

Test Date	08/01/2020
Test Time	2:30 PM - 5:30 PM
Subject	BTECH

## Section : Physics

**Q.1** A uniform sphere of mass 500 g rolls without slipping on a plane horizontal surface with its centre moving at a speed of 5.00 cm/s. Its kinetic energy is :

- Options**
1.  $8.75 \times 10^{-4}$  J
  2.  $8.75 \times 10^{-3}$  J
  3.  $6.25 \times 10^{-4}$  J
  4.  $1.13 \times 10^{-3}$  J

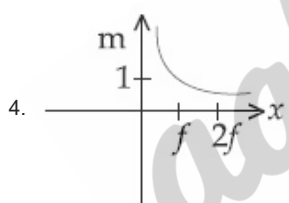
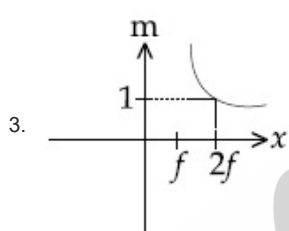
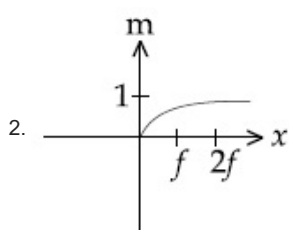
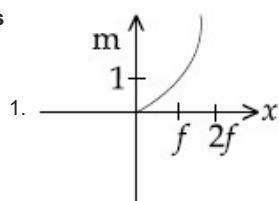
Question Type : **MCQ**  
Question ID : **4050361698**  
Option 1 ID : **4050366149**  
Option 2 ID : **4050366150**  
Option 3 ID : **4050366147**  
Option 4 ID : **4050366148**  
Status : **Answered**  
Chosen Option : **3**

Q.2

An object is gradually moving away from the focal point of a concave mirror along the axis of the mirror. The graphical representation of the magnitude of linear magnification ( $m$ ) versus distance of the object from the mirror ( $x$ ) is correctly given by

(Graphs are drawn schematically and are not to scale)

Options



Question Type : MCQ

Question ID : 4050361709

Option 1 ID : 4050366191

Option 2 ID : 4050366194

Option 3 ID : 4050366193

Option 4 ID : 4050366192

Status : Not Answered

Chosen Option : --

**Q.3** A transverse wave travels on a taut steel wire with a velocity of  $v$  when tension in it is  $2.06 \times 10^4$  N. When the tension is changed to  $T$ , the velocity changed to  $v/2$ . The value of  $T$  is close to :

- Options**
1.  $2.50 \times 10^4$  N
  2.  $5.15 \times 10^3$  N
  3.  $30.5 \times 10^4$  N
  4.  $10.2 \times 10^2$  N

Question Type : **MCQ**

Question ID : **4050361702**

Option 1 ID : **4050366163**

Option 2 ID : **4050366164**

Option 3 ID : **4050366165**

Option 4 ID : **4050366166**

Status : **Answered**

Chosen Option : **2**

**Q.4** Consider a mixture of  $n$  moles of helium gas and  $2n$  moles of oxygen gas (molecules taken to be rigid) as an ideal gas. Its  $C_p/C_v$  value will be :

- Options**
1. 19/13
  2. 67/45
  3. 40/27
  4. 23/15

Question Type : **MCQ**

Question ID : **4050361701**

Option 1 ID : **4050366161**

Option 2 ID : **4050366159**

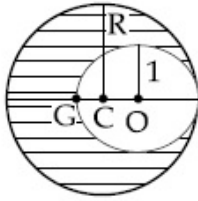
Option 3 ID : **4050366162**

Option 4 ID : **4050366160**

Status : **Not Answered**

Chosen Option : **--**

Q.5



As shown in fig. when a spherical cavity (centred at O) of radius 1 is cut out of a uniform sphere of radius R (centred at C), the centre of mass of remaining (shaded) part of sphere is at G, i.e on the surface of the cavity. R can be determined by the equation :

- Options
1.  $(R^2 + R + 1)(2 - R) = 1$
  2.  $(R^2 - R - 1)(2 - R) = 1$
  3.  $(R^2 - R + 1)(2 - R) = 1$
  4.  $(R^2 + R - 1)(2 - R) = 1$

Question Type : MCQ

Question ID : 4050361697

Option 1 ID : 4050366145

Option 2 ID : 4050366146

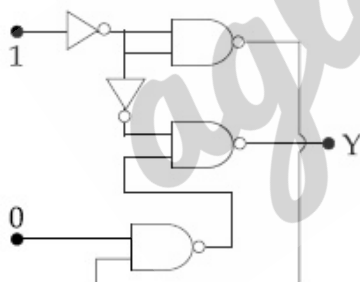
Option 3 ID : 4050366144

Option 4 ID : 4050366143

Status : Not Answered

Chosen Option : --

Q.6 In the given circuit, value of Y is :



- Options
1. 0
  2. toggles between 0 and 1
  3. will not execute
  4. 1

Question Type : MCQ

Question ID : 4050361712

Option 1 ID : 4050366203

Option 2 ID : 4050366205

Option 3 ID : 4050366206

Option 4 ID : 4050366204

Status : Answered

Chosen Option : 1

Q.7

A Carnot engine having an efficiency of  $\frac{1}{10}$  is being used as a refrigerator. If the work done on the refrigerator is 10 J, the amount of heat absorbed from the reservoir at lower temperature is :

- Options
1. 99 J
  2. 100 J
  3. 1 J
  4. 90 J

Question Type : **MCQ**Question ID : **4050361700**Option 1 ID : **4050366156**Option 2 ID : **4050366155**Option 3 ID : **4050366158**Option 4 ID : **4050366157**Status : **Not Answered**

Chosen Option : --

Q.8

In a double-slit experiment, at a certain point on the screen the path difference between the two interfering waves is  $\frac{1}{8}$ th of a wavelength. The ratio of the intensity of light at that point to that at the centre of a bright fringe is :

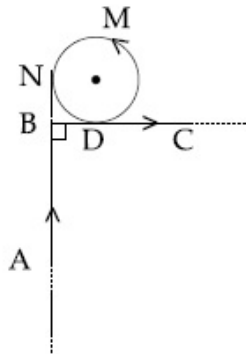
- Options
1. 0.853
  2. 0.672
  3. 0.568
  4. 0.760

Question Type : **MCQ**Question ID : **4050361710**Option 1 ID : **4050366195**Option 2 ID : **4050366197**Option 3 ID : **4050366198**Option 4 ID : **4050366196**Status : **Not Attempted and  
Marked For Review**

Chosen Option : --

Q.9

A very long wire ABDMNDC is shown in figure carrying current  $I$ . AB and BC parts are straight, long and at right angle. At D wire forms a circular turn DMND of radius  $R$ . AB, BC parts are tangential to circular turn at N and D. Magnetic field at the centre of circle is :



Options

1.  $\frac{\mu_0 I}{2\pi R} \left( \pi + \frac{1}{\sqrt{2}} \right)$
2.  $\frac{\mu_0 I}{2\pi R} \left( \pi - \frac{1}{\sqrt{2}} \right)$
3.  $\frac{\mu_0 I}{2\pi R} (\pi + 1)$
4.  $\frac{\mu_0 I}{2R}$

Question Type : MCQ

Question ID : 4050361705

Option 1 ID : 4050366175

Option 2 ID : 4050366176

Option 3 ID : 4050366178

Option 4 ID : 4050366177

Status : Answered

Chosen Option : 4

Q.10 A particle of mass  $m$  is dropped from a height  $h$  above the ground. At the same time another particle of the same mass is thrown vertically upwards from the ground with a speed of  $\sqrt{2gh}$ . If they collide head-on completely inelastically, the time taken for the combined mass to reach the ground, in units of  $\sqrt{\frac{h}{g}}$  is :

Options

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

Question Type : MCQ

Question ID : 4050361696

Option 1 ID : 4050366142

Option 2 ID : 4050366141

Option 3 ID : 4050366139

Option 4 ID : 4050366140

Status : Answered

Chosen Option : 1

Q.11 A plane electromagnetic wave of frequency 25 GHz is propagating in vacuum along the z-direction. At a particular point in space and time, the magnetic field is given by  $\vec{B} = 5 \times 10^{-8} \hat{j} \text{ T}$ . The corresponding electric field  $\vec{E}$  is (speed of light  $c = 3 \times 10^8 \text{ ms}^{-1}$ )

Options

1.  $1.66 \times 10^{-16} \hat{i} \text{ V/m}$
2.  $-1.66 \times 10^{-16} \hat{i} \text{ V/m}$
3.  $-15 \hat{i} \text{ V/m}$
4.  $15 \hat{i} \text{ V/m}$

Question Type : **MCQ**

Question ID : **4050361708**

Option 1 ID : **4050366189**

Option 2 ID : **4050366190**

Option 3 ID : **4050366188**

Option 4 ID : **4050366187**

Status : **Answered**

Chosen Option : **4**



- Q.12 An electron (mass  $m$ ) with initial velocity  $\vec{v} = v_0 \hat{i} + v_0 \hat{j}$  is in an electric field  $\vec{E} = -E_0 \hat{k}$ . If  $\lambda_0$  is initial de-Broglie wavelength of electron, its de-Broglie wavelength at time  $t$  is given by :

Options

1.  $\frac{\lambda_0 \sqrt{2}}{\sqrt{1 + \frac{e^2 E_0^2 t^2}{m^2 v_0^2}}}$

2.  $\frac{\lambda_0}{\sqrt{1 + \frac{e^2 E_0^2 t^2}{m^2 v_0^2}}}$

3.  $\frac{\lambda_0}{\sqrt{1 + \frac{e^2 E_0^2 t^2}{2m^2 v_0^2}}}$

4.  $\frac{\lambda_0}{\sqrt{2 + \frac{e^2 E_0^2 t^2}{m^2 v_0^2}}}$

Question Type : MCQ

Question ID : 4050361711

Option 1 ID : 4050366202

Option 2 ID : 4050366199

Option 3 ID : 4050366200

Option 4 ID : 4050366201

Status : Not Answered

Chosen Option : --

**Q.13** A simple pendulum is being used to determine the value of gravitational acceleration  $g$  at a certain place. The length of the pendulum is 25.0 cm and a stop watch with 1 s resolution measures the time taken for 40 oscillations to be 50 s. The accuracy in  $g$  is :

- Options**
1. 5.40%
  2. 3.40%
  3. 4.40%
  4. 2.40%

Question Type : **MCQ**

Question ID : **4050361694**

Option 1 ID : **4050366134**

Option 2 ID : **4050366131**

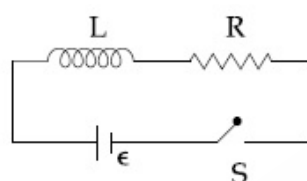
Option 3 ID : **4050366133**

Option 4 ID : **4050366132**

Status : **Not Answered**

Chosen Option : --

**Q.14**



As shown in the figure, a battery of emf  $\epsilon$  is connected to an inductor  $L$  and resistance  $R$  in series. The switch is closed at  $t=0$ . The total charge that flows from the battery, between  $t=0$  and  $t=t_c$  ( $t_c$  is the time constant of the circuit) is :

- Options**
1.  $\frac{\epsilon L}{eR^2}$
  2.  $\frac{\epsilon L}{R^2} \left(1 - \frac{1}{e}\right)$
  3.  $\frac{\epsilon L}{R^2}$
  4.  $\frac{\epsilon R}{eL^2}$

Question Type : **MCQ**

Question ID : **4050361707**

Option 1 ID : **4050366183**

Option 2 ID : **4050366186**

Option 3 ID : **4050366185**

Option 4 ID : **4050366184**

Status : **Answered**

Chosen Option : **4**

Q.15 Consider two charged metallic spheres  $S_1$  and  $S_2$  of radii  $R_1$  and  $R_2$ , respectively. The electric fields  $E_1$  (on  $S_1$ ) and  $E_2$  (on  $S_2$ ) on their surfaces are such that  $E_1/E_2 = R_1/R_2$ . Then the ratio  $V_1(\text{on } S_1)/V_2(\text{on } S_2)$  of the electrostatic potentials on each sphere is :

- Options
1.  $R_1/R_2$
  2.  $(R_1/R_2)^2$
  3.  $(R_2/R_1)$
  4.  $\left(\frac{R_1}{R_2}\right)^3$

Question Type : MCQ

Question ID : 4050361703

Option 1 ID : 4050366167

Option 2 ID : 4050366168

Option 3 ID : 4050366170

Option 4 ID : 4050366169

Status : Answered

Chosen Option : 1

Q.16 A particle moves such that its position vector  $\vec{r}(t) = \cos\omega t \hat{i} + \sin\omega t \hat{j}$  where  $\omega$  is a constant and  $t$  is time. Then which of the following statements is true for the velocity  $\vec{v}(t)$  and acceleration  $\vec{a}(t)$  of the particle :

- Options
1.  $\vec{v}$  is perpendicular to  $\vec{r}$  and  $\vec{a}$  is directed away from the origin
  2.  $\vec{v}$  and  $\vec{a}$  both are perpendicular to  $\vec{r}$
  3.  $\vec{v}$  and  $\vec{a}$  both are parallel to  $\vec{r}$
  4.  $\vec{v}$  is perpendicular to  $\vec{r}$  and  $\vec{a}$  is directed towards the origin

Question Type : MCQ

Question ID : 4050361695

Option 1 ID : 4050366138

Option 2 ID : 4050366136

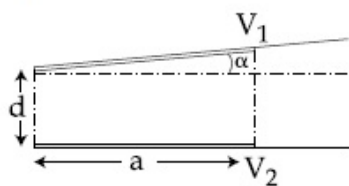
Option 3 ID : 4050366135

Option 4 ID : 4050366137

Status : Answered

Chosen Option : 2

- Q.17 A capacitor is made of two square plates each of side 'a' making a very small angle  $\alpha$  between them, as shown in figure. The capacitance will be close to :



Options

1.  $\frac{\epsilon_0 a^2}{d} \left( 1 - \frac{\alpha a}{2d} \right)$
2.  $\frac{\epsilon_0 a^2}{d} \left( 1 - \frac{\alpha a}{4d} \right)$
3.  $\frac{\epsilon_0 a^2}{d} \left( 1 + \frac{\alpha a}{d} \right)$
4.  $\frac{\epsilon_0 a^2}{d} \left( 1 - \frac{3\alpha a}{2d} \right)$

Question Type : MCQ

Question ID : 4050361704

Option 1 ID : 4050366172

Option 2 ID : 4050366174

Option 3 ID : 4050366173

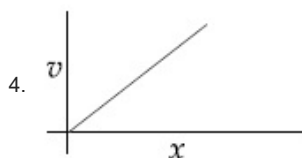
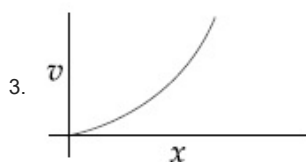
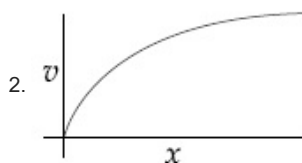
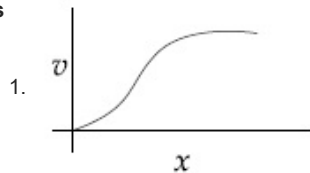
Option 4 ID : 4050366171

Status : Not Answered

Chosen Option : --

Q.18 A particle of mass  $m$  and charge  $q$  is released from rest in a uniform electric field. If there is no other force on the particle, the dependence of its speed  $v$  on the distance  $x$  travelled by it is correctly given by (graphs are schematic and not drawn to scale)

Options



Question Type : MCQ

Question ID : 4050361706

Option 1 ID : 4050366182

Option 2 ID : 4050366181

Option 3 ID : 4050366180

Option 4 ID : 4050366179

Status : Answered

Chosen Option : 2

**Q.19** A galvanometer having a coil resistance  $100\ \Omega$  gives a full scale deflection when a current of  $1\text{ mA}$  is passed through it. What is the value of the resistance which can convert this galvanometer into a voltmeter giving full scale deflection for a potential difference of  $10\text{ V}$ ?

- Options
1.  $10\text{ k}\Omega$
  2.  $8.9\text{ k}\Omega$
  3.  $7.9\text{ k}\Omega$
  4.  $9.9\text{ k}\Omega$

Question Type : **MCQ**

Question ID : **4050361713**

Option 1 ID : **4050366210**

Option 2 ID : **4050366207**

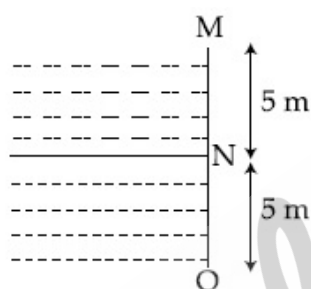
Option 3 ID : **4050366209**

Option 4 ID : **4050366208**

Status : **Not Answered**

Chosen Option : --

**Q.20**



Two liquids of densities  $\rho_1$  and  $\rho_2$  ( $\rho_2 = 2\rho_1$ ) are filled up behind a square wall of side  $10\text{ m}$  as shown in figure. Each liquid has a height of  $5\text{ m}$ . The ratio of the forces due to these liquids exerted on upper part  $MN$  to that at the lower part  $NO$  is (Assume that the liquids are not mixing) :

- Options
1.  $1/3$
  2.  $2/3$
  3.  $1/2$
  4.  $1/4$

Question Type : **MCQ**

Question ID : **4050361699**

Option 1 ID : **4050366153**

Option 2 ID : **4050366151**

Option 3 ID : **4050366152**

Option 4 ID : **4050366154**

Status : **Answered**

Chosen Option : **3**

**Q.21** A ball is dropped from the top of a 100 m high tower on a planet. In the last  $\frac{1}{2}$  s before hitting the ground, it covers a distance of 19 m. Acceleration due to gravity (in  $\text{ms}^{-2}$ ) near the surface on that planet is \_\_\_\_\_.

Given **9.8**  
Answer :

Question Type : **SA**  
Question ID : **4050361714**  
Status : **Answered**

**Q.22** The first member of the Balmer series of hydrogen atom has a wavelength of 6561 Å. The wavelength of the second member of the Balmer series (in nm) is \_\_\_\_\_.

Given --  
Answer :

Question Type : **SA**  
Question ID : **4050361718**  
Status : **Not Attempted and Marked For Review**

**Q.23** The series combination of two batteries, both of the same emf 10 V, but different internal resistance of  $20\ \Omega$  and  $5\ \Omega$ , is connected to the parallel combination of two resistors  $30\ \Omega$  and  $R\ \Omega$ . The voltage difference across the battery of internal resistance  $20\ \Omega$  is zero, the value of  $R$  (in  $\Omega$ ) is \_\_\_\_\_.

Given **2**  
Answer :

Question Type : **SA**  
Question ID : **4050361717**  
Status : **Answered**



Q.24

Three containers  $C_1$ ,  $C_2$  and  $C_3$  have water at different temperatures. The table below shows the final temperature  $T$  when different amounts of water (given in liters) are taken from each container and mixed (assume no loss of heat during the process)

$C_1$	$C_2$	$C_3$	$T$
1l	2l	--	60°C
--	1l	2l	30°C
2l	--	1l	60°C
1l	1l	1l	$\theta$

The value of  $\theta$  (in °C to the nearest integer) is \_\_\_\_\_.

Given 90

Answer :

Question Type : SA

Question ID : 4050361716

Status : Answered

Q.25

An asteroid is moving directly towards the centre of the earth. When at a distance of  $10R$  ( $R$  is the radius of the earth) from the earth's centre, it has a speed of 12 km/s. Neglecting the effect of earth's atmosphere, what will be the speed of the asteroid when it hits the surface of the earth (escape velocity from the earth is 11.2 km/s)? Give your answer to the nearest integer in kilometer/s \_\_\_\_\_.

Given 11.2

Answer :

Question Type : SA

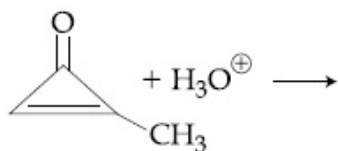
Question ID : 4050361715

Status : Answered

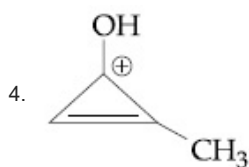
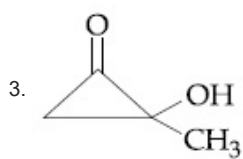
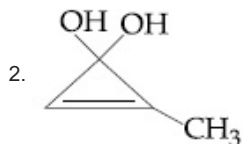
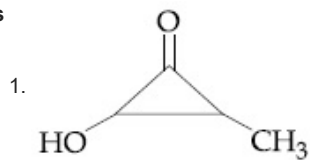
Section : Chemistry



Q.1 The major product in the following reaction is :



Options



Question Type : MCQ

Question ID : 4050361734

Option 1 ID : 4050366278

Option 2 ID : 4050366277

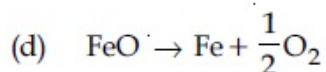
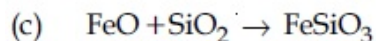
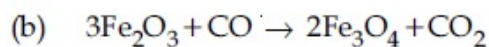
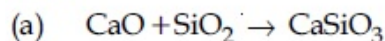
Option 3 ID : 4050366276

Option 4 ID : 4050366279

Status : Answered

Chosen Option : 4

**Q.2** Among the reactions (a) - (d), the reaction(s) that does/do not occur in the blast furnace during the extraction of iron is/are :



**Options** 1. (a)

2. (a) and (d)

3. (c) and (d)

4. (d)

Question Type : **MCQ**

Question ID : **4050361726**

Option 1 ID : **4050366244**

Option 2 ID : **4050366247**

Option 3 ID : **4050366246**

Option 4 ID : **4050366245**

Status : **Not Answered**

Chosen Option : --

**Q.3** Hydrogen has three isotopes (A), (B) and (C). If the number of neutron(s) in (A), (B) and (C) respectively, are (x), (y) and (z), the sum of (x), (y) and (z) is :

**Options** 1. 3

2. 2

3. 4

4. 1

Question Type : **MCQ**

Question ID : **4050361727**

Option 1 ID : **4050366250**

Option 2 ID : **4050366249**

Option 3 ID : **4050366251**

Option 4 ID : **4050366248**

Status : **Answered**

Chosen Option : **1**

**Q.4** For the following Assertion and Reason, the correct option is :

**Assertion :** For hydrogenation reactions, the catalytic activity increases from Group 5 to Group 11 metals with maximum activity shown by Group 7 - 9 elements.

**Reason :** The reactants are most strongly adsorbed on group 7 - 9 elements.

- Options**
1. The assertion is true, but the reason is false.
  2. Both assertion and reason are false.
  3. Both assertion and reason are true and the reason is the correct explanation for the assertion.
  4. Both assertion and reason are true but the reason is not the correct explanation for the assertion.

Question Type : **MCQ**

Question ID : **4050361719**

Option 1 ID : **4050366218**

Option 2 ID : **4050366219**

Option 3 ID : **4050366216**

Option 4 ID : **4050366217**

Status : **Answered**

Chosen Option : **3**

**Q.5** Two monomers in maltose are :

- Options**
1.  $\alpha$ -D-glucose and  $\beta$ -D-glucose
  2.  $\alpha$ -D-glucose and  $\alpha$ -D-galactose
  3.  $\alpha$ -D-glucose and  $\alpha$ -D-Fructose
  4.  $\alpha$ -D-glucose and  $\alpha$ -D-glucose

Question Type : **MCQ**

Question ID : **4050361732**

Option 1 ID : **4050366271**

Option 2 ID : **4050366270**

Option 3 ID : **4050366268**

Option 4 ID : **4050366269**

Status : **Answered**

Chosen Option : **1**

**Q.6** Preparation of Bakelite proceeds via reactions :

Options

1. Electrophilic addition and dehydration
2. Condensation and elimination
3. Electrophilic substitution and dehydration
4. Nucleophilic addition and dehydration

Question Type : **MCQ**

Question ID : **4050361736**

Option 1 ID : **4050366285**

Option 2 ID : **4050366287**

Option 3 ID : **4050366284**

Option 4 ID : **4050366286**

Status : **Answered**

Chosen Option : **4**

**Q.7** The radius of the second Bohr orbit, in terms of the Bohr radius,  $a_0$ , in  $\text{Li}^{2+}$  is :

Options

1.  $\frac{2a_0}{3}$
2.  $\frac{4a_0}{9}$
3.  $\frac{4a_0}{3}$
4.  $\frac{2a_0}{9}$

Question Type : **MCQ**

Question ID : **4050361722**

Option 1 ID : **4050366228**

Option 2 ID : **4050366231**

Option 3 ID : **4050366229**

Option 4 ID : **4050366230**

Status : **Answered**

Chosen Option : **4**

**Q.8** A metal (A) on heating in nitrogen gas gives compound B. B on treatment with  $\text{H}_2\text{O}$  gives a colourless gas which when passed through  $\text{CuSO}_4$  solution gives a dark blue-violet coloured solution. A and B respectively, are :

- Options**
1. Na and  $\text{NaNO}_3$
  2. Na and  $\text{Na}_3\text{N}$
  3. Mg and  $\text{Mg}_3\text{N}_2$
  4. Mg and  $\text{Mg}(\text{NO}_3)_2$

Question Type : **MCQ**

Question ID : **4050361728**

Option 1 ID : **4050366255**

Option 2 ID : **4050366252**

Option 3 ID : **4050366253**

Option 4 ID : **4050366254**

Status : **Answered**

Chosen Option : **3**

**Q.9** Among (a) - (d), the complexes that can display geometrical isomerism are :

- (a)  $[\text{Pt}(\text{NH}_3)_3\text{Cl}]^+$
- (b)  $[\text{Pt}(\text{NH}_3)\text{Cl}_5]^-$
- (c)  $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NO}_2)]$
- (d)  $[\text{Pt}(\text{NH}_3)_4\text{ClBr}]^{2+}$

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

Question Type : **MCQ**

Question ID : **4050361731**

Option 1 ID : **4050366265**

Option 2 ID : **4050366267**

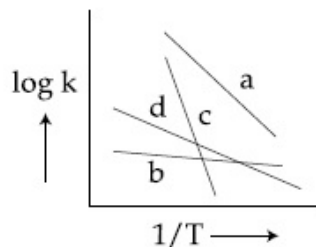
Option 3 ID : **4050366266**

Option 4 ID : **4050366264**

Status : **Answered**

Chosen Option : **3**

Q.10 Consider the following plots of rate constant versus  $\frac{1}{T}$  for four different reactions. Which of the following orders is correct for the activation energies of these reactions ?



- Options
1.  $E_b > E_a > E_d > E_c$
  2.  $E_a > E_c > E_d > E_b$
  3.  $E_c > E_a > E_d > E_b$
  4.  $E_b > E_d > E_c > E_a$

Question Type : MCQ

Question ID : 4050361720

Option 1 ID : 4050366223

Option 2 ID : 4050366221

Option 3 ID : 4050366222

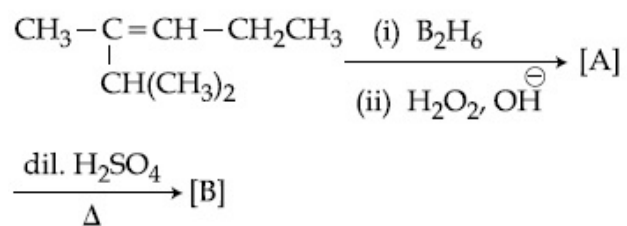
Option 4 ID : 4050366220

Status : Marked For Review

Chosen Option : 4

Q.11

The major product [B] in the following sequence of reactions is :



Options

1.  $\begin{array}{c} \text{CH}_2 = \text{C} - \text{CH}_2\text{CH}_2\text{CH}_3 \\ | \\ \text{CH}(\text{CH}_3)_2 \end{array}$
2.  $\begin{array}{c} \text{CH}_3 - \text{C} - \text{CH}_2\text{CH}_2\text{CH}_3 \\ || \\ \text{C} \\ / \quad \backslash \\ \text{H}_3\text{C} \quad \text{CH}_3 \end{array}$
3.  $\begin{array}{c} \text{CH}_3 - \text{C} = \text{CH} - \text{CH}_2\text{CH}_3 \\ | \\ \text{CH}(\text{CH}_3)_2 \end{array}$
4.  $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH} = \text{CH} - \text{CH}_3 \\ | \\ \text{CH}(\text{CH}_3)_2 \end{array}$

Question Type : MCQ

Question ID : 4050361738

Option 1 ID : 4050366293

Option 2 ID : 4050366295

Option 3 ID : 4050366294

Option 4 ID : 4050366292

Status : Not Answered

Chosen Option : --

**Q.12** The correct order of the calculated spin-only magnetic moments of complexes (A) to (D) is :

- (A)  $\text{Ni}(\text{CO})_4$   
 (B)  $[\text{Ni}(\text{H}_2\text{O})_6]\text{Cl}_2$   
 (C)  $\text{Na}_2[\text{Ni}(\text{CN})_4]$   
 (D)  $\text{PdCl}_2(\text{PPh}_3)_2$

- Options**
1.  $(A) \approx (C) < (B) \approx (D)$
  2.  $(C) < (D) < (B) < (A)$
  3.  $(C) \approx (D) < (B) < (A)$
  4.  $(A) \approx (C) \approx (D) < (B)$

Question Type : **MCQ**

Question ID : **4050361730**

Option 1 ID : **4050366262**

Option 2 ID : **4050366260**

Option 3 ID : **4050366261**

Option 4 ID : **4050366263**

Status : **Not Attempted and Marked For Review**

Chosen Option : --

**Q.13** Arrange the following bonds according to their average bond energies in descending order :

$\text{C} - \text{Cl}$ ,  $\text{C} - \text{Br}$ ,  $\text{C} - \text{F}$ ,  $\text{C} - \text{I}$

- Options**
1.  $\text{C} - \text{F} > \text{C} - \text{Cl} > \text{C} - \text{Br} > \text{C} - \text{I}$
  2.  $\text{C} - \text{Br} > \text{C} - \text{I} > \text{C} - \text{Cl} > \text{C} - \text{F}$
  3.  $\text{C} - \text{I} > \text{C} - \text{Br} > \text{C} - \text{Cl} > \text{C} - \text{F}$
  4.  $\text{C} - \text{Cl} > \text{C} - \text{Br} > \text{C} - \text{I} > \text{C} - \text{F}$

Question Type : **MCQ**

Question ID : **4050361723**

Option 1 ID : **4050366233**

Option 2 ID : **4050366235**

Option 3 ID : **4050366234**

Option 4 ID : **4050366232**

Status : **Answered**

Chosen Option : 1



Q.14 Kjeldahl's method cannot be used to estimate nitrogen for which of the following compounds ?

- Options
1.  $\text{C}_6\text{H}_5\text{NH}_2$
  2.  $\text{CH}_3\text{CH}_2-\text{C}\equiv\text{N}$
  3.  $\text{C}_6\text{H}_5\text{NO}_2$
  4. 
$$\begin{array}{c} \text{O} \\ || \\ \text{NH}_2-\text{C}-\text{NH}_2 \end{array}$$

Question Type : **MCQ**

Question ID : **4050361733**

Option 1 ID : **4050366275**

Option 2 ID : **4050366273**

Option 3 ID : **4050366274**

Option 4 ID : **4050366272**

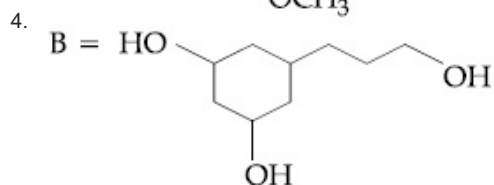
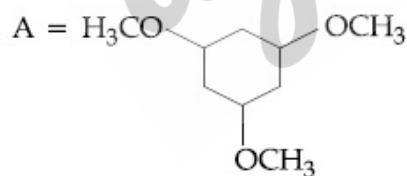
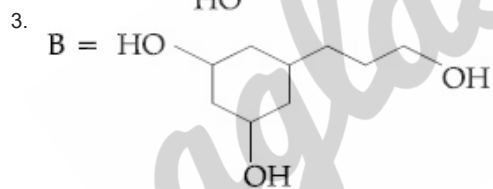
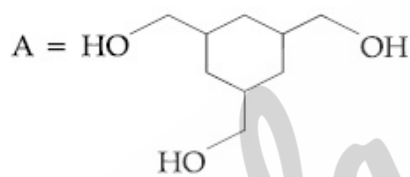
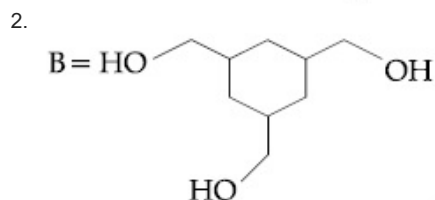
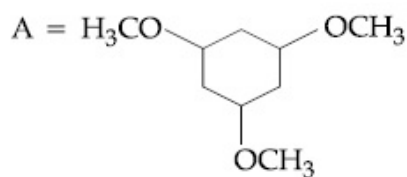
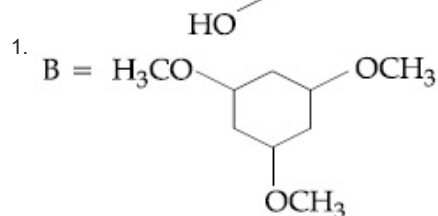
Status : **Answered**

Chosen Option : **4**

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Q.15 Among the compounds A and B with molecular formula  $C_9H_{18}O_3$ , A is having higher boiling point than B. The possible structures of A and B are :

Options



Question Type : MCQ

Question ID : 4050361737

Option 1 ID : 4050366289

Option 2 ID : 4050366291

Option 3 ID : 4050366288

Option 4 ID : 4050366290

Status : Answered

Chosen Option : 2

**Q.16** For the following Assertion and Reason, the correct option is :

**Assertion :** The pH of water increases with increase in temperature.

**Reason :** The dissociation of water into  $H^+$  and  $OH^-$  is an exothermic reaction.

- Options**
- Both assertion and reason are true, and the reason is the correct explanation for the assertion.
  - Both assertion and reason are false.
  - Both assertion and reason are true, but the reason is not the correct explanation for the assertion.
  - Assertion is not true, but reason is true.

Question Type : **MCQ**

Question ID : **4050361721**

Option 1 ID : **4050366224**

Option 2 ID : **4050366227**

Option 3 ID : **4050366225**

Option 4 ID : **4050366226**

Status : **Marked For Review**

Chosen Option : **4**

**Q.17** Which of the following compounds is likely to show both Frenkel and Schottky defects in its crystalline form ?

- Options**
- AgBr
  - CsCl
  - KBr
  - ZnS

Question Type : **MCQ**

Question ID : **4050361724**

Option 1 ID : **4050366239**

Option 2 ID : **4050366237**

Option 3 ID : **4050366238**

Option 4 ID : **4050366236**

Status : **Marked For Review**

Chosen Option : **2**

Q.18 White phosphorus on reaction with concentrated NaOH solution in an inert atmosphere of  $\text{CO}_2$  gives phosphine and compound (X). (X) on acidification with HCl gives compound (Y). The basicity of compound (Y) is :

- Options
- 2
  - 1
  - 4
  - 3

Question Type : MCQ

Question ID : 4050361729

Option 1 ID : 4050366257

Option 2 ID : 4050366256

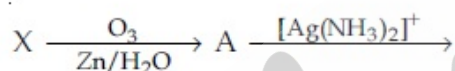
Option 3 ID : 4050366259

Option 4 ID : 4050366258

Status : Marked For Review

Chosen Option : 2

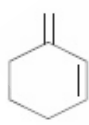
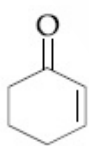
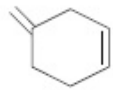
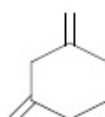
Q.19 An unsaturated hydrocarbon X absorbs two hydrogen molecules on catalytic hydrogenation, and also gives following reaction :



B(3-oxo-hexanedicarboxylic acid)

X will be :

Options

- 
- 
- 
- 

Question Type : MCQ

Question ID : 4050361735

Option 1 ID : 4050366280

Option 2 ID : 4050366281

Option 3 ID : 4050366282

Option 4 ID : 4050366283

Status : Answered

Chosen Option : 2

**Q.20** The increasing order of the atomic radii of the following elements is :

- (a) C (b) O (c) F  
(d) Cl (e) Br

**Options** 1. (b) < (c) < (d) < (a) < (e)

2. (d) < (c) < (b) < (a) < (e)

3. (c) < (b) < (a) < (d) < (e)

4. (a) < (b) < (c) < (d) < (e)

Question Type : **MCQ**

Question ID : **4050361725**

Option 1 ID : **4050366241**

Option 2 ID : **4050366243**

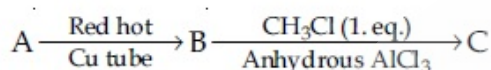
Option 3 ID : **4050366242**

Option 4 ID : **4050366240**

Status : **Answered**

Chosen Option : **3**

**Q.21** In the following sequence of reactions the maximum number of atoms present in molecule 'C' in one plane is \_\_\_\_\_.



(A is a lowest molecular weight alkyne)

Given 12  
Answer :

Question Type : **SA**

Question ID : **4050361743**

Status : **Answered**

**Q.22** For an electrochemical cell



the ratio  $\frac{[\text{Sn}^{2+}]}{[\text{Pb}^{2+}]}$  when this cell attains equilibrium is \_\_\_\_\_.

$$\left( \text{Given : } E_{\text{Sn}^{2+}|\text{Sn}}^0 = -0.14\text{V}, \right.$$

$$\left. E_{\text{Pb}^{2+}|\text{Pb}}^0 = -0.13\text{V}, \frac{2.303RT}{F} = 0.06 \right)$$

Given 1  
Answer :

Question Type : **SA**

Question ID : **4050361741**

Status : **Answered**

**Q.23** At constant volume, 4 mol of an ideal gas when heated from 300 K to 500 K changes its internal energy by 5000 J. The molar heat capacity at constant volume is \_\_\_\_\_.

Given **100**

Answer :

Question Type : **SA**

Question ID : **4050361740**

Status : **Answered**

**Q.24** Complexes ( $ML_5$ ) of metals Ni and Fe have ideal square pyramidal and trigonal bipyramidal geometries, respectively. The sum of the  $90^\circ$ ,  $120^\circ$  and  $180^\circ$  L-M-L angles in the two complexes is \_\_\_\_\_.

Given **390**

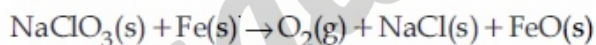
Answer :

Question Type : **SA**

Question ID : **4050361742**

Status : **Answered**

**Q.25**  $NaClO_3$  is used, even in spacecrafts, to produce  $O_2$ . The daily consumption of pure  $O_2$  by a person is 492 L at 1 atm, 300 K. How much amount of  $NaClO_3$ , in grams, is required to produce  $O_2$  for the daily consumption of a person at 1 atm, 300 K ? \_\_\_\_\_.



$$R = 0.082 \text{ L atm mol}^{-1} \text{ K}^{-1}$$

Given **400**

Answer :

Question Type : **SA**

Question ID : **4050361739**

Status : **Answered**

Section : **Mathematics**

Q.1

$\lim_{x \rightarrow 0} \frac{\int_0^x t \sin(10t) dt}{x}$  is equal to :

Options 1. 0

2.  $\frac{1}{10}$

3.  $-\frac{1}{5}$

4.  $-\frac{1}{10}$

Question Type : MCQ

Question ID : 4050361751

Option 1 ID : 4050366332

Option 2 ID : 4050366330

Option 3 ID : 4050366329

Option 4 ID : 4050366331

Status : Not Answered

Chosen Option : --

Q.2

The length of the perpendicular from the origin, on the normal to the curve,  $x^2 + 2xy - 3y^2 = 0$  at the point (2, 2) is :

Options 1.  $\sqrt{2}$ 

2.  $4\sqrt{2}$

3. 2

4.  $2\sqrt{2}$

Question Type : MCQ

Question ID : 4050361753

Option 1 ID : 4050366337

Option 2 ID : 4050366340

Option 3 ID : 4050366338

Option 4 ID : 4050366339

Status : Not Answered

Chosen Option : --



Q.3

Let  $\vec{a} = \hat{i} - 2\hat{j} + \hat{k}$  and

$\vec{b} = \hat{i} - \hat{j} + \hat{k}$  be two vectors. If  $\vec{c}$  is a

vector such that  $\vec{b} \times \vec{c} = \vec{b} \times \vec{a}$  and

$\vec{c} \cdot \vec{a} = 0$ , then  $\vec{c} \cdot \vec{b}$  is equal to :

Options

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

Question Type : MCQ

Question ID : 4050361760

Option 1 ID : 4050366368

Option 2 ID : 4050366365

Option 3 ID : 4050366366

Option 4 ID : 4050366367

Status : Answered

Chosen Option : 2

Q.4

The area (in sq. units) of the region  $\{(x, y) \in \mathbb{R}^2 : x^2 \leq y \leq 3 - 2x\}$ , is :

Options

1.  $\frac{32}{3}$
2.  $\frac{34}{3}$
3.  $\frac{29}{3}$
4.  $\frac{31}{3}$

Question Type : MCQ

Question ID : 4050361755

Option 1 ID : 4050366345

Option 2 ID : 4050366348

Option 3 ID : 4050366346

Option 4 ID : 4050366347

Status : Not Answered

Chosen Option : --



Q.5

If  $A = \begin{pmatrix} 2 & 2 \\ 9 & 4 \end{pmatrix}$  and  $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ , then

$10A^{-1}$  is equal to :

- Options
1.  $A - 4I$
  2.  $6I - A$
  3.  $A - 6I$
  4.  $4I - A$

Question Type : **MCQ**

Question ID : **4050361747**

Option 1 ID : **4050366315**

Option 2 ID : **4050366313**

Option 3 ID : **4050366316**

Option 4 ID : **4050366314**

Status : **Answered**

Chosen Option : **3**

Q.6

The mean and variance of 20 observations are found to be 10 and 4, respectively. On rechecking, it was found that an observation 9 was incorrect and the correct observation was 11. Then the correct variance is :

- Options
1. 3.99
  2. 4.01
  3. 4.02
  4. 3.98

Question Type : **MCQ**

Question ID : **4050361761**

Option 1 ID : **4050366370**

Option 2 ID : **4050366371**

Option 3 ID : **4050366372**

Option 4 ID : **4050366369**

Status : **Not Attempted and Marked For Review**

Chosen Option : **--**

**Q.7** The differential equation of the family of curves,  $x^2 = 4b(y + b)$ ,  $b \in \mathbb{R}$ , is :

- Options**
1.  $x(y')^2 = x + 2yy'$
  2.  $x(y')^2 = 2yy' - x$
  3.  $xy'' = y'$
  4.  $x(y')^2 = x - 2yy'$

Question Type : **MCQ**

Question ID : **4050361756**

Option 1 ID : **4050366351**

Option 2 ID : **4050366352**

Option 3 ID : **4050366349**

Option 4 ID : **4050366350**

Status : **Not Answered**

Chosen Option : --

**Q.8** If a hyperbola passes through the point  $P(10, 16)$  and it has vertices at  $(\pm 6, 0)$ , then the equation of the normal to it at  $P$  is :

- Options**
1.  $3x + 4y = 94$
  2.  $2x + 5y = 100$
  3.  $x + 2y = 42$
  4.  $x + 3y = 58$

Question Type : **MCQ**

Question ID : **4050361758**

Option 1 ID : **4050366357**

Option 2 ID : **4050366360**

Option 3 ID : **4050366359**

Option 4 ID : **4050366358**

Status : **Not Attempted and Marked For Review**

Chosen Option : --

**Q.9** Which of the following statements is a tautology ?

- Options**
1.  $p \vee (\sim q) \rightarrow p \wedge q$
  2.  $\sim(p \wedge \sim q) \rightarrow p \vee q$
  3.  $\sim(p \vee \sim q) \rightarrow p \wedge q$
  4.  $\sim(p \vee \sim q) \rightarrow p \vee q$

Question Type : **MCQ**

Question ID : **4050361763**

Option 1 ID : **4050366377**

Option 2 ID : **4050366379**

Option 3 ID : **4050366378**

Option 4 ID : **4050366380**

Status : **Answered**

Chosen Option : **4**

Q.10

If the 10<sup>th</sup> term of an A.P. is  $\frac{1}{20}$  and its 20<sup>th</sup> term is  $\frac{1}{10}$ , then the sum of its first 200 terms is :

Options 1. 50

2.  $50\frac{1}{4}$

3. 100

4.  $100\frac{1}{2}$

Question Type : MCQ

Question ID : 4050361750

Option 1 ID : 4050366325

Option 2 ID : 4050366326

Option 3 ID : 4050366327

Option 4 ID : 4050366328

Status : Answered

Chosen Option : 3

Q.11

Let  $\alpha = \frac{-1 + i\sqrt{3}}{2}$ . If

$$a = (1 + \alpha) \sum_{k=0}^{100} \alpha^{2k} \text{ and } b = \sum_{k=0}^{100} \alpha^{3k}, \text{ then}$$

a and b are the roots of the quadratic equation :

Options 1.  $x^2 + 101x + 100 = 0$

2.  $x^2 - 102x + 101 = 0$

3.  $x^2 - 101x + 100 = 0$

4.  $x^2 + 102x + 101 = 0$

Question Type : MCQ

Question ID : 4050361745

Option 1 ID : 4050366305

Option 2 ID : 4050366308

Option 3 ID : 4050366307

Option 4 ID : 4050366306

Status : Answered

Chosen Option : 3

**Q.12** Let  $S$  be the set of all functions  $f: [0, 1] \rightarrow \mathbb{R}$ , which are continuous on  $[0, 1]$  and differentiable on  $(0, 1)$ . Then for every  $f$  in  $S$ , there exists a  $c \in (0, 1)$ , depending on  $f$ , such that :

- Options**
1.  $|f(c) - f(1)| < (1 - c) |f'(c)|$
  2.  $\frac{f(1) - f(c)}{1 - c} = f'(c)$
  3.  $|f(c) + f(1)| < (1 + c) |f'(c)|$
  4.  $|f(c) - f(1)| < |f'(c)|$

Question Type : **MCQ**

Question ID : **4050361752**

Option 1 ID : **4050366334**

Option 2 ID : **4050366336**

Option 3 ID : **4050366335**

Option 4 ID : **4050366333**

Status : **Answered**

Chosen Option : **2**

**Q.13** Let  $A$  and  $B$  be two events such that the probability that exactly one of them occurs is  $\frac{2}{5}$  and the probability that  $A$  or  $B$  occurs is  $\frac{1}{2}$ , then the probability of both of them occur together is :

- Options**
1. 0.02
  2. 0.20
  3. 0.01
  4. 0.10

Question Type : **MCQ**

Question ID : **4050361762**

Option 1 ID : **4050366374**

Option 2 ID : **4050366376**

Option 3 ID : **4050366373**

Option 4 ID : **4050366375**

Status : **Answered**

Chosen Option : **2**

Q.14

If  $I = \int_1^2 \frac{dx}{\sqrt{2x^3 - 9x^2 + 12x + 4}}$ , then :

Options

1.  $\frac{1}{8} < I^2 < \frac{1}{4}$
2.  $\frac{1}{9} < I^2 < \frac{1}{8}$
3.  $\frac{1}{16} < I^2 < \frac{1}{9}$
4.  $\frac{1}{6} < I^2 < \frac{1}{2}$

Question Type : MCQ

Question ID : 4050361754

Option 1 ID : 4050366343

Option 2 ID : 4050366341

Option 3 ID : 4050366342

Option 4 ID : 4050366344

Status : Not Answered

Chosen Option : --

Q.15

Let  $f : (1, 3) \rightarrow \mathbb{R}$  be a function defined by

$$f(x) = \frac{x[x]}{1+x^2}, \text{ where } [x] \text{ denotes the}$$

greatest integer  $\leq x$ . Then the range of  $f$  is :

Options

1.  $\left(\frac{2}{5}, \frac{3}{5}\right] \cup \left(\frac{3}{4}, \frac{4}{5}\right)$
2.  $\left(\frac{2}{5}, \frac{1}{2}\right) \cup \left(\frac{3}{5}, \frac{4}{5}\right]$
3.  $\left(\frac{2}{5}, \frac{4}{5}\right]$
4.  $\left(\frac{3}{5}, \frac{4}{5}\right)$

Question Type : MCQ

Question ID : 4050361744

Option 1 ID : 4050366304

Option 2 ID : 4050366303

Option 3 ID : 4050366302

Option 4 ID : 4050366301

Status : Answered

Chosen Option : 2

**Q.16** The mirror image of the point  $(1, 2, 3)$  in a plane is  $\left(-\frac{7}{3}, -\frac{4}{3}, -\frac{1}{3}\right)$ . Which of the following points lies on this plane ?

- Options**
1.  $(1, 1, 1)$
  2.  $(1, -1, 1)$
  3.  $(-1, -1, 1)$
  4.  $(-1, -1, -1)$

Question Type : **MCQ**

Question ID : **4050361759**

Option 1 ID : **4050366362**

Option 2 ID : **4050366363**

Option 3 ID : **4050366364**

Option 4 ID : **4050366361**

Status : **Not Answered**

Chosen Option : --

**Q.17** The system of linear equations

$$\lambda x + 2y + 2z = 5$$

$$2\lambda x + 3y + 5z = 8$$

$$4x + \lambda y + 6z = 10 \text{ has :}$$

- Options**
1. no solution when  $\lambda = 8$
  2. a unique solution when  $\lambda = -8$
  3. no solution when  $\lambda = 2$
  4. infinitely many solutions when  $\lambda = 2$

Question Type : **MCQ**

Question ID : **4050361748**

Option 1 ID : **4050366318**

Option 2 ID : **4050366317**

Option 3 ID : **4050366320**

Option 4 ID : **4050366319**

Status : **Answered**

Chosen Option : **3**

**Q.18** Let  $S$  be the set of all real roots of the equation,  $3^x(3^x - 1) + 2 = |3^x - 1| + |3^x - 2|$ . Then  $S$  :

- Options**
1. contains exactly two elements.
  2. is a singleton.
  3. is an empty set.
  4. contains at least four elements.

Question Type : **MCQ**

Question ID : **4050361746**

Option 1 ID : **4050366311**

Option 2 ID : **4050366310**

Option 3 ID : **4050366309**

Option 4 ID : **4050366312**

Status : **Answered**

Chosen Option : 1

**Q.19** If  $\alpha$  and  $\beta$  be the coefficients of  $x^4$  and  $x^2$  respectively in the expansion of

$$\left(x + \sqrt{x^2 - 1}\right)^6 + \left(x - \sqrt{x^2 - 1}\right)^6, \text{ then :}$$

- Options**
1.  $\alpha + \beta = 60$
  2.  $\alpha + \beta = -30$
  3.  $\alpha - \beta = 60$
  4.  $\alpha - \beta = -132$

Question Type : **MCQ**

Question ID : **4050361749**

Option 1 ID : **4050366321**

Option 2 ID : **4050366323**

Option 3 ID : **4050366324**

Option 4 ID : **4050366322**

Status : **Answered**

Chosen Option : 2



**Q.20** If a line,  $y = mx + c$  is a tangent to the circle,  $(x - 3)^2 + y^2 = 1$  and it is perpendicular to a line  $L_1$ , where  $L_1$  is the tangent to the circle,  $x^2 + y^2 = 1$  at the point  $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ ; then :

- Options**
1.  $c^2 - 7c + 6 = 0$
  2.  $c^2 + 7c + 6 = 0$
  3.  $c^2 + 6c + 7 = 0$
  4.  $c^2 - 6c + 7 = 0$

Question Type : **MCQ**

Question ID : **4050361757**

Option 1 ID : **4050366353**

Option 2 ID : **4050366354**

Option 3 ID : **4050366355**

Option 4 ID : **4050366356**

Status : **Answered**

Chosen Option : **3**

**Q.21** Let a line  $y = mx$  ( $m > 0$ ) intersect the parabola,  $y^2 = x$  at a point P, other than the origin. Let the tangent to it at P meet the x-axis at the point Q. If area  $(\Delta OPQ) = 4$  sq. units, then m is equal to \_\_\_\_\_.

Given 1  
Answer :

Question Type : **SA**

Question ID : **4050361767**

Status : **Answered**

**Q.22** The number of 4 letter words (with or without meaning) that can be formed from the eleven letters of the word 'EXAMINATION' is \_\_\_\_\_.

Given 330  
Answer :

Question Type : **SA**

Question ID : **4050361764**

Status : **Answered**



Q.23

The sum,  $\sum_{n=1}^7 \frac{n(n+1)(2n+1)}{4}$  is equal to

\_\_\_\_\_.

Given 343

Answer :

Question Type : SA

Question ID : 4050361765

Status : Answered

Q.24

Let  $f(x)$  be a polynomial of degree 3 such that  $f(-1) = 10$ ,  $f(1) = -6$ ,  $f(x)$  has a critical point at  $x = -1$  and  $f'(x)$  has a critical point at  $x = 1$ . Then  $f(x)$  has a local minima at  $x =$  \_\_\_\_\_.

Given -1

Answer :

Question Type : SA

Question ID : 4050361766

Status : Answered

Q.25

If  $\frac{\sqrt{2} \sin \alpha}{\sqrt{1 + \cos 2\alpha}} = \frac{1}{7}$  and  $\sqrt{\frac{1 - \cos 2\beta}{2}} = \frac{1}{\sqrt{10}}$ ,

$\alpha, \beta \in \left(0, \frac{\pi}{2}\right)$ , then  $\tan(\alpha + 2\beta)$  is equal to

\_\_\_\_\_.

Given 1.63

Answer :

Question Type : SA

Question ID : 4050361768

Status : Answered