 

2. 

3. 

4. 

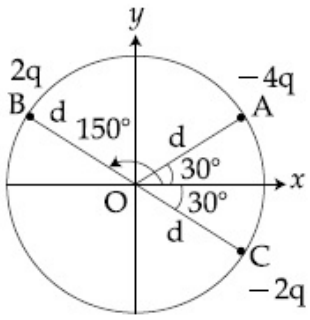
Question Type : **MCQ**
Question ID : **4050361476**
Option 1 ID : **4050365395**
Option 2 ID : **4050365396**
Option 3 ID : **4050365397**
Option 4 ID : **4050365394**
Status : **Answered**
Chosen Option : **4**

Q.6 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°C, relative to the density at T = 0°C is close to :

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

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

Q.7 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. $\frac{\sqrt{3}q}{\pi\epsilon_0 d^2}$

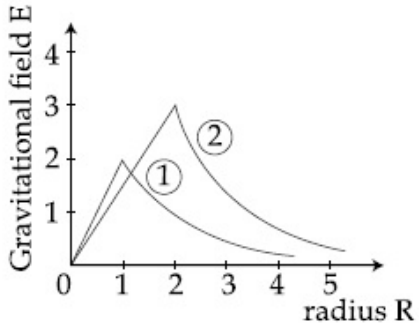
2. $\frac{2\sqrt{3}q}{\pi\epsilon_0 d^2}$

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

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

Question Type : **MCQ**
Question ID : **4050361478**
Option 1 ID : **4050365405**
Option 2 ID : **4050365404**
Option 3 ID : **4050365402**
Option 4 ID : **4050365403**
Status : **Answered**
Chosen Option : **2**

Q.8 Consider two solid spheres of radii $R_1 = 1m$, $R_2 = 2m$ 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. $\frac{2}{3}$
2. $\frac{1}{6}$
3. $\frac{1}{2}$
4. $\frac{1}{3}$

Question Type : **MCQ**
Question ID : **4050361473**
Option 1 ID : **4050365385**
Option 2 ID : **4050365382**
Option 3 ID : **4050365384**
Option 4 ID : **4050365383**
Status : **Answered**
Chosen Option : **3**

Q.9

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

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

Q.10

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 :

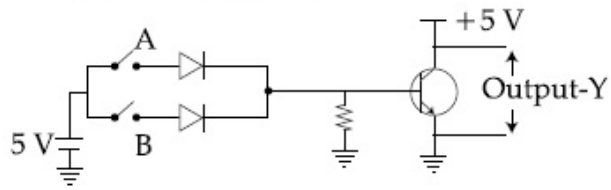
Options

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

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

Q.11

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



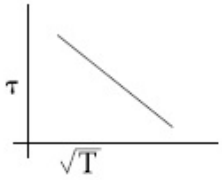
Options

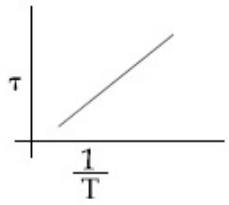
1. $\overline{A} + \overline{B}$
2. $A + B$
3. $A \cdot B$
4. $\overline{A} \cdot \overline{B}$

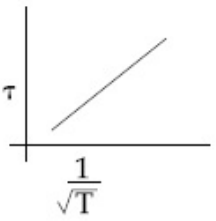
Question Type : **MCQ**
Question ID : **4050361487**
Option 1 ID : **4050365440**
Option 2 ID : **4050365438**
Option 3 ID : **4050365439**
Option 4 ID : **4050365441**
Status : **Answered**
Chosen Option : **4**

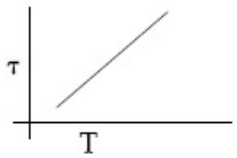
Q.12 The plot that depicts the behavior of the mean free time τ (time between two successive collisions) for the molecules of an ideal gas, as a function of temperature (T), qualitatively, is : (Graphs are schematic and not drawn to scale)

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050361477**
Option 1 ID : **4050365399**
Option 2 ID : **4050365401**
Option 3 ID : **4050365400**
Option 4 ID : **4050365398**
Status : **Marked For Review**
Chosen Option : **4**

Q.13

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. 4 eV
2. 2 eV
3. 1.5 eV
4. 3 eV

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

Q.14

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

Options

1. 20 cm
2. 40 cm
3. 30 cm
4. 10 cm

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

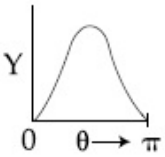
Q.15 The graph which depicts the results of Rutherford gold foil experiment with α-particles is :

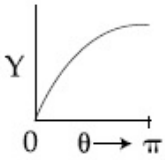
θ : Scattering angle

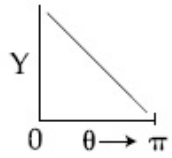
Y : Number of scattered α-particles detected

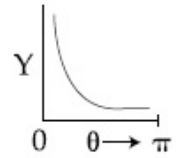
(Plots are schematic and not to scale)

Options

1. 

2. 

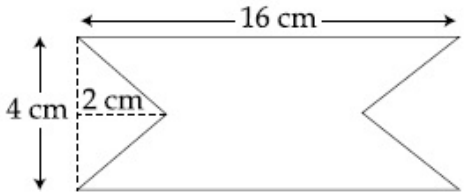
3. 

4. 

Question Type : **MCQ**
Question ID : **4050361486**
Option 1 ID : **4050365436**
Option 2 ID : **4050365435**
Option 3 ID : **4050365434**
Option 4 ID : **4050365437**
Status : **Answered**
Chosen Option : **2**

Q.16

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. 56 μV
2. 28 μV
3. 48 μV
4. 36 μV

Question Type : **MCQ**
Question ID : **4050361482**
Option 1 ID : **4050365421**
Option 2 ID : **4050365418**
Option 3 ID : **4050365420**
Option 4 ID : **4050365419**
Status : **Answered**
Chosen Option : **4**

Q.17 In finding the electric field using Gauss law the formula $\left|\vec{E}\right| = \frac{q_{enc}}{\epsilon_0 |A|}$ 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 the Gaussian surface is an equipotential surface and $\left|\vec{E}\right|$ is constant on the surface.
3. Only when $\left|\vec{E}\right|$ = constant on the surface.
4. For any choice of Gaussian surface.

Question Type : **MCQ**
Question ID : **4050361481**
Option 1 ID : **4050365415**
Option 2 ID : **4050365416**
Option 3 ID : **4050365417**
Option 4 ID : **4050365414**
Status : **Answered**
Chosen Option : **3**

Q.18 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 20 Ω, the null point on it is found to be at 1000 cm. The resistance of whole wire is :

Options

1. 80 Ω
2. 120 Ω
3. 60 Ω
4. 100 Ω

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

Q.19 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 1.6×10^{-27} kg)

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

Question Type : **MCQ**
Question ID : **4050361480**
Option 1 ID : **4050365412**
Option 2 ID : **4050365411**
Option 3 ID : **4050365413**
Option 4 ID : **4050365410**
Status : **Answered**
Chosen Option : **3**

Q.20 Consider a solid sphere of radius R and mass density $\rho(r)=\rho_0\left(1-\frac{r^2}{R^2}\right)$, $0<r\le R$. The minimum density of a liquid in which it will float is :

Options
1. $\frac{\rho_0}{3}$
2. $\frac{\rho_0}{5}$
3. $\frac{2\rho_0}{5}$
4. $\frac{2\rho_0}{3}$

Question Type : **MCQ**
Question ID : **4050361474**
Option 1 ID : **4050365387**
Option 2 ID : **4050365386**
Option 3 ID : **4050365388**
Option 4 ID : **4050365389**
Status : **Answered**
Chosen Option : **2**

Q.21 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 **9**
Answer :

Question Type : **SA**
Question ID : **4050361489**
Status : **Answered**

Q.22 Four resistances of 15 Ω, 12 Ω, 4 Ω and 10 Ω respectively in cyclic order to form Wheatstone's network. The resistance that is to be connected in parallel with the resistance of 10 Ω to balance the network is _____ Ω.

Given **7.76**
Answer :

Question Type : **SA**
Question ID : **4050361492**
Status : **Answered**

Q.23 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**
Answer :

Question Type : **SA**
Question ID : **4050361493**
Status : **Answered**

Q.24

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

Given **1**
Answer :

Question Type : **SA**
Question ID : **4050361490**
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 **50**
Answer :

Question Type : **SA**
Question ID : **4050361491**
Status : **Answered**

Section : **Chemistry**

Q.1 Among the gases (a) - (e), the gases that cause greenhouse effect are :

(a) CO_2

(b) H_2O

(c) CFCs

(d) O_2

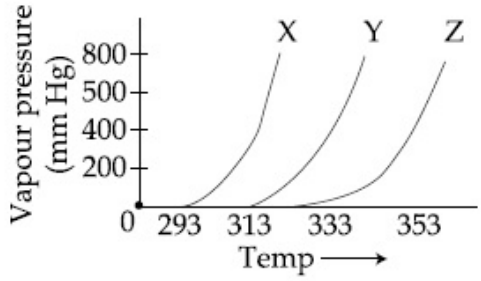
(e) O_3

Options

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

Question Type : **MCQ**
Question ID : **4050361506**
Option 1 ID : **4050365502**
Option 2 ID : **4050365501**
Option 3 ID : **4050365499**
Option 4 ID : **4050365500**
Status : **Answered**
Chosen Option : **1**

Q.2 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 :

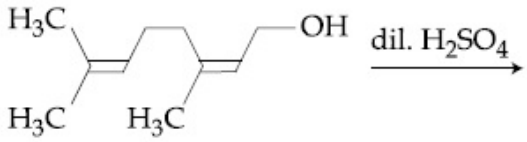
Options

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

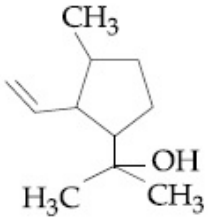
Question Type : **MCQ**
Question ID : **4050361499**
Option 1 ID : **4050365474**
Option 2 ID : **4050365471**
Option 3 ID : **4050365472**
Option 4 ID : **4050365473**
Status : **Answered**
Chosen Option : **3**

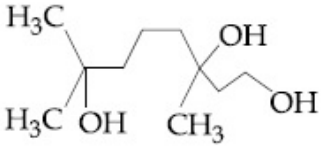
Q.3

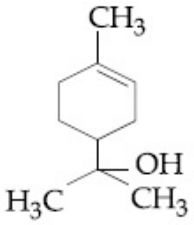
The major product of the following reaction is :

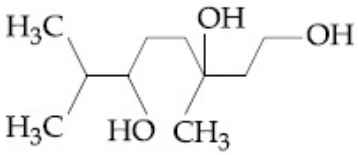


Options

1.


2.


3.


4.


Question Type : **MCQ**
Question ID : **4050361513**
Option 1 ID : **4050365529**
Option 2 ID : **4050365530**
Option 3 ID : **4050365528**
Option 4 ID : **4050365527**
Status : **Answered**
Chosen Option : **4**

Q.4 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 pipette and aqueous oxalic acid in a burette
2. Aq. NaOH in a burette and aqueous oxalic acid in a conical flask
3. Aq. NaOH in a burette and concentrated H_2SO_4 in a conical flask
4. Aq. NaOH in a volumetric flask and concentrated H_2SO_4 in a conical flask

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

Q.5 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. $-6(2.303)RT$
2. $-6RT$
3. $+6(2.303)RT$
4. $+6RT$

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

Q.6 The first ionization energy (in kJ/mol) of Na, Mg, Al and Si respectively, are :

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

Question Type : **MCQ**
Question ID : **4050361500**
Option 1 ID : **4050365477**
Option 2 ID : **4050365475**
Option 3 ID : **4050365476**
Option 4 ID : **4050365478**
Status : **Answered**
Chosen Option : **2**

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

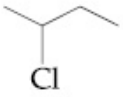
Options
1. $[Co(NH_3)_4Cl_2]^+$
2. $[Pt(NH_3)_2Cl_2]$
3. $[CoCl_2(en)_2]$
4. $[Co(NH_3)_3(NO_2)_3]$

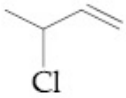
Question Type : **MCQ**
Question ID : **4050361505**
Option 1 ID : **4050365497**
Option 2 ID : **4050365498**
Option 3 ID : **4050365496**
Option 4 ID : **4050365495**
Status : **Answered**
Chosen Option : **4**

Q.8 The decreasing order of reactivity towards dehydrohalogenation (E_1) reaction of the following compounds is :

(A) 

(B) 

(C) 

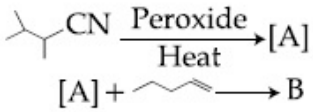
(D) 

Options

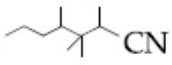
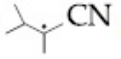
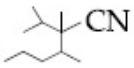
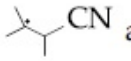
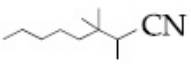
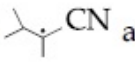
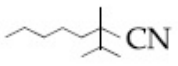
1. D > B > C > A
2. B > D > A > C
3. B > D > C > A
4. B > A > D > C

Question Type : **MCQ**
Question ID : **4050361512**
Option 1 ID : **4050365524**
Option 2 ID : **4050365526**
Option 3 ID : **4050365523**
Option 4 ID : **4050365525**
Status : **Answered**
Chosen Option : **1**

Q.9 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 = 

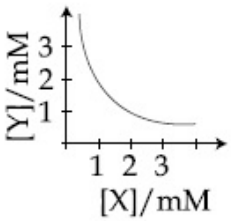
Question Type : **MCQ**
Question ID : **4050361511**
Option 1 ID : **4050365520**
Option 2 ID : **4050365519**
Option 3 ID : **4050365522**
Option 4 ID : **4050365521**
Status : **Answered**
Chosen Option : **2**

Q.10 The predominant intermolecular forces present in ethyl acetate, a liquid, are :

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

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

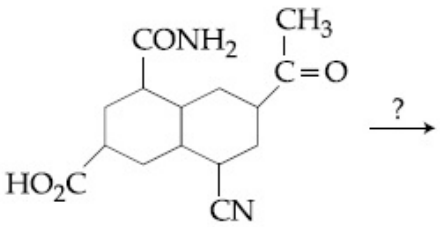
Q.11 The stoichiometry and solubility product of a salt with the solubility curve given below is, respectively :

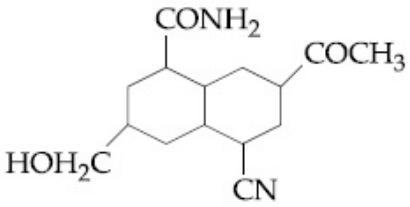


Options
1. $X_2Y, 2\times10^{-9}\,M^3$
2. $XY_2, 4\times10^{-9}\,M^3$
3. $XY_2, 1\times10^{-9}\,M^3$
4. $XY, 2\times10^{-6}\,M^3$

Question Type : **MCQ**
Question ID : **4050361494**
Option 1 ID : **4050365453**
Option 2 ID : **4050365452**
Option 3 ID : **4050365454**
Option 4 ID : **4050365451**
Status : **Answered**
Chosen Option : **1**

Q.12 The most suitable reagent for the given conversion is :





Options
1. B_2H_6
2. $NaBH_4$
3. $LiAlH_4$
4. H_2/Pd

Question Type : **MCQ**
Question ID : **4050361507**
Option 1 ID : **4050365504**
Option 2 ID : **4050365506**
Option 3 ID : **4050365503**
Option 4 ID : **4050365505**
Status : **Answered**
Chosen Option : **4**

Q.13 Arrange the following compounds in increasing order of C – OH bond length :

methanol, phenol, p-ethoxyphenol

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

Question Type : **MCQ**
Question ID : **4050361509**
Option 1 ID : **4050365514**
Option 2 ID : **4050365513**
Option 3 ID : **4050365512**
Option 4 ID : **4050365511**
Status : **Answered**
Chosen Option : **4**

Q.14 When gypsum is heated to 393 K, it forms :

Options
1. Anhydrous $CaSO_4$
2. $CaSO_4 \cdot 5\ H_2O$
3. $CaSO_4 \cdot 0.5\ H_2O$
4. Dead burnt plaster

Question Type : **MCQ**
Question ID : **4050361502**
Option 1 ID : **4050365483**
Option 2 ID : **4050365486**
Option 3 ID : **4050365485**
Option 4 ID : **4050365484**
Status : **Answered**
Chosen Option : **2**

Q.15 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. fractional distillation, isohexane
2. simple distillation, 3-methylpentane
3. simple distillation, isohexane
4. fractional distillation, 3-methylpentane

Question Type : **MCQ**
Question ID : **4050361508**
Option 1 ID : **4050365507**
Option 2 ID : **4050365510**
Option 3 ID : **4050365509**
Option 4 ID : **4050365508**
Status : **Answered**
Chosen Option : **4**

Q.16 Which of the following statement is not true for glucose ?

Options

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

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

Q.17 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 6
2. 8 and 8
3. 8 and 6
4. 4 and 8

Question Type : **MCQ**
Question ID : **4050361503**
Option 1 ID : **4050365487**
Option 2 ID : **4050365490**
Option 3 ID : **4050365489**
Option 4 ID : **4050365488**
Status : **Answered**
Chosen Option : **3**

Q.18 The third ionization enthalpy is minimum for :

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

Question Type : **MCQ**
Question ID : **4050361504**
Option 1 ID : **4050365494**
Option 2 ID : **4050365493**
Option 3 ID : **4050365491**
Option 4 ID : **4050365492**
Status : **Answered**
Chosen Option : **4**

Q.19 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. (I), (III), (IV)
2. (I), (II), (III)
3. (I), (II), (IV)
4. (II), (III), (IV)

Question Type : **MCQ**
Question ID : **4050361498**
Option 1 ID : **4050365469**
Option 2 ID : **4050365467**
Option 3 ID : **4050365470**
Option 4 ID : **4050365468**
Status : **Answered**
Chosen Option : **2**

Q.20 As per Hardy-Schulze formulation, the flocculation values of the following for ferric hydroxide sol are in the order :

Options

1. $K_3[Fe(CN)_6] < K_2CrO_4 < KBr = KNO_3 = AlCl_3$

2. $K_3[Fe(CN)_6] < K_2CrO_4 < AlCl_3 < KBr < KNO_3$

3. $AlCl_3 > K_3[Fe(CN)_6] > K_2CrO_4 > KBr = KNO_3$

4. $K_3[Fe(CN)_6] > AlCl_3 > K_2CrO_4 > KBr > KNO_3$

Question Type : **MCQ**
Question ID : **4050361496**
Option 1 ID : **4050365462**
Option 2 ID : **4050365461**
Option 3 ID : **4050365460**
Option 4 ID : **4050365459**
Status : **Answered**
Chosen Option : **3**

Q.21 What would be the electrode potential for the given half cell reaction at pH = 5 ?

_____.

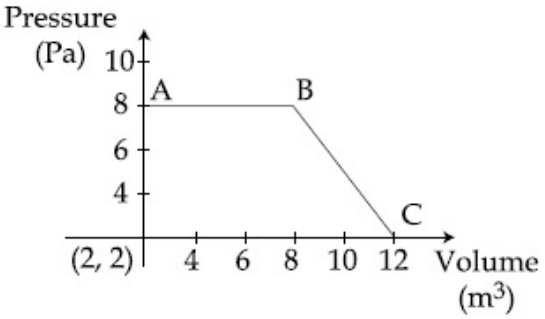
$2H_2O \rightarrow O_2 + 4H^{\oplus} + 4e^{-}; E^0_{red} = 1.23\ V$

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

Given Answer : **10**

Question Type : **SA**
Question ID : **4050361516**
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 **10**
Answer :

Question Type : **SA**
Question ID : **4050361515**
Status : **Answered**

Q.23 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 **10**
Answer :

Question Type : **SA**
Question ID : **4050361514**
Status : **Answered**

Q.24 The volume (in mL) of 0.125 M $AgNO_3$ required to quantitatively precipitate chloride ions in 0.3 g of $[Co(NH_3)_6]Cl_3$ is _____.

$^{M}[Co(NH_3)_6]Cl_3 = 267.46$ g/mol

$^{M}AgNO_3 = 169.87$ g/mol

Given **10**
Answer :

Question Type : **SA**
Question ID : **4050361517**
Status : **Answered**

Q.25 The number of chiral centres in penicillin is _____.

Given Answer : **3**

Question Type : **SA**
Question ID : **4050361518**
Status : **Answered**

Section : **Mathematics**

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

Question Type : **MCQ**
Question ID : **4050361533**
Option 1 ID : **4050365592**
Option 2 ID : **4050365595**
Option 3 ID : **4050365593**
Option 4 ID : **4050365594**
Status : **Answered**
Chosen Option : **4**

Q.2 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. -5
2. 10
3. -20
4. -10

Question Type : **MCQ**
Question ID : **4050361535**
Option 1 ID : **4050365600**
Option 2 ID : **4050365601**
Option 3 ID : **4050365603**
Option 4 ID : **4050365602**
Status : **Not Answered**
Chosen Option : **--**

Q.3 $\lim\limits_{x \to 0} \left(\frac{3x^2 + 2}{7x^2 + 2}\right)^{1/x^2}$ is equal to :

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

Question Type : **MCQ**
Question ID : **4050361525**
Option 1 ID : **4050365562**
Option 2 ID : **4050365563**
Option 3 ID : **4050365561**
Option 4 ID : **4050365560**
Status : **Answered**
Chosen Option : **3**

Q.4

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

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

Q.5

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 $\alpha \in R$, then $f''(c)$ is equal to :

Options

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

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

Q.6

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

then which of the following is true ?

Options

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

2. $f'(0)=-\frac{\pi}{2}$

3. f is not differentiable at $x=0$

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

Question Type : **MCQ**
Question ID : **4050361526**
Option 1 ID : **4050365567**
Option 2 ID : **4050365565**
Option 3 ID : **4050365564**
Option 4 ID : **4050365566**
Status : **Answered**
Chosen Option : **1**

Q.7

Which one of the following is a tautology ?

Options

1. $(P\wedge(P\rightarrow Q))\rightarrow Q$

2. $Q\rightarrow(P\wedge(P\rightarrow Q))$

3. $P\wedge(P\vee Q)$

4. $P\vee(P\wedge Q)$

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

Q.8 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. $\frac{2\sqrt{2}}{3}$
2. $\frac{2}{\sqrt{3}}$
3. $\frac{2}{3}$
4. $\frac{\sqrt{2}}{3}$

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

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

Question Type : **MCQ**
Question ID : **4050361531**
Option 1 ID : **4050365586**
Option 2 ID : **4050365587**
Option 3 ID : **4050365585**
Option 4 ID : **4050365584**
Status : **Not Answered**
Chosen Option : **--**

Q.10

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

Question Type : **MCQ**
Question ID : **4050361536**
Option 1 ID : **4050365605**
Option 2 ID : **4050365606**
Option 3 ID : **4050365607**
Option 4 ID : **4050365604**
Status : **Answered**
Chosen Option : **1**

Q.11

Let the volume of a parallelopiped whose coterminous edges are given by $\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}$, $\vec{v} = \hat{i} + \hat{j} + 3\hat{k}$ and $\vec{w} = 2\hat{i} + \hat{j} + \hat{k}$ be 1 cu. unit. If θ be the angle between the edges $\vec{u}$ and $\vec{w}$, then $\cos\theta$ can be :

Options

1. $\frac{7}{6\sqrt{6}}$
2. $\frac{7}{6\sqrt{3}}$
3. $\frac{5}{7}$
4. $\frac{5}{3\sqrt{3}}$

Question Type : **MCQ**
Question ID : **4050361534**
Option 1 ID : **4050365597**
Option 2 ID : **4050365598**
Option 3 ID : **4050365596**
Option 4 ID : **4050365599**
Status : **Answered**
Chosen Option : **2**

Q.12 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. $-\frac{9}{8}$
2. 2
3. $\frac{9}{8}$
4. -2

Question Type : **MCQ**
Question ID : **4050361528**
Option 1 ID : **4050365573**
Option 2 ID : **4050365574**
Option 3 ID : **4050365572**
Option 4 ID : **4050365575**
Status : **Answered**
Chosen Option : **3**

Q.13 If the equation, $x^2+bx+45=0$ $(b\epsilon R)$ has conjugate complex roots and they satisfy $|z+1| = 2\sqrt{10}$, then :

Options

1. $b^2-b=30$
2. $b^2+b=72$
3. $b^2-b=42$
4. $b^2+b=12$

Question Type : **MCQ**
Question ID : **4050361520**
Option 1 ID : **4050365542**
Option 2 ID : **4050365543**
Option 3 ID : **4050365541**
Option 4 ID : **4050365540**
Status : **Not Answered**
Chosen Option : **--**

Q.14

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

Options

1. 2
2. 3
3. 0
4. 4

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

Q.15

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

Question Type : **MCQ**
Question ID : **4050361529**
Option 1 ID : **4050365579**
Option 2 ID : **4050365577**
Option 3 ID : **4050365576**
Option 4 ID : **4050365578**
Status : **Not Answered**
Chosen Option : **--**

Q.16 The inverse function of

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

_____.

Options

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

Question Type : **MCQ**
Question ID : **4050361519**
Option 1 ID : **4050365536**
Option 2 ID : **4050365537**
Option 3 ID : **4050365538**
Option 4 ID : **4050365539**
Status : **Not Answered**
Chosen Option : **--**

Q.17 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. $(4,3)$
2. $(4,6)$
3. $(1,0)$
4. $(3,4)$

Question Type : **MCQ**
Question ID : **4050361521**
Option 1 ID : **4050365546**
Option 2 ID : **4050365547**
Option 3 ID : **4050365544**
Option 4 ID : **4050365545**
Status : **Not Answered**
Chosen Option : **--**

Q.18 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. $\frac{a}{11} = \frac{b}{22} = \frac{c}{42}$
4. $\frac{a}{10} = \frac{b}{11} = \frac{c}{42}$

Question Type : **MCQ**
Question ID : **4050361523**
Option 1 ID : **4050365552**
Option 2 ID : **4050365554**
Option 3 ID : **4050365555**
Option 4 ID : **4050365553**
Status : **Answered**
Chosen Option : **1**

Q.19 Let

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

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

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

Options

1. $\frac{2\pi}{3}$
2. $-\frac{\pi}{6}$
3. $\frac{5\pi}{6}$
4. $\frac{\pi}{3}$

Question Type : **MCQ**
Question ID : **4050361537**
Option 1 ID : **4050365609**
Option 2 ID : **4050365608**
Option 3 ID : **4050365610**
Option 4 ID : **4050365611**
Status : **Answered**
Chosen Option : **4**

Q.20 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. $\frac{1}{\sqrt{2}}$
4. $-\frac{\sqrt{3}}{2}$

Question Type : **MCQ**
Question ID : **4050361530**
Option 1 ID : **4050365582**
Option 2 ID : **4050365580**
Option 3 ID : **4050365581**
Option 4 ID : **4050365583**
Status : **Answered**
Chosen Option : **4**

Q.21 The sum $\sum_{k=1}^{20}(1 + 2 + 3 + \ldots + k)$ is _____.

Given Answer : **1**

Question Type : **SA**
Question ID : **4050361541**
Status : **Answered**

Q.22 The number of all 3×3 matrices A, with enteries from the set $\{-1, 0, 1\}$ such that the sum of the diagonal elements of AA^T is 3, is _____.

Given Answer : **3**

Question Type : **SA**
Question ID : **4050361540**
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 $\left(0, \frac{3}{2}\right)$. If m is the slope of the tangent at P to the curve, then $|m|$ is equal to _____.

Given **1**
Answer :

Question Type : **SA**
Question ID : **4050361542**
Status : **Answered**

Q.24 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 **.01**
Answer :

Question Type : **SA**
Question ID : **4050361543**
Status : **Answered**

Q.25 The least positive value of 'a' for which the equation, $2x^2 + (a-10)x + \frac{33}{2} = 2a$ has real roots is _____.

Given **3**
Answer :

Question Type : **SA**
Question ID : **4050361539**
Status : **Answered**