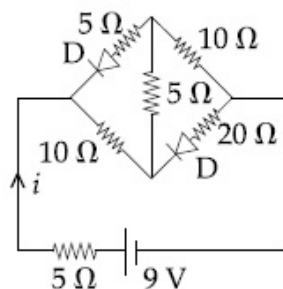


Test Date	09/01/2020
Test Time	2:30 PM - 5:30 PM
Subject	BTECH

Section : Physics

Q.1 The current i in the network is :



- Options
1. 0.2 A
 2. 0.6 A
 3. 0.3 A
 4. 0 A

Question Type : MCQ

Question ID : 4050362163

Option 1 ID : 4050367739

Option 2 ID : 4050367737

Option 3 ID : 4050367738

Option 4 ID : 4050367740

Status : Answered

Chosen Option : 2

Q.2 A wire of length L and mass per unit length $6.0 \times 10^{-3} \text{ kgm}^{-1}$ is put under tension of 540 N . Two consecutive frequencies that it resonates at are : 420 Hz and 490 Hz . Then L in meters is :

- Options
1. 2.1 m
 2. 1.1 m
 3. 8.1 m
 4. 5.1 m

Question Type : **MCQ**

Question ID : **4050362154**

Option 1 ID : **4050367703**

Option 2 ID : **4050367702**

Option 3 ID : **4050367704**

Option 4 ID : **4050367701**

Status : **Answered**

Chosen Option : **1**

Q.3 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 :

- Options
1. $-\frac{h}{|e|E\sqrt{t}}$
 2. $\frac{|e|Et}{h}$
 3. $-\frac{h}{|e|Et}$
 4. $\frac{-h}{|e|Et^2}$

Question Type : **MCQ**

Question ID : **4050362161**

Option 1 ID : **4050367731**

Option 2 ID : **4050367730**

Option 3 ID : **4050367732**

Option 4 ID : **4050367729**

Status : **Answered**

Chosen Option : **4**

Q.4 In LC circuit the inductance $L = 40 \text{ mH}$ and capacitance $C = 100 \text{ } \mu\text{F}$. If a voltage $V(t) = 10\sin(314 t)$ is applied to the circuit, the current in the circuit is given as :

- Options
1. $0.52 \cos 314 t$
 2. $10 \cos 314 t$
 3. $5.2 \cos 314 t$
 4. $0.52 \sin 314 t$

Question Type : **MCQ**

Question ID : **4050362158**

Option 1 ID : **4050367718**

Option 2 ID : **4050367719**

Option 3 ID : **4050367720**

Option 4 ID : **4050367717**

Status : **Answered**

Chosen Option : **2**

Q.5 A small circular loop of conducting wire has radius a and carries current I . It is placed in a uniform magnetic field B perpendicular to its plane such that when rotated slightly about its diameter and released, it starts performing simple harmonic motion of time period T . If the mass of the loop is m then :

- Options
1. $T = \sqrt{\frac{2m}{IB}}$
 2. $T = \sqrt{\frac{\pi m}{2IB}}$
 3. $T = \sqrt{\frac{2\pi m}{IB}}$
 4. $T = \sqrt{\frac{\pi m}{IB}}$

Question Type : **MCQ**

Question ID : **4050362156**

Option 1 ID : **4050367709**

Option 2 ID : **4050367712**

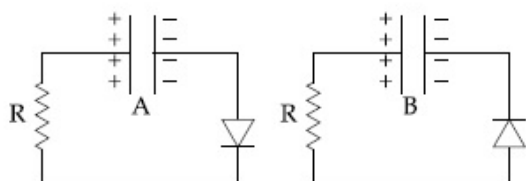
Option 3 ID : **4050367711**

Option 4 ID : **4050367710**

Status : **Answered**

Chosen Option : **3**

- Q.6** Two identical capacitors A and B, charged to the same potential 5V are connected in two different circuits as shown below at time $t=0$. If the charge on capacitors A and B at time $t=CR$ is Q_A and Q_B respectively, then (Here e is the base of natural logarithm)



Options

1. $Q_A = \frac{VC}{e}, Q_B = \frac{CV}{2}$
2. $Q_A = VC, Q_B = CV$
3. $Q_A = VC, Q_B = \frac{VC}{e}$
4. $Q_A = \frac{CV}{2}, Q_B = \frac{VC}{e}$

Question Type : **MCQ**

Question ID : **4050362155**

Option 1 ID : **4050367707**

Option 2 ID : **4050367705**

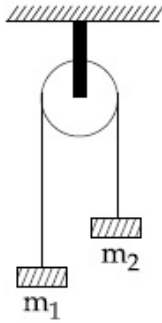
Option 3 ID : **4050367708**

Option 4 ID : **4050367706**

Status : **Answered**

Chosen Option : **4**

- Q.7 A uniformly thick wheel with moment of inertia I and radius R is free to rotate about its centre of mass (see fig). A massless string is wrapped over its rim and two blocks of masses m_1 and m_2 ($m_1 > m_2$) are attached to the ends of the string. The system is released from rest. The angular speed of the wheel when m_1 descends by a distance h is :



Options

1. $\left[\frac{2(m_1 - m_2) gh}{(m_1 + m_2) R^2 + I} \right]^{\frac{1}{2}}$
2. $\left[\frac{2(m_1 + m_2) gh}{(m_1 + m_2) R^2 + I} \right]^{\frac{1}{2}}$
3. $\left[\frac{(m_1 - m_2)}{(m_1 + m_2) R^2 + I} \right]^{\frac{1}{2}} gh$
4. $\left[\frac{m_1 + m_2}{(m_1 + m_2) R^2 + I} \right]^{\frac{1}{2}} gh$

Question Type : MCQ

Question ID : 4050362146

Option 1 ID : 4050367670

Option 2 ID : 4050367669

Option 3 ID : 4050367671

Option 4 ID : 4050367672

Status : Answered

Chosen Option : 2

Q.8

There is a small source of light at some depth below the surface of water (refractive index = $\frac{4}{3}$) in a tank of large cross sectional surface area. Neglecting any reflection from the bottom and absorption by water, percentage of light that emerges out of surface is (nearly) :

[Use the fact that surface area of a spherical cap of height h and radius of curvature r is $2\pi rh$]

- Options
1. 21 %
 2. 34 %
 3. 17 %
 4. 50 %

Question Type : **MCQ**

Question ID : **4050362160**

Option 1 ID : **4050367727**

Option 2 ID : **4050367726**

Option 3 ID : **4050367728**

Option 4 ID : **4050367725**

Status : **Answered**

Chosen Option : **2**

Q.9 A spring mass system (mass m , spring constant k and natural length l) rests in equilibrium on a horizontal disc. The free end of the spring is fixed at the centre of the disc. If the disc together with spring mass system, rotates about it's axis with an angular velocity ω , ($k \gg m\omega^2$) the relative change in the length of the spring is best given by the option :

Options

1. $\sqrt{\frac{2}{3}} \left(\frac{m\omega^2}{k} \right)$

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

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

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

Question Type : MCQ

Question ID : 4050362149

Option 1 ID : 4050367684

Option 2 ID : 4050367682

Option 3 ID : 4050367681

Option 4 ID : 4050367683

Status : Answered

Chosen Option : 2

Q.10 A small spherical droplet of density d is floating exactly half immersed in a liquid of density ρ and surface tension T . The radius of the droplet is (take note that the surface tension applies an upward force on the droplet) :

Options

1. $r = \sqrt{\frac{2T}{3(d + \rho)g}}$

2. $r = \sqrt{\frac{T}{(d - \rho)g}}$

3. $r = \sqrt{\frac{T}{(d + \rho)g}}$

4. $r = \sqrt{\frac{3T}{(2d - \rho)g}}$

Question Type : **MCQ**

Question ID : **4050362152**

Option 1 ID : **4050367695**

Option 2 ID : **4050367693**

Option 3 ID : **4050367696**

Option 4 ID : **4050367694**

Status : **Answered**

Chosen Option : **2**

Q.11 Planet A has mass M and radius R . Planet B has half the mass and half the radius of Planet A. If the escape velocities from the Planets A and B are v_A and v_B , respectively, then $\frac{v_A}{v_B} = \frac{n}{4}$. The value of n is :

Options

1. 4

2. 1

3. 2

4. 3

Question Type : **MCQ**

Question ID : **4050362150**

Option 1 ID : **4050367688**

Option 2 ID : **4050367685**

Option 3 ID : **4050367686**

Option 4 ID : **4050367687**

Status : **Not Answered**

Chosen Option : **--**

Q.12 A rod of length L has non-uniform linear mass density given by $\rho(x) = a + b \left(\frac{x}{L}\right)^2$, where a and b are constants and $0 \leq x \leq L$. The value of x for the centre of mass of the rod is at :

Options

1. $\frac{3}{2} \left(\frac{a+b}{2a+b}\right) L$
2. $\frac{3}{4} \left(\frac{2a+b}{3a+b}\right) L$
3. $\frac{4}{3} \left(\frac{a+b}{2a+3b}\right) L$
4. $\frac{3}{2} \left(\frac{2a+b}{3a+b}\right) L$

Question Type : MCQ

Question ID : 4050362148

Option 1 ID : 4050367680

Option 2 ID : 4050367677

Option 3 ID : 4050367679

Option 4 ID : 4050367678

Status : Answered

Chosen Option : 3

Q.13 For the four sets of three measured physical quantities as given below. Which of the following options is correct ?

- (i) $A_1 = 24.36, B_1 = 0.0724, C_1 = 256.2$
- (ii) $A_2 = 24.44, B_2 = 16.082, C_2 = 240.2$
- (iii) $A_3 = 25.2, B_3 = 19.2812, C_3 = 236.183$
- (iv) $A_4 = 25, B_4 = 236.191, C_4 = 19.5$

Options

1. $A_4 + B_4 + C_4 < A_1 + B_1 + C_1 < A_3 + B_3 + C_3 < A_2 + B_2 + C_2$
2. $A_1 + B_1 + C_1 = A_2 + B_2 + C_2 = A_3 + B_3 + C_3 = A_4 + B_4 + C_4$
3. $A_4 + B_4 + C_4 < A_1 + B_1 + C_1 = A_2 + B_2 + C_2 = A_3 + B_3 + C_3$
4. $A_1 + B_1 + C_1 < A_3 + B_3 + C_3 < A_2 + B_2 + C_2 < A_4 + B_4 + C_4$

Question Type : **MCQ**

Question ID : **4050362144**

Option 1 ID : **4050367664**

Option 2 ID : **4050367662**

Option 3 ID : **4050367663**

Option 4 ID : **4050367661**

Status : **Answered**

Chosen Option : **4**

Q.14 Two gases - argon (atomic radius 0.07 nm, atomic weight 40) and xenon (atomic radius 0.1 nm, atomic weight 140) have the same number density and are at the same temperature. The ratio of their respective mean free times is closest to :

Options

1. 3.67
2. 1.83
3. 2.3
4. 4.67

Question Type : **MCQ**

Question ID : **4050362153**

Option 1 ID : **4050367697**

Option 2 ID : **4050367700**

Option 3 ID : **4050367699**

Option 4 ID : **4050367698**

Status : **Not Answered**

Chosen Option : **--**

Q.15 Two steel wires having same length are suspended from a ceiling under the same load. If the ratio of their energy stored per unit volume is 1 : 4, the ratio of their diameters is :

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

Question Type : **MCQ**

Question ID : **4050362151**

Option 1 ID : **4050367691**

Option 2 ID : **4050367690**

Option 3 ID : **4050367692**

Option 4 ID : **4050367689**

Status : **Answered**

Chosen Option : **3**

Q.16 The energy required to ionise a hydrogen like ion in its ground state is 9 Rydbergs. What is the wavelength of the radiation emitted when the electron in this ion jumps from the second excited state to the ground state ?

- Options
1. 24.2 nm
 2. 11.4 nm
 3. 35.8 nm
 4. 8.6 nm

Question Type : **MCQ**

Question ID : **4050362162**

Option 1 ID : **4050367734**

Option 2 ID : **4050367733**

Option 3 ID : **4050367736**

Option 4 ID : **4050367735**

Status : **Answered**

Chosen Option : **2**

Q.17

A particle of mass m is projected with a speed u from the ground at an angle $\theta = \frac{\pi}{3}$ w.r.t. horizontal (x -axis). When it has reached its maximum height, it collides completely inelastically with another particle of the same mass and velocity $u \hat{i}$. The horizontal distance covered by the combined mass before reaching the ground is :

Options

1. $\frac{3\sqrt{3}}{8} \frac{u^2}{g}$
2. $\frac{3\sqrt{2}}{4} \frac{u^2}{g}$
3. $\frac{5}{8} \frac{u^2}{g}$
4. $2\sqrt{2} \frac{u^2}{g}$

Question Type : MCQ

Question ID : 4050362147

Option 1 ID : 4050367673

Option 2 ID : 4050367676

Option 3 ID : 4050367674

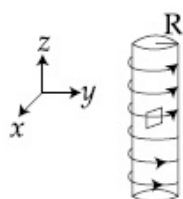
Option 4 ID : 4050367675

Status : Answered

Chosen Option : 3

Q.18

An electron gun is placed inside a long solenoid of radius R on its axis. The solenoid has n turns/length and carries a current I . The electron gun shoots an electron along the radius of the solenoid with speed v . If the electron does not hit the surface of the solenoid, maximum possible value of v is (all symbols have their standard meaning) :



Options

1. $\frac{e\mu_0 nIR}{m}$
2. $\frac{e\mu_0 nIR}{2m}$
3. $\frac{e\mu_0 nIR}{4m}$
4. $\frac{2e\mu_0 nIR}{m}$

Question Type : MCQ

Question ID : 4050362157

Option 1 ID : 4050367713

Option 2 ID : 4050367714

Option 3 ID : 4050367715

Option 4 ID : 4050367716

Status : Answered

Chosen Option : 3

Q.19 A particle starts from the origin at $t = 0$ with an initial velocity of $3.0\hat{i}$ m/s and moves in the x - y plane with a constant acceleration $(6.0\hat{i} + 4.0\hat{j})$ m/s². The x -coordinate of the particle at the instant when its y -coordinate is 32 m is D meters. The value of D is :

- Options**
1. 32
 2. 50
 3. 60
 4. 40

Question Type : **MCQ**

Question ID : **4050362145**

Option 1 ID : **4050367666**

Option 2 ID : **4050367665**

Option 3 ID : **4050367667**

Option 4 ID : **4050367668**

Status : **Not Answered**

Chosen Option : --

Q.20 A plane electromagnetic wave is propagating along the direction $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$, with its polarization along the direction $\hat{k}$. The correct form of the magnetic field of the wave would be (here B_0 is an appropriate constant) :

Options

1. $B_0 \frac{\hat{i} - \hat{j}}{\sqrt{2}} \cos\left(\omega t - k \frac{\hat{i} + \hat{j}}{\sqrt{2}}\right)$
2. $B_0 \frac{\hat{j} - \hat{i}}{\sqrt{2}} \cos\left(\omega t + k \frac{\hat{i} + \hat{j}}{\sqrt{2}}\right)$
3. $B_0 \hat{k} \cos\left(\omega t - k \frac{\hat{i} + \hat{j}}{\sqrt{2}}\right)$
4. $B_0 \frac{\hat{i} + \hat{j}}{\sqrt{2}} \cos\left(\omega t - k \frac{\hat{i} + \hat{j}}{\sqrt{2}}\right)$

Question Type : MCQ

Question ID : 4050362159

Option 1 ID : 4050367723

Option 2 ID : 4050367722

Option 3 ID : 4050367724

Option 4 ID : 4050367721

Status : Answered

Chosen Option : 2

Q.21 Starting at temperature 300 K, one mole of an ideal diatomic gas ($\gamma = 1.4$) is first compressed adiabatically from volume V_1 to $V_2 = \frac{V_1}{16}$. It is then allowed to expand isobarically to volume $2V_2$. If all the processes are the quasi-static then the final temperature of the gas (in °K) is (to the nearest integer) _____.

Given 100

Answer :

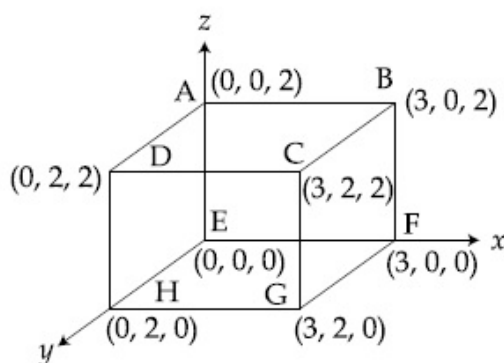
Question Type : SA

Question ID : 4050362164

Status : Answered

Q.22

An electric field $\vec{E} = 4x\hat{i} - (y^2 + 1)\hat{j}$ N/C passes through the box shown in figure. The flux of the electric field through surfaces ABCD and BCGF are marked as ϕ_I and ϕ_{II} respectively. The difference between $(\phi_I - \phi_{II})$ is (in Nm^2/C) _____.



Given 2

Answer :

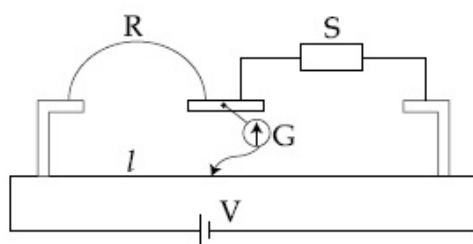
Question Type : SA

Question ID : 4050362165

Status : Answered

Q.23

In a meter bridge experiment S is a standard resistance. R is a resistance wire. It is found that balancing length is $l = 25$ cm. If R is replaced by a wire of half length and half diameter that of R of same material, then the balancing distance l' (in cm) will now be _____.



Given 25

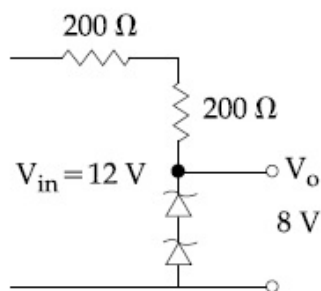
Answer :

Question Type : SA

Question ID : 4050362166

Status : Answered

- Q.24** The circuit shown below is working as a 8 V dc regulated voltage source. When 12 V is used as input, the power dissipated (in mW) in each diode is; (considering both zener diodes are identical) _____.



Given --
Answer :

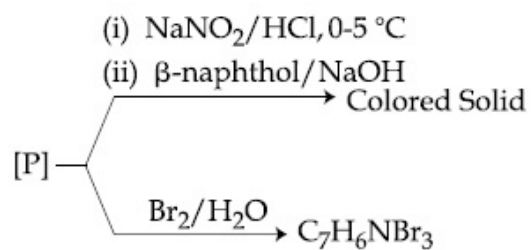
Question Type : **SA**
Question ID : **4050362168**
Status : **Not Answered**

- Q.25** In a Young's double slit experiment 15 fringes are observed on a small portion of the screen when light of wavelength 500 nm is used. Ten fringes are observed on the same section of the screen when another light source of wavelength λ is used. Then the value of λ is (in nm) _____.

Given **16**
Answer :

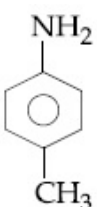
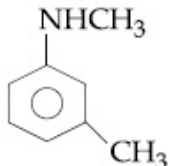
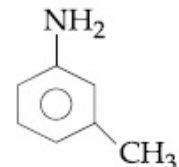
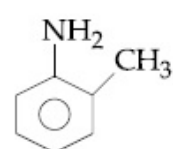
Question Type : **SA**
Question ID : **4050362167**
Status : **Answered**

Q.1 Consider the following reactions,



The compound [P] is :

Options

1. 
2. 
3. 
4. 

Question Type : MCQ

Question ID : 4050362188

Option 1 ID : 4050367824

Option 2 ID : 4050367825

Option 3 ID : 4050367823

Option 4 ID : 4050367822

Status : Answered

Chosen Option : 3

Q.2 Among the statements (a)–(d), the correct ones are :

- (a) Lithium has the highest hydration enthalpy among the alkali metals.
- (b) Lithium chloride is insoluble in pyridine.
- (c) Lithium cannot form ethynide upon its reaction with ethyne.
- (d) Both lithium and magnesium react slowly with H_2O .

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

Question Type : **MCQ**
Question ID : **4050362177**
Option 1 ID : **4050367781**
Option 2 ID : **4050367780**
Option 3 ID : **4050367779**
Option 4 ID : **4050367778**
Status : **Answered**
Chosen Option : **3**

Q.3 The solubility product of $\text{Cr}(\text{OH})_3$ at 298 K is 6.0×10^{-31} . The concentration of hydroxide ions in a saturated solution of $\text{Cr}(\text{OH})_3$ will be :

- Options**
- 1. $(2.22 \times 10^{-31})^{1/4}$
 - 2. $(18 \times 10^{-31})^{1/4}$
 - 3. $(18 \times 10^{-31})^{1/2}$
 - 4. $(4.86 \times 10^{-29})^{1/4}$

Question Type : **MCQ**
Question ID : **4050362170**
Option 1 ID : **4050367752**
Option 2 ID : **4050367750**
Option 3 ID : **4050367753**
Option 4 ID : **4050367751**
Status : **Answered**
Chosen Option : **4**

Q.4 Which of the following has the shortest C–Cl bond ?

- Options**
1. $\text{Cl}-\text{CH}=\text{CH}_2$
 2. $\text{Cl}-\text{CH}=\text{CH}-\text{NO}_2$
 3. $\text{Cl}-\text{CH}=\text{CH}-\text{CH}_3$
 4. $\text{Cl}-\text{CH}=\text{CH}-\text{OCH}_3$

Question Type : **MCQ**

Question ID : **4050362183**

Option 1 ID : **4050367802**

Option 2 ID : **4050367803**

Option 3 ID : **4050367804**

Option 4 ID : **4050367805**

Status : **Answered**

Chosen Option : **1**

Q.5 The reaction of $\text{H}_3\text{N}_3\text{B}_3\text{Cl}_3$ (A) with LiBH_4 in tetrahydrofuran gives inorganic benzene (B). Further, the reaction of (A) with (C) leads to $\text{H}_3\text{N}_3\text{B}_3(\text{Me})_3$. Compounds (B) and (C) respectively, are :

- Options**
1. Borazine and MeBr
 2. Diborane and MeMgBr
 3. Boron nitride and MeBr
 4. Borazine and MeMgBr

Question Type : **MCQ**

Question ID : **4050362178**

Option 1 ID : **4050367785**

Option 2 ID : **4050367782**

Option 3 ID : **4050367784**

Option 4 ID : **4050367783**

Status : **Answered**

Chosen Option : **3**

Q.6

The first and second ionisation enthalpies of a metal are 496 and 4560 kJ mol⁻¹, respectively. How many moles of HCl and H₂SO₄, respectively, will be needed to react completely with 1 mole of the metal hydroxide ?

Options

- 1 and 1
- 2 and 0.5
- 1 and 2
- 1 and 0.5

Question Type : MCQ

Question ID : 4050362175

Option 1 ID : 4050367770

Option 2 ID : 4050367771

Option 3 ID : 4050367772

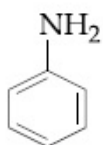
Option 4 ID : 4050367773

Status : Answered

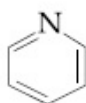
Chosen Option : 3

Q.7

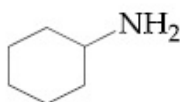
The decreasing order of basicity of the following amines is :



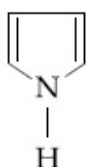
(I)



(II)



(III)



(IV)

Options

- (I) > (III) > (IV) > (II)
- (III) > (I) > (II) > (IV)
- (II) > (III) > (IV) > (I)
- (III) > (II) > (I) > (IV)

Question Type : MCQ

Question ID : 4050362182

Option 1 ID : 4050367801

Option 2 ID : 4050367799

Option 3 ID : 4050367800

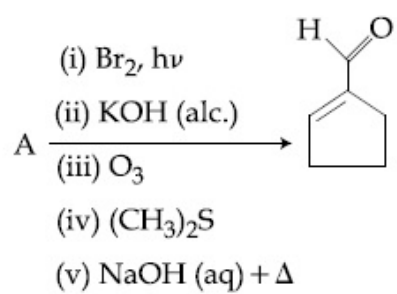
Option 4 ID : 4050367798

Status : Answered

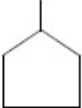
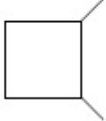
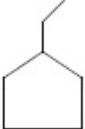
Chosen Option : 3

Q.8

In the following reaction A is :



Options

1. 
2. 
3. 
4. 

Question Type : MCQ

Question ID : 4050362187

Option 1 ID : 4050367819

Option 2 ID : 4050367818

Option 3 ID : 4050367821

Option 4 ID : 4050367820

Status : Answered

Chosen Option : 1

Q.9 The correct order of the spin-only magnetic moments of the following complexes is :

- (I) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Br}_2$
- (II) $\text{Na}_4[\text{Fe}(\text{CN})_6]$
- (III) $\text{Na}_3[\text{Fe}(\text{C}_2\text{O}_4)_3] (\Delta_0 > P)$
- (IV) $(\text{Et}_4\text{N})_2[\text{CoCl}_4]$

- Options**
- 1. (III) > (I) > (IV) > (II)
 - 2. (III) > (I) > (II) > (IV)
 - 3. (I) > (IV) > (III) > (II)
 - 4. (II) $\approx$ (I) > (IV) > (III)

Question Type : **MCQ**

Question ID : **4050362180**

Option 1 ID : **4050367790**

Option 2 ID : **4050367793**

Option 3 ID : **4050367791**

Option 4 ID : **4050367792**

Status : **Answered**

Chosen Option : **4**

Q.10 5 g of zinc is treated separately with an excess of

- (a) dilute hydrochloric acid and
- (b) aqueous sodium hydroxide.

The ratio of the volumes of H_2 evolved in these two reactions is :

- Options**
- 1. 1 : 2
 - 2. 1 : 1
 - 3. 1 : 4
 - 4. 2 : 1

Question Type : **MCQ**

Question ID : **4050362176**

Option 1 ID : **4050367774**

Option 2 ID : **4050367775**

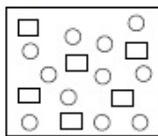
Option 3 ID : **4050367777**

Option 4 ID : **4050367776**

Status : **Answered**

Chosen Option : **4**

Q.11 In the figure shown below reactant A (represented by square) is in equilibrium with product B (represented by circle). The equilibrium constant is :



Options 1. 4

2. 8

3. 1

4. 2

Question Type : MCQ

Question ID : 4050362173

Option 1 ID : 4050367763

Option 2 ID : 4050367764

Option 3 ID : 4050367765

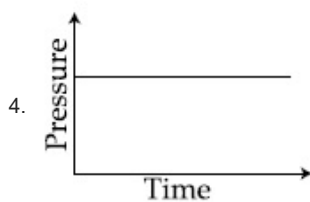
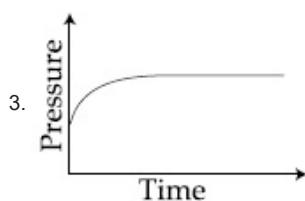
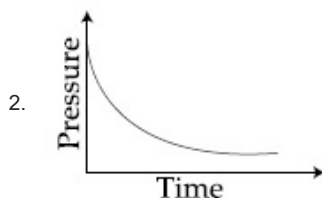
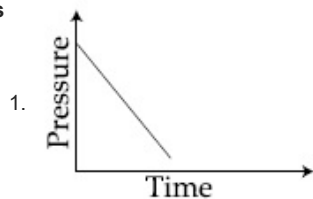
Option 4 ID : 4050367762

Status : Answered

Chosen Option : 3

Q.12 A mixture of gases O_2 , H_2 and CO are taken in a closed vessel containing charcoal. The graph that represents the correct behaviour of pressure with time is :

Options



Question Type : **MCQ**

Question ID : **4050362172**

Option 1 ID : **4050367761**

Option 2 ID : **4050367758**

Option 3 ID : **4050367760**

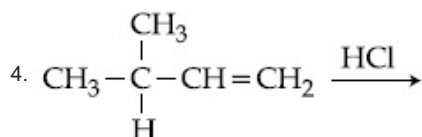
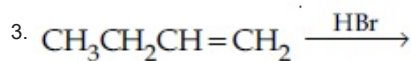
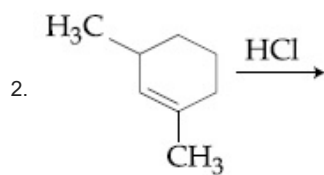
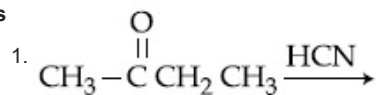
Option 4 ID : **4050367759**

Status : **Answered**

Chosen Option : **2**

Q.13 Which of the following reactions will not produce a racemic product ?

Options



Question Type : MCQ

Question ID : 4050362186

Option 1 ID : 4050367817

Option 2 ID : 4050367815

Option 3 ID : 4050367814

Option 4 ID : 4050367816

Status : Answered

Chosen Option : 3

Q.14 Which polymer has 'chiral' monomer(s) ?

Options 1. Neoprene

2. Buna-N

3. Nylon 6, 6

4. PHBV

Question Type : MCQ

Question ID : 4050362185

Option 1 ID : 4050367810

Option 2 ID : 4050367811

Option 3 ID : 4050367812

Option 4 ID : 4050367813

Status : Answered

Chosen Option : 1

Q.15 The number of sp^2 hybrid orbitals in a molecule of benzene is :

- Options
1. 24
 2. 6
 3. 18
 4. 12

Question Type : **MCQ**

Question ID : **4050362174**

Option 1 ID : **4050367769**

Option 2 ID : **4050367766**

Option 3 ID : **4050367768**

Option 4 ID : **4050367767**

Status : **Answered**

Chosen Option : **3**

Q.16 Amongst the following, the form of water with the lowest ionic conductance at 298 K is :

- Options
1. distilled water
 2. saline water used for intravenous injection
 3. water from a well
 4. sea water

Question Type : **MCQ**

Question ID : **4050362171**

Option 1 ID : **4050367757**

Option 2 ID : **4050367756**

Option 3 ID : **4050367755**

Option 4 ID : **4050367754**

Status : **Answered**

Chosen Option : **1**

Q.17 A, B and C are three biomolecules. The results of the tests performed on them are given below :

	Molisch's Test	Barfoed Test	Biuret Test
A	Positive	Negative	Negative
B	Positive	Positive	Negative
C	Negative	Negative	Positive

A, B and C are respectively :

- Options
1. A = Glucose, B = Fructose, C = Albumin
 2. A = Lactose, B = Glucose, C = Albumin
 3. A = Lactose, B = Glucose, C = Alanine
 4. A = Lactose, B = Fructose, C = Alanine

Question Type : **MCQ**

Question ID : **4050362184**

Option 1 ID : **4050367807**

Option 2 ID : **4050367806**

Option 3 ID : **4050367808**

Option 4 ID : **4050367809**

Status : **Not Answered**

Chosen Option : --

Q.18 The true statement amongst the following is :

- Options
1. Both ΔS and S are functions of temperature.
 2. Both S and ΔS are not functions of temperature.
 3. S is not a function of temperature but ΔS is a function of temperature.
 4. S is a function of temperature but ΔS is not a function of temperature.

Question Type : **MCQ**

Question ID : **4050362169**

Option 1 ID : **4050367747**

Option 2 ID : **4050367748**

Option 3 ID : **4050367749**

Option 4 ID : **4050367746**

Status : **Answered**

Chosen Option : **3**

Q.19 Biochemical Oxygen Demand (BOD) is the amount of oxygen required (in ppm) :

- Options
1. for sustaining life in a water body.
by bacteria to break-down organic waste in a certain volume of a water sample.
 2. waste in a certain volume of a water sample.
for the photochemical breakdown of waste present in 1 m³ volume of a water body.
 3. waste present in 1 m³ volume of a water body.
by anaerobic bacteria to breakdown inorganic waste present in a water body.
 4. inorganic waste present in a water body.

Question Type : **MCQ**
Question ID : **4050362181**
Option 1 ID : **4050367794**
Option 2 ID : **4050367796**
Option 3 ID : **4050367795**
Option 4 ID : **4050367797**
Status : **Answered**
Chosen Option : **3**

Q.20 The isomer(s) of $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]$ that has/ have a Cl – Co – Cl angle of 90°, is/are :

- Options
1. meridional and trans
 2. cis and trans
 3. trans only
 4. cis only

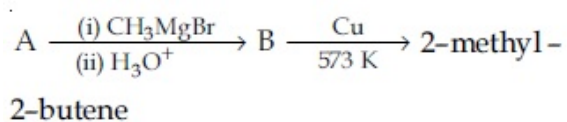
Question Type : **MCQ**
Question ID : **4050362179**
Option 1 ID : **4050367789**
Option 2 ID : **4050367788**
Option 3 ID : **4050367786**
Option 4 ID : **4050367787**
Status : **Answered**
Chosen Option : **1**

Q.21 10.30 mg of O₂ is dissolved into a liter of sea water of density 1.03 g/mL. The concentration of O₂ in ppm is _____.

Given **0.01**
Answer :

Question Type : **SA**
Question ID : **4050362190**
Status : **Answered**

Q.22 Consider the following reactions



The mass percentage of carbon in A is _____.

Given 25
Answer :

Question Type : SA
Question ID : 4050362193
Status : Answered

Q.23 A sample of milk splits after 60 min. at 300 K and after 40 min. at 400 K when the population of *lactobacillus acidophilus* in it doubles. The activation energy (in kJ/mol) for this process is closest to _____.

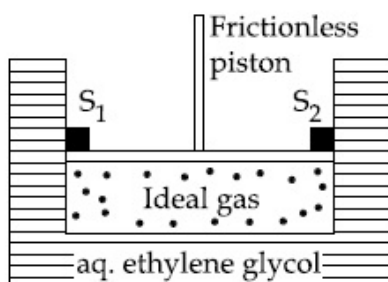
(Given, $R = 8.3 \text{ J mol}^{-1}\text{K}^{-1}$, $\ln\left(\frac{2}{3}\right) = 0.4$, $e^{-3} = 4.0$)

Given 3.038
Answer :

Question Type : SA
Question ID : 4050362191
Status : Answered

Q.24 A cylinder containing an ideal gas (0.1 mol of 1.0 dm^3) is in thermal equilibrium with a large volume of 0.5 molal aqueous solution of ethylene glycol at its freezing point. If the stoppers S_1 and S_2 (as shown in the figure) are suddenly withdrawn, the volume of the gas in litres after equilibrium is achieved will be _____.

(Given, $K_f(\text{water}) = 2.0 \text{ K kg mol}^{-1}$, $R = 0.08 \text{ dm}^3 \text{ atm K}^{-1} \text{ mol}^{-1}$)



Given 2.5

Answer :

Question Type : SA

Question ID : 4050362189

Status : Answered

Q.25 The sum of the total number of bonds between chromium and oxygen atoms in chromate and dichromate ions is _____.

Given 3

Answer :

Question Type : SA

Question ID : 4050362192

Status : Answered

Q.1 The following system of linear equations

$$7x + 6y - 2z = 0$$

$$3x + 4y + 2z = 0$$

$$x - 2y - 6z = 0, \text{ has}$$

- Options
1. infinitely many solutions, (x, y, z) satisfying $y = 2z$.
 2. no solution.
 3. infinitely many solutions, (x, y, z) satisfying $x = 2z$.
 4. only the trivial solution.

Question Type : **MCQ**

Question ID : **4050362198**

Option 1 ID : **4050367849**

Option 2 ID : **4050367847**

Option 3 ID : **4050367850**

Option 4 ID : **4050367848**

Status : **Answered**

Chosen Option : **3**

Q.2 If 10 different balls are to be placed in 4 distinct boxes at random, then the probability that two of these boxes contain exactly 2 and 3 balls is :

- Options
1. $\frac{965}{2^{11}}$
 2. $\frac{965}{2^{10}}$
 3. $\frac{945}{2^{10}}$
 4. $\frac{945}{2^{11}}$

Question Type : **MCQ**

Question ID : **4050362211**

Option 1 ID : **4050367900**

Option 2 ID : **4050367902**

Option 3 ID : **4050367899**

Option 4 ID : **4050367901**

Status : **Answered**

Chosen Option : **3**

Q.3 Let f and g be differentiable functions on $\mathbb{R}$ such that $f \circ g$ is the identity function. If for some $a, b \in \mathbb{R}$, $g'(a) = 5$ and $g(a) = b$, then $f'(b)$ is equal to :

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

Question Type : **MCQ**
Question ID : **4050362203**
Option 1 ID : **4050367867**
Option 2 ID : **4050367869**
Option 3 ID : **4050367870**
Option 4 ID : **4050367868**
Status : **Answered**
Chosen Option : **4**

Q.4 Let a function $f: [0, 5] \rightarrow \mathbb{R}$ be continuous, $f(1) = 3$ and F be defined as :

$$F(x) = \int_1^x t^2 g(t) dt, \text{ where } g(t) = \int_1^t f(u) du.$$

Then for the function F , the point $x = 1$ is :

- Options
1. a point of local minima.
 2. not a critical point.
 3. a point of local maxima.
 4. a point of inflection.

Question Type : **MCQ**
Question ID : **4050362204**
Option 1 ID : **4050367873**
Option 2 ID : **4050367871**
Option 3 ID : **4050367872**
Option 4 ID : **4050367874**
Status : **Answered**
Chosen Option : **3**

Q.5 Let a_n be the n^{th} term of a G.P. of positive terms. If $\sum_{n=1}^{100} a_{2n+1} = 200$ and

$\sum_{n=1}^{100} a_{2n} = 100$, then $\sum_{n=1}^{200} a_n$ is equal to :

- Options
1. 300
 2. 225
 3. 175
 4. 150

Question Type : **MCQ**

Question ID : **4050362200**

Option 1 ID : **4050367855**

Option 2 ID : **4050367858**

Option 3 ID : **4050367857**

Option 4 ID : **4050367856**

Status : **Not Answered**

Chosen Option : --

Q.6 Let $[t]$ denote the greatest integer $\leq t$ and

$\lim_{x \rightarrow 0} x \left[\frac{4}{x} \right] = A$. Then the function,

$f(x) = [x^2] \sin(\pi x)$ is discontinuous, when x is equal to :

- Options
1. $\sqrt{A+1}$
 2. $\sqrt{A+5}$
 3. $\sqrt{A+21}$
 4. $\sqrt{A}$

Question Type : **MCQ**

Question ID : **4050362201**

Option 1 ID : **4050367860**

Option 2 ID : **4050367861**

Option 3 ID : **4050367862**

Option 4 ID : **4050367859**

Status : **Answered**

Chosen Option : **2**

Q.7 If z be a complex number satisfying $|\operatorname{Re}(z)| + |\operatorname{Im}(z)| = 4$, then $|z|$ cannot be :

Options

1. $\sqrt{\frac{17}{2}}$
2. $\sqrt{10}$
3. $\sqrt{7}$
4. $\sqrt{8}$

Question Type : MCQ

Question ID : 4050362196

Option 1 ID : 4050367842

Option 2 ID : 4050367841

Option 3 ID : 4050367839

Option 4 ID : 4050367840

Status : Not Answered

Chosen Option : --

Q.8 If $x = \sum_{n=0}^{\infty} (-1)^n \tan^{2n} \theta$ and $y = \sum_{n=0}^{\infty} \cos^{2n} \theta$,

for $0 < \theta < \frac{\pi}{4}$, then :

Options

1. $x(1+y) = 1$
2. $y(1-x) = 1$
3. $y(1+x) = 1$
4. $x(1-y) = 1$

Question Type : MCQ

Question ID : 4050362212

Option 1 ID : 4050367906

Option 2 ID : 4050367904

Option 3 ID : 4050367903

Option 4 ID : 4050367905

Status : Answered

Chosen Option : 3

Q.9 If $x = 2\sin\theta - \sin 2\theta$ and $y = 2\cos\theta - \cos 2\theta$,

$\theta \in [0, 2\pi]$, then $\frac{d^2y}{dx^2}$ at $\theta = \pi$ is :

Options

1. $\frac{3}{4}$

2. $-\frac{3}{8}$

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

4. $-\frac{3}{4}$

Question Type : **MCQ**

Question ID : **4050362202**

Option 1 ID : **4050367865**

Option 2 ID : **4050367863**

Option 3 ID : **4050367866**

Option 4 ID : **4050367864**

Status : **Answered**

Chosen Option : **3**

Q.10

$$\text{Given: } f(x) = \begin{cases} x & , 0 \leq x < \frac{1}{2} \\ \frac{1}{2} & , x = \frac{1}{2} \\ 1 - x & , \frac{1}{2} < x \leq 1 \end{cases}$$

and $g(x) = \left(x - \frac{1}{2}\right)^2, x \in \mathbb{R}$. Then the area

(in sq. units) of the region bounded by the curves, $y=f(x)$ and $y=g(x)$ between the lines, $2x=1$ and $2x = \sqrt{3}$, is :

Options

1. $\frac{1}{3} + \frac{\sqrt{3}}{4}$

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

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

4. $\frac{1}{2} + \frac{\sqrt{3}}{4}$

Question Type : **MCQ**

Question ID : **4050362206**

Option 1 ID : **4050367880**

Option 2 ID : **4050367882**

Option 3 ID : **4050367879**

Option 4 ID : **4050367881**

Status : **Answered**

Chosen Option : **3**

Q.11 The length of the minor axis (along y -axis) of an ellipse in the standard form is $\frac{4}{\sqrt{3}}$. If this ellipse touches the line, $x + 6y = 8$; then its eccentricity is :

Options

1. $\frac{1}{2} \sqrt{\frac{11}{3}}$
2. $\sqrt{\frac{5}{6}}$
3. $\frac{1}{2} \sqrt{\frac{5}{3}}$
4. $\frac{1}{3} \sqrt{\frac{11}{3}}$

Question Type : MCQ

Question ID : 4050362208

Option 1 ID : 4050367888

Option 2 ID : 4050367889

Option 3 ID : 4050367890

Option 4 ID : 4050367887

Status : Answered

Chosen Option : 4

Q.12 Let $a, b \in \mathbb{R}$, $a \neq 0$ be such that the equation, $ax^2 - 2bx + 5 = 0$ has a repeated root α , which is also a root of the equation, $x^2 - 2bx - 10 = 0$. If β is the other root of this equation, then $\alpha^2 + \beta^2$ is equal to :

Options

1. 25
2. 26
3. 28
4. 24

Question Type : MCQ

Question ID : 4050362195

Option 1 ID : 4050367836

Option 2 ID : 4050367837

Option 3 ID : 4050367838

Option 4 ID : 4050367835

Status : Answered

Chosen Option : 3

Q.13 If one end of a focal chord AB of the parabola $y^2 = 8x$ is at $A\left(\frac{1}{2}, -2\right)$, then the equation of the tangent to it at B is :

- Options
1. $2x + y - 24 = 0$
 2. $x - 2y + 8 = 0$
 3. $x + 2y + 8 = 0$
 4. $2x - y - 24 = 0$

Question Type : **MCQ**
Question ID : **4050362209**
Option 1 ID : **4050367891**
Option 2 ID : **4050367893**
Option 3 ID : **4050367892**
Option 4 ID : **4050367894**
Status : **Not Answered**
Chosen Option : --

Q.14 If $\frac{dy}{dx} = \frac{xy}{x^2 + y^2}$; $y(1) = 1$; then a value of x satisfying $y(x) = e$ is :

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

Question Type : **MCQ**
Question ID : **4050362207**
Option 1 ID : **4050367885**
Option 2 ID : **4050367886**
Option 3 ID : **4050367883**
Option 4 ID : **4050367884**
Status : **Answered**
Chosen Option : **2**

Q.15 Let $a - 2b + c = 1$.

If $f(x) = \begin{vmatrix} x+a & x+2 & x+1 \\ x+b & x+3 & x+2 \\ x+c & x+4 & x+3 \end{vmatrix}$, then :

Options 1. $f(-50) = 501$

2. $f(-50) = -1$

3. $f(50) = -501$

4. $f(50) = 1$

Question Type : **MCQ**

Question ID : **4050362197**

Option 1 ID : **4050367844**

Option 2 ID : **4050367846**

Option 3 ID : **4050367843**

Option 4 ID : **4050367845**

Status : **Answered**

Chosen Option : **4**

Q.16 If $A = \{x \in \mathbb{R} : |x| < 2\}$ and

$B = \{x \in \mathbb{R} : |x-2| \geq 3\}$; then :

Options 1. $A \cap B = (-2, -1)$

2. $B - A = \mathbb{R} - (-2, 5)$

3. $A \cup B = \mathbb{R} - (2, 5)$

4. $A - B = [-1, 2)$

Question Type : **MCQ**

Question ID : **4050362194**

Option 1 ID : **4050367833**

Option 2 ID : **4050367832**

Option 3 ID : **4050367834**

Option 4 ID : **4050367831**

Status : **Answered**

Chosen Option : **3**

Q.17

In the expansion of $\left(\frac{x}{\cos\theta} + \frac{1}{x\sin\theta}\right)^{16}$, if l_1 is the least value of the term independent of x when $\frac{\pi}{8} \leq \theta \leq \frac{\pi}{4}$ and l_2 is the least value of the term independent of x when $\frac{\pi}{16} \leq \theta \leq \frac{\pi}{8}$, then the ratio $l_2 : l_1$ is equal to :

- Options
1. 1 : 8
 2. 16 : 1
 3. 8 : 1
 4. 1 : 16

Question Type : MCQ

Question ID : 4050362199

Option 1 ID : 4050367852

Option 2 ID : 4050367853

Option 3 ID : 4050367854

Option 4 ID : 4050367851

Status : Answered

Chosen Option : 2

Q.18

A random variable X has the following probability distribution :

X :	1	2	3	4	5
$P(X)$:	K^2	$2K$	K	$2K$	$5K^2$

Then $P(X > 2)$ is equal to :

- Options
1. $\frac{7}{12}$
 2. $\frac{1}{36}$
 3. $\frac{1}{6}$
 4. $\frac{23}{36}$

Question Type : MCQ

Question ID : 4050362210

Option 1 ID : 4050367896

Option 2 ID : 4050367898

Option 3 ID : 4050367895

Option 4 ID : 4050367897

Status : Answered

Chosen Option : 4

Q.19 If $p \rightarrow (p \wedge \sim q)$ is false, then the truth values of p and q are respectively :

- Options
1. F, F
 2. T, F
 3. T, T
 4. F, T

Question Type : MCQ

Question ID : 4050362213

Option 1 ID : 4050367907

Option 2 ID : 4050367908

Option 3 ID : 4050367910

Option 4 ID : 4050367909

Status : Answered

Chosen Option : 3

Q.20 If $\int \frac{d\theta}{\cos^2 \theta (\tan 2\theta + \sec 2\theta)} = \lambda \tan \theta + 2 \log_e |f(\theta)| + C$ where C is a constant of integration, then the ordered pair $(\lambda, f(\theta))$ is equal to :

- Options
1. $(1, 1 - \tan \theta)$
 2. $(-1, 1 - \tan \theta)$
 3. $(-1, 1 + \tan \theta)$
 4. $(1, 1 + \tan \theta)$

Question Type : MCQ

Question ID : 4050362205

Option 1 ID : 4050367876

Option 2 ID : 4050367877

Option 3 ID : 4050367875

Option 4 ID : 4050367878

Status : Not Answered

Chosen Option : --

Q.21 If $C_r \equiv {}^{25}C_r$ and $C_0 + 5 \cdot C_1 + 9 \cdot C_2 + \dots + (101) \cdot C_{25} = 2^{25} \cdot k$, then k is equal to _____.

Given 2
Answer :

Question Type : SA

Question ID : 4050362214

Status : Answered

Q.22 The number of terms common to the two A.P.'s 3, 7, 11, ..., 407 and 2, 9, 16, ..., 709 is

_____.

Given 1
Answer :

Question Type : **SA**
Question ID : **4050362215**
Status : **Answered**

Q.23 Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three vectors such that $|\vec{a}| = \sqrt{3}$, $|\vec{b}| = 5$, $\vec{b} \cdot \vec{c} = 10$ and the angle between $\vec{b}$ and $\vec{c}$ is $\frac{\pi}{3}$. If $\vec{a}$ is perpendicular to the vector $\vec{b} \times \vec{c}$, then $|\vec{a} \times (\vec{b} \times \vec{c})|$ is equal to _____.

Given 5
Answer :

Question Type : **SA**
Question ID : **4050362218**
Status : **Answered**

Q.24 If the distance between the plane, $23x - 10y - 2z + 48 = 0$ and the plane containing the lines

$$\frac{x+1}{2} = \frac{y-3}{4} = \frac{z+1}{3}$$

$$\text{and } \frac{x+3}{2} = \frac{y+2}{6} = \frac{z-1}{\lambda} \quad (\lambda \in \mathbb{R})$$

is equal to $\frac{k}{\sqrt{633}}$, then k is equal to _____.

Given 7
Answer :

Question Type : **SA**
Question ID : **4050362217**
Status : **Answered**

Q.25

If the curves, $x^2 - 6x + y^2 + 8 = 0$ and $x^2 - 8y + y^2 + 16 - k = 0$, ($k > 0$) touch each other at a point, then the largest value of k is _____.

Given 4

Answer :

Question Type : **SA**

Question ID : **4050362216**

Status : **Answered**