NTA JEE 7th to 9th Jan 2020

Application No.	
Candidate Name	
Roll No.	
Test Date	09/01/2020
Test Time	2:30 PM - 5:30 PM
Subject	BTECH

Section : **Physics**

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

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. $A_1 + B_1 + C_1 < A_3 + B_3 + C_3 < A_2 + B_2 + C_2 < A_4 + B_4 + C_4$

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

Question Type : **MCQ**
Question ID : **4050362144**
Option 1 ID : **4050367663**
Option 2 ID : **4050367662**
Option 3 ID : **4050367661**
Option 4 ID : **4050367664**
Status : **Answered**
Chosen Option : **1**

Q.2

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. 4.67
2. 2.3
3. 1.83
4. 3.67

Question Type : **MCQ**
Question ID : **4050362153**
Option 1 ID : **4050367698**
Option 2 ID : **4050367699**
Option 3 ID : **4050367700**
Option 4 ID : **4050367697**
Status : **Answered**
Chosen Option : **1**

Q.3

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 : **4050367696**
Option 3 ID : **4050367693**
Option 4 ID : **4050367694**
Status : **Answered**
Chosen Option : **1**

Q.4

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

Options

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

Question Type : **MCQ**
Question ID : **4050362158**
Option 1 ID : **4050367719**
Option 2 ID : **4050367718**
Option 3 ID : **4050367720**
Option 4 ID : **4050367717**
Status : **Answered**
Chosen Option : **1**

Q.5

A wire of length L and mass per unit length $6.0 \times 10^{-3}\ kgm^{-1}$ 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. 8.1 m
2. 2.1 m
3. 1.1 m
4. 5.1 m

Question Type : **MCQ**
Question ID : **4050362154**
Option 1 ID : **4050367704**
Option 2 ID : **4050367703**
Option 3 ID : **4050367702**
Option 4 ID : **4050367701**
Status : **Answered**
Chosen Option : **1**

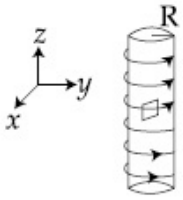
Q.6 Two steel wires having same length are suspended from a ceiling under the same load. If the ratio of their energy stored per unit volume is 1 : 4, the ratio of their diameters is :

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

Question Type : **MCQ**
Question ID : **4050362151**
Option 1 ID : **4050367690**
Option 2 ID : **4050367691**
Option 3 ID : **4050367692**
Option 4 ID : **4050367689**
Status : **Answered**
Chosen Option : **1**

Q.7

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

Question Type : **MCQ**
Question ID : **4050362157**
Option 1 ID : **4050367716**
Option 2 ID : **4050367714**
Option 3 ID : **4050367715**
Option 4 ID : **4050367713**
Status : **Answered**
Chosen Option : **1**

Q.8 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. $B_0 \frac{\hat{i}+\hat{j}}{\sqrt{2}} \cos\left(\omega t - k \frac{\hat{i}+\hat{j}}{\sqrt{2}}\right)$

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

Question Type : **MCQ**
Question ID : **4050362159**
Option 1 ID : **4050367723**
Option 2 ID : **4050367722**
Option 3 ID : **4050367721**
Option 4 ID : **4050367724**
Status : **Answered**
Chosen Option : **1**

Q.9 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. 3
2. 1
3. 2
4. 4

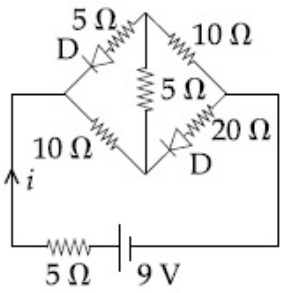
Question Type : **MCQ**
Question ID : **4050362150**
Option 1 ID : **4050367687**
Option 2 ID : **4050367685**
Option 3 ID : **4050367686**
Option 4 ID : **4050367688**
Status : **Answered**
Chosen Option : **1**

Q.10 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 $0 \le x \le L$. The value of x for the centre of mass of the rod is at :

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

Question Type : **MCQ**
Question ID : **4050362148**
Option 1 ID : **4050367678**
Option 2 ID : **4050367680**
Option 3 ID : **4050367677**
Option 4 ID : **4050367679**
Status : **Answered**
Chosen Option : **1**

Q.11 The current i in the network is :



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

Question Type : **MCQ**
Question ID : **4050362163**
Option 1 ID : **4050367738**
Option 2 ID : **4050367740**
Option 3 ID : **4050367739**
Option 4 ID : **4050367737**
Status : **Answered**
Chosen Option : **1**

Q.12 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. 34%
2. 17%
3. 50%
4. 21%

Question Type : **MCQ**
Question ID : **4050362160**
Option 1 ID : **4050367726**
Option 2 ID : **4050367728**
Option 3 ID : **4050367725**
Option 4 ID : **4050367727**
Status : **Answered**
Chosen Option : **1**

Q.13 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. 8.6 nm
2. 24.2 nm
3. 11.4 nm
4. 35.8 nm

Question Type : **MCQ**
Question ID : **4050362162**
Option 1 ID : **4050367735**
Option 2 ID : **4050367734**
Option 3 ID : **4050367733**
Option 4 ID : **4050367736**
Status : **Answered**
Chosen Option : **1**

Q.14 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. $T = \sqrt{\frac{\pi m}{IB}}$
2. $T = \sqrt{\frac{\pi m}{2IB}}$
3. $T = \sqrt{\frac{2m}{IB}}$
4. $T = \sqrt{\frac{2\pi m}{IB}}$

Question Type : **MCQ**
Question ID : **4050362156**
Option 1 ID : **4050367710**
Option 2 ID : **4050367712**
Option 3 ID : **4050367709**
Option 4 ID : **4050367711**
Status : **Answered**
Chosen Option : **1**

Q.15

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

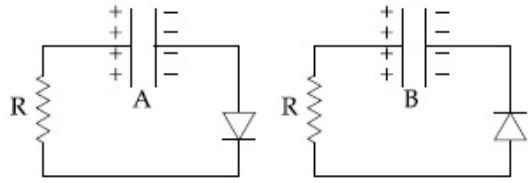
Question Type : **MCQ**
Question ID : **4050362147**
Option 1 ID : **4050367673**
Option 2 ID : **4050367675**
Option 3 ID : **4050367676**
Option 4 ID : **4050367674**
Status : **Answered**
Chosen Option : **1**

Q.16 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 $\left(6.0\hat{i} + 4.0\hat{j}\right)$ m/s^2. 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. 60
2. 50
3. 32
4. 40

Question Type : **MCQ**
Question ID : **4050362145**
Option 1 ID : **4050367667**
Option 2 ID : **4050367665**
Option 3 ID : **4050367666**
Option 4 ID : **4050367668**
Status : **Answered**
Chosen Option : **1**

Q.17 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. $Q_A = VC, Q_B = CV$

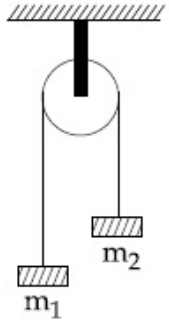
2. $Q_A = \frac{CV}{2}, Q_B = \frac{VC}{e}$

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

4. $Q_A = VC, Q_B = \frac{VC}{e}$

Question Type : **MCQ**
Question ID : **4050362155**
Option 1 ID : **4050367705**
Option 2 ID : **4050367706**
Option 3 ID : **4050367707**
Option 4 ID : **4050367708**
Status : **Answered**
Chosen Option : **1**

Q.18 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 descents 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. $\left[\frac{m_1+m_2}{(m_1+m_2)\,R^2+I}\right]^{\frac{1}{2}} gh$

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

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

Question Type : **MCQ**
Question ID : **4050362146**
Option 1 ID : **4050367669**
Option 2 ID : **4050367672**
Option 3 ID : **4050367671**
Option 4 ID : **4050367670**
Status : **Answered**
Chosen Option : **1**

Q.19 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. $\frac{-h}{|e|Et^2}$

2. $\frac{|e|Et}{h}$

3. $-\frac{h}{|e|Et}$

4. $-\frac{h}{|e|E\sqrt{t}}$

Question Type : **MCQ**
Question ID : **4050362161**
Option 1 ID : **4050367729**
Option 2 ID : **4050367730**
Option 3 ID : **4050367732**
Option 4 ID : **4050367731**
Status : **Answered**
Chosen Option : **1**

Q.20

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, ($k >> m\omega^2$) the relative change in the length of the spring is best given by the option :

Options

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

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

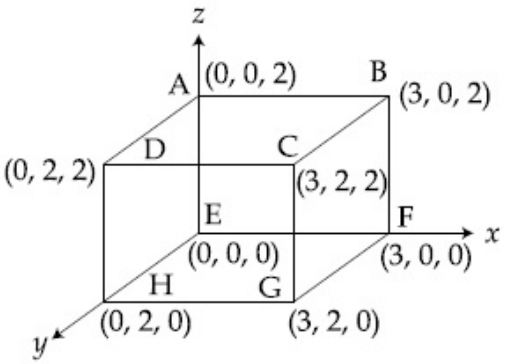
3. $\sqrt{\frac{2}{3}}\left(\frac{m\omega^2}{k}\right)$

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

Question Type : **MCQ**
Question ID : **4050362149**
Option 1 ID : **4050367683**
Option 2 ID : **4050367681**
Option 3 ID : **4050367684**
Option 4 ID : **4050367682**
Status : **Answered**
Chosen Option : **1**

Q.21

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) _____.

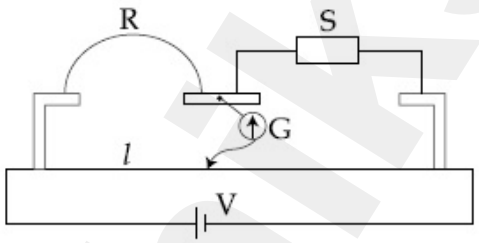


Given **485**
Answer :

Question Type : **SA**
Question ID : **4050362165**
Status : **Answered**

Q.22

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 **6.25**
Answer :

Question Type : **SA**
Question ID : **4050362166**
Status : **Answered**

Q.23

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 **0**
Answer :

Question Type : **SA**
Question ID : **4050362164**
Status : **Answered**

Q.24

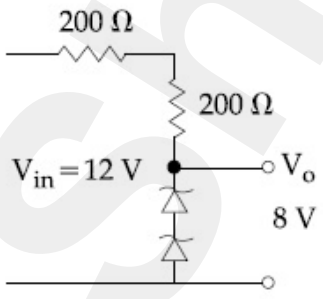
In a Young's double slit experiment 15 fringes are observed on a small portion of the screen when light of wavelength 500 nm is used. Ten fringes are observed on the same section of the screen when another light source of wavelength λ is used. Then the value of λ is (in nm) _____.

Given **112**
Answer :

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

Q.25

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.1 The reaction of $H_3N_3B_3Cl_3$ (A) with $LiBH_4$ in tetrahydrofuran gives inorganic benzene (B). Further, the reaction of (A) with (C) leads to $H_3N_3B_3(Me)_3$. Compounds (B) and (C) respectively, are :

Options

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

Question Type : **MCQ**
Question ID : **4050362178**
Option 1 ID : **4050367782**
Option 2 ID : **4050367785**
Option 3 ID : **4050367783**
Option 4 ID : **4050367784**
Status : **Answered**
Chosen Option : **1**

Q.2 Amongst the following, the form of water with the lowest ionic conductance at 298 K is :

Options

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

Question Type : **MCQ**
Question ID : **4050362171**
Option 1 ID : **4050367756**
Option 2 ID : **4050367755**
Option 3 ID : **4050367757**
Option 4 ID : **4050367754**
Status : **Answered**
Chosen Option : **1**

Q.3

The first and second ionisation enthalpies of a metal are 496 and 4560 kJ mol^{-1}, respectively. How many moles of HCl and H_2SO_4, respectively, will be needed to react completely with 1 mole of the metal hydroxide ?

Options

1. 1 and 2
2. 1 and 0.5
3. 1 and 1
4. 2 and 0.5

Question Type : **MCQ**
Question ID : **4050362175**
Option 1 ID : **4050367772**
Option 2 ID : **4050367773**
Option 3 ID : **4050367770**
Option 4 ID : **4050367771**
Status : **Answered**
Chosen Option : **1**

Q.4

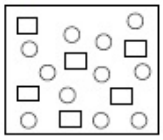
The isomer(s) of $[Co(NH_3)_4Cl_2]$ that has/have a Cl – Co – Cl angle of 90°, is/are :

Options

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

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

Q.5 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. 1
2. 4
3. 8
4. 2

Question Type : **MCQ**
Question ID : **4050362173**
Option 1 ID : **4050367765**
Option 2 ID : **4050367763**
Option 3 ID : **4050367764**
Option 4 ID : **4050367762**
Status : **Answered**
Chosen Option : **1**

Q.6 Which of the following has the shortest C – Cl bond ?

Options
1. $Cl-CH=CH_2$
2. $Cl-CH=CH-CH_3$
3. $Cl-CH=CH-OCH_3$
4. $Cl-CH=CH-NO_2$

Question Type : **MCQ**
Question ID : **4050362183**
Option 1 ID : **4050367802**
Option 2 ID : **4050367804**
Option 3 ID : **4050367805**
Option 4 ID : **4050367803**
Status : **Answered**
Chosen Option : **1**

Q.7 Which polymer has 'chiral' monomer(s) ?

Options
1. Buna-N
2. Neoprene
3. PHBV
4. Nylon 6, 6

Question Type : **MCQ**
Question ID : **4050362185**
Option 1 ID : **4050367811**
Option 2 ID : **4050367810**
Option 3 ID : **4050367813**
Option 4 ID : **4050367812**
Status : **Answered**
Chosen Option : **1**

Q.8 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 : 4
3. 1 : 1
4. 2 : 1

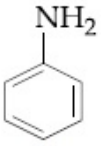
Question Type : **MCQ**
Question ID : **4050362176**
Option 1 ID : **4050367774**
Option 2 ID : **4050367777**
Option 3 ID : **4050367775**
Option 4 ID : **4050367776**
Status : **Answered**
Chosen Option : **1**

Q.9 The solubility product of $Cr(OH)_3$ at 298 K is 6.0×10^{-31}. The concentration of hydroxide ions in a saturated solution of $Cr(OH)_3$ will be :

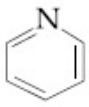
Options
1. $(18 \times 10^{-31})^{1/2}$
2. $(2.22 \times 10^{-31})^{1/4}$
3. $(18 \times 10^{-31})^{1/4}$
4. $(4.86 \times 10^{-29})^{1/4}$

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

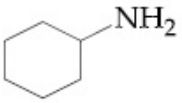
Q.10 The decreasing order of basicity of the following amines is :



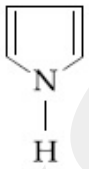
(I)



(II)



(III)



(IV)

Options
1. (I) > (III) > (IV) > (II)
2. (II) > (III) > (IV) > (I)
3. (III) > (I) > (II) > (IV)
4. (III) > (II) > (I) > (IV)

Question Type : **MCQ**
Question ID : **4050362182**
Option 1 ID : **4050367801**
Option 2 ID : **4050367800**
Option 3 ID : **4050367799**
Option 4 ID : **4050367798**
Status : **Answered**
Chosen Option : **1**

Q.11

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

Options

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

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

Q.12

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

(I) $[Cr(H_2O)_6]Br_2$

(II) $Na_4[Fe(CN)_6]$

(III) $Na_3[Fe(C_2O_4)_3]$ $(\Delta_0 > P)$

(IV) $(Et_4N)_2[CoCl_4]$

Options

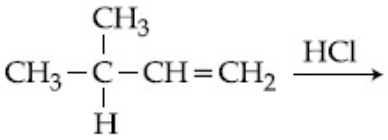
1. (III) > (I) > (II) > (IV)
2. (III) > (I) > (IV) > (II)
3. (I) > (IV) > (III) > (II)
4. (II) $\approx$ (I) > (IV) > (III)

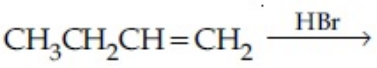
Question Type : **MCQ**
Question ID : **4050362180**
Option 1 ID : **4050367793**
Option 2 ID : **4050367790**
Option 3 ID : **4050367791**
Option 4 ID : **4050367792**
Status : **Answered**
Chosen Option : **1**

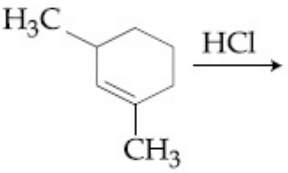
Q.13 Which of the following reactions will not produce a racemic product ?

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050362186**
Option 1 ID : **4050367817**
Option 2 ID : **4050367816**
Option 3 ID : **4050367814**
Option 4 ID : **4050367815**
Status : **Answered**
Chosen Option : **1**

Q.14 The true statement amongst the following is :

Options

1. S is a function of temperature but ΔS is not a function of temperature.

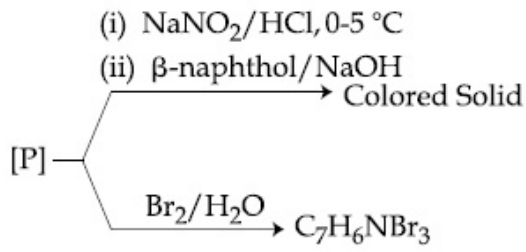
2. Both ΔS and S are functions of temperature.

3. Both S and ΔS are not functions of temperature.

4. S is not a function of temperature but ΔS is a function of temperature.

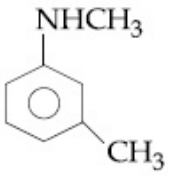
Question Type : **MCQ**
Question ID : **4050362169**
Option 1 ID : **4050367746**
Option 2 ID : **4050367747**
Option 3 ID : **4050367748**
Option 4 ID : **4050367749**
Status : **Answered**
Chosen Option : **2**

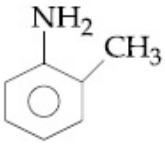
Q.15 Consider the following reactions,

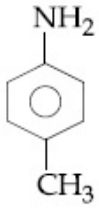


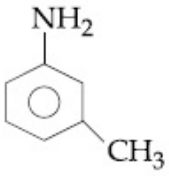
The compound [P] is :

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050362188**
Option 1 ID : **4050367825**
Option 2 ID : **4050367822**
Option 3 ID : **4050367824**
Option 4 ID : **4050367823**
Status : **Answered**
Chosen Option : **1**

Q.16 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 = Lactose, B = Glucose, C = Albumin
2. A = Lactose, B = Fructose, C = Alanine
3. A = Lactose, B = Glucose, C = Alanine
4. A = Glucose, B = Fructose, C = Albumin

Question Type : **MCQ**
Question ID : **4050362184**
Option 1 ID : **4050367806**
Option 2 ID : **4050367809**
Option 3 ID : **4050367808**
Option 4 ID : **4050367807**
Status : **Answered**
Chosen Option : **1**

Q.17 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.

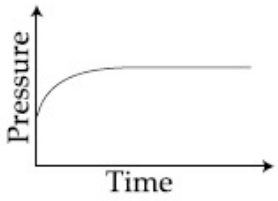
(d) Both lithium and magnesium react slowly with H_2O.

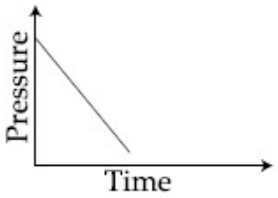
Options
1. (a), (b) and (d) only
2. (b) and (c) only
3. (a), (c) and (d) only
4. (a) and (d) only

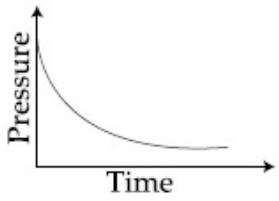
Question Type : **MCQ**
Question ID : **4050362177**
Option 1 ID : **4050367781**
Option 2 ID : **4050367779**
Option 3 ID : **4050367780**
Option 4 ID : **4050367778**
Status : **Answered**
Chosen Option : **1**

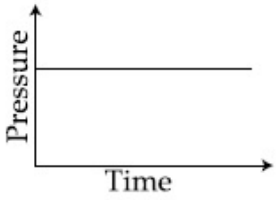
Q.18 A mixture of gases O_2, H_2 and CO are taken in a closed vessel containing charcoal. The graph that represents the correct behaviour of pressure with time is :

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050362172**
Option 1 ID : **4050367760**
Option 2 ID : **4050367761**
Option 3 ID : **4050367758**
Option 4 ID : **4050367759**
Status : **Answered**
Chosen Option : **1**

Q.19 The number of sp^2 hybrid orbitals in a molecule of benzene is :

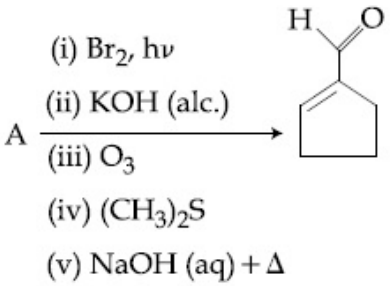
Options

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

Question Type : **MCQ**
Question ID : **4050362174**
Option 1 ID : **4050367767**
Option 2 ID : **4050367769**
Option 3 ID : **4050367766**
Option 4 ID : **4050367768**
Status : **Answered**
Chosen Option : **1**

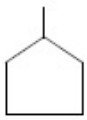
Q.20

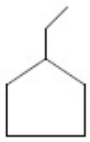
In the following reaction A is :

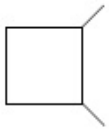


Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050362187**
Option 1 ID : **4050367819**
Option 2 ID : **4050367818**
Option 3 ID : **4050367820**
Option 4 ID : **4050367821**
Status : **Answered**
Chosen Option : **2**

Q.21

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

Given Answer : **6**

Question Type : **SA**
Question ID : **4050362192**
Status : **Answered**

Q.22 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 _____.

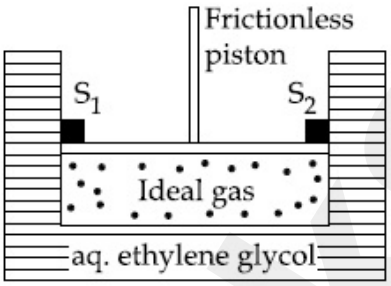
(Given, $R = 8.3\ J\ mol^{-1}K^{-1}$, $ln\left(\frac{2}{3}\right) = 0.4$, $e^{-3} = 4.0$)

Given --
Answer :

Question Type : **SA**
Question ID : **4050362191**
Status : **Not Answered**

Q.23 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 (water) = 2.0 K kg mol^{-1}, $R = 0.08\ dm^3\ atm\ K^{-1}\ mol^{-1}$)



Given **552**
Answer :

Question Type : **SA**
Question ID : **4050362189**
Status : **Answered**

Q.24 10.30 mg of O_2 is dissolved into a liter of sea water of density 1.03 g/mL. The concentration of O_2 in ppm is _____.

Given **4622**
Answer :

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

Q.25

Consider the following reactions

$$A \xrightarrow[(ii)\ H_3O^+]{(i)\ CH_3MgBr} B \xrightarrow[573\ K]{Cu} \text{2-methyl-2-butene}$$

The mass percentage of carbon in A is _____.

Given Answer : **55**

Question Type : **SA**
Question ID : **4050362193**
Status : **Answered**

Section : **Mathematics**

Q.1

If $A = \{x \in \mathbf{R} : |x| < 2\}$ and $B = \{x \in \mathbf{R} : |x-2| \geq 3\}$; then :

Options

1. $A - B = [-1, 2)$
2. $B - A = \mathbf{R} - (-2, 5)$
3. $A \cup B = \mathbf{R} - (2, 5)$
4. $A \cap B = (-2, -1)$

Question Type : **MCQ**
Question ID : **4050362194**
Option 1 ID : **4050367831**
Option 2 ID : **4050367832**
Option 3 ID : **4050367834**
Option 4 ID : **4050367833**
Status : **Answered**
Chosen Option : **1**

Q.2 જો 10 ભિન્ન દડાઓને, 4 ભિન્ન ખોખાં માં યાદચ્છિક રીતે મૂકવાના હોય, તો આમાંના બે ખોખાં માં બરાબર 2 અને 3 દડા હોય તેની સંભાવના કેટલી થાય?

Options

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

Question Type : **MCQ**
Question ID : **4050362211**
Option 1 ID : **4050367902**
Option 2 ID : **4050367899**
Option 3 ID : **4050367901**
Option 4 ID : **4050367900**
Status : **Answered**
Chosen Option : **1**

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

Question Type : **MCQ**
Question ID : **4050362202**
Option 1 ID : **4050367863**
Option 2 ID : **4050367865**
Option 3 ID : **4050367866**
Option 4 ID : **4050367864**
Status : **Answered**
Chosen Option : **1**

Q.4

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

Options

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

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

Q.5

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 $\frac{\pi}{8}\le\theta\le\frac{\pi}{4}$ and l_2 is the least value of the term independent of x when $\frac{\pi}{16}\le\theta\le\frac{\pi}{8}$, then the ratio $l_2 : l_1$ is equal to :

Options

1. $16:1$
2. $8:1$
3. $1:8$
4. $1:16$

Question Type : **MCQ**
Question ID : **4050362199**
Option 1 ID : **4050367853**
Option 2 ID : **4050367854**
Option 3 ID : **4050367852**
Option 4 ID : **4050367851**
Status : **Answered**
Chosen Option : **1**

Q.6 Let $a, b \in \mathbf{R}, a \neq 0$ 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. 24
2. 25
3. 26
4. 28

Question Type : **MCQ**
Question ID : **4050362195**
Option 1 ID : **4050367835**
Option 2 ID : **4050367836**
Option 3 ID : **4050367837**
Option 4 ID : **4050367838**
Status : **Answered**
Chosen Option : **1**

Q.7 Let a function $f : [0, 5] \to \mathbf{R}$ 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 inflection.
2. a point of local maxima.
3. a point of local minima.
4. not a critical point.

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

Q.8

Let [t] denote the greatest integer $\leq$ t and $\lim_{x\to 0} x\left[\frac{4}{x}\right] = A$. Then the function, $f(x) = [x^2]\sin(\pi x)$ is discontinuous, when x is equal to :

Options

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

Question Type : **MCQ**
Question ID : **4050362201**
Option 1 ID : **4050367860**
Option 2 ID : **4050367859**
Option 3 ID : **4050367861**
Option 4 ID : **4050367862**
Status : **Answered**
Chosen Option : **1**

Q.9

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

Question Type : **MCQ**
Question ID : **4050362197**
Option 1 ID : **4050367844**
Option 2 ID : **4050367846**
Option 3 ID : **4050367845**
Option 4 ID : **4050367843**
Status : **Answered**
Chosen Option : **1**

Q.10

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

and $g(x)=\left(x-\frac{1}{2}\right)^2, x \in \mathbf{R}$. 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. $\frac{\sqrt{3}}{4}-\frac{1}{3}$
2. $\frac{1}{3}+\frac{\sqrt{3}}{4}$
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 : **4050367882**
Option 2 ID : **4050367880**
Option 3 ID : **4050367881**
Option 4 ID : **4050367879**
Status : **Answered**
Chosen Option : **1**

Q.11 The following system of linear equations

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

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

$x-2y-6z=0$, has

Options

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

Question Type : **MCQ**
Question ID : **4050362198**
Option 1 ID : **4050367849**
Option 2 ID : **4050367850**
Option 3 ID : **4050367847**
Option 4 ID : **4050367848**
Status : **Answered**
Chosen Option : **1**

Q.12 If $p \rightarrow (p \wedge \sim q)$ is false, then the truth values of p and q are respectively :

Options

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

Question Type : **MCQ**
Question ID : **4050362213**
Option 1 ID : **4050367909**
Option 2 ID : **4050367908**
Option 3 ID : **4050367907**
Option 4 ID : **4050367910**
Status : **Answered**
Chosen Option : **1**

Q.13 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. $\frac{1}{2}\sqrt{\frac{5}{3}}$
2. $\frac{1}{2}\sqrt{\frac{11}{3}}$
3. $\sqrt{\frac{5}{6}}$
4. $\frac{1}{3}\sqrt{\frac{11}{3}}$

Question Type : **MCQ**
Question ID : **4050362208**
Option 1 ID : **4050367890**
Option 2 ID : **4050367888**
Option 3 ID : **4050367889**
Option 4 ID : **4050367887**
Status : **Answered**
Chosen Option : **1**

Q.14 If z be a complex number satisfying $|\mathrm{Re}(z)|+|\mathrm{Im}(z)|=4$, then $|z|$ cannot be :

Options

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

Question Type : **MCQ**
Question ID : **4050362196**
Option 1 ID : **4050367839**
Option 2 ID : **4050367842**
Option 3 ID : **4050367841**
Option 4 ID : **4050367840**
Status : **Answered**
Chosen Option : **1**

Q.15

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

Question Type : **MCQ**
Question ID : **4050362212**
Option 1 ID : **4050367903**
Option 2 ID : **4050367905**
Option 3 ID : **4050367904**
Option 4 ID : **4050367906**
Status : **Answered**
Chosen Option : **1**

Q.16

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

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

Q.17 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. $x+2y+8=0$
2. $2x-y-24=0$
3. $x-2y+8=0$
4. $2x+y-24=0$

Question Type : **MCQ**
Question ID : **4050362209**
Option 1 ID : **4050367892**
Option 2 ID : **4050367894**
Option 3 ID : **4050367893**
Option 4 ID : **4050367891**
Status : **Answered**
Chosen Option : **1**

Q.18 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. 175
3. 225
4. 150

Question Type : **MCQ**
Question ID : **4050362200**
Option 1 ID : **4050367855**
Option 2 ID : **4050367857**
Option 3 ID : **4050367858**
Option 4 ID : **4050367856**
Status : **Answered**
Chosen Option : **1**

Q.19 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. $\frac{23}{36}$
3. $\frac{1}{36}$
4. $\frac{1}{6}$

Question Type : **MCQ**
Question ID : **4050362210**
Option 1 ID : **4050367896**
Option 2 ID : **4050367897**
Option 3 ID : **4050367898**
Option 4 ID : **4050367895**
Status : **Answered**
Chosen Option : **1**

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 : **4050367877**
Option 2 ID : **4050367875**
Option 3 ID : **4050367878**
Option 4 ID : **4050367876**
Status : **Answered**
Chosen Option : **1**

Q.21

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 $\left|\vec{a} \times \left(\vec{b} \times \vec{c}\right)\right|$ is equal to _____.

Given **0**
Answer :

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

Q.22

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

Given **116**
Answer :

Question Type : **SA**
Question ID : **4050362214**
Status : **Answered**

Q.23

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 **859**
Answer :

Question Type : **SA**
Question ID : **4050362216**
Status : **Answered**

Q.24

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

Given **14**
Answer :

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

Q.25

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

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

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

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

Given Answer : **44**

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