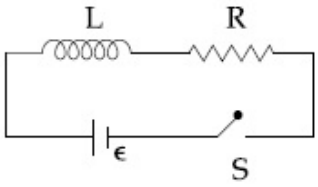
NTA JEE 7th to 9th Jan 2020

Application No.	
Candidate Name	
Roll No.	
Test Date	08/01/2020
Test Time	2:30 PM - 5:30 PM
Subject	BTECH

Section : **Physics**

Q.1



As shown in the figure, a battery of emf ϵ 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. $\frac{\epsilon L}{R^2}\left(1-\frac{1}{e}\right)$
2. $\frac{\epsilon L}{R^2}$
3. $\frac{\epsilon R}{eL^2}$
4. $\frac{\epsilon L}{eR^2}$

Question Type : **MCQ**
Question ID : **4050361707**
Option 1 ID : **4050366186**
Option 2 ID : **4050366185**
Option 3 ID : **4050366184**
Option 4 ID : **4050366183**
Status : **Not Answered**
Chosen Option : **--**

Q.2 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. 2.40%
2. 5.40%
3. 4.40%
4. 3.40%

Question Type : **MCQ**
Question ID : **4050361694**
Option 1 ID : **4050366132**
Option 2 ID : **4050366134**
Option 3 ID : **4050366133**
Option 4 ID : **4050366131**
Status : **Answered**
Chosen Option : **4**

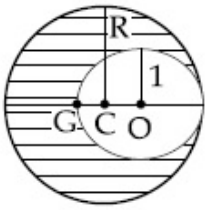
Q.3 A particle of mass m is dropped from a height h above the ground. At the same time another particle of the same mass is thrown vertically upwards from the ground with a speed of $\sqrt{2gh}$. If they collide head-on completely inelastically, the time taken for the combined mass to reach the ground, in units of $\sqrt{\frac{h}{g}}$ is :

Options

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

Question Type : **MCQ**
Question ID : **4050361696**
Option 1 ID : **4050366142**
Option 2 ID : **4050366139**
Option 3 ID : **4050366140**
Option 4 ID : **4050366141**
Status : **Answered**
Chosen Option : **1**

Q.4



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 : **4050366143**
Option 3 ID : **4050366146**
Option 4 ID : **4050366144**
Status : **Not Answered**
Chosen Option : **--**

Q.5 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 $\vec{B} = 5 \times 10^{-8} \hat{j}\ T$. The corresponding electric field $\vec{E}$ is (speed of light $c = 3 \times 10^8\ ms^{-1}$)

Options

1. $-1.66 \times 10^{-16} \hat{i}\ V/m$

2. $1.66 \times 10^{-16} \hat{i}\ V/m$

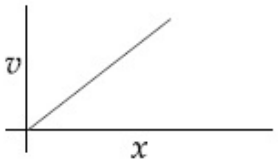
3. $-15 \hat{i}\ V/m$

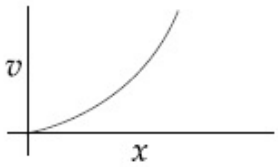
4. $15 \hat{i}\ V/m$

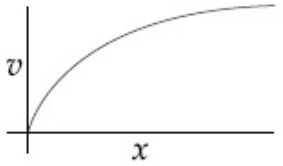
Question Type : **MCQ**
Question ID : **4050361708**
Option 1 ID : **4050366190**
Option 2 ID : **4050366189**
Option 3 ID : **4050366188**
Option 4 ID : **4050366187**
Status : **Answered**
Chosen Option : **4**

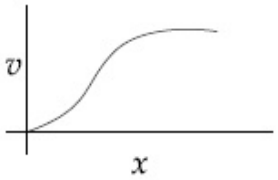
Q.6 A particle of mass m and charge q is released from rest in a uniform electric field. If there is no other force on the particle, the dependence of its speed v on the distance x travelled by it is correctly given by (graphs are schematic and not drawn to scale)

Options

1. 

2. 

3. 

4. 

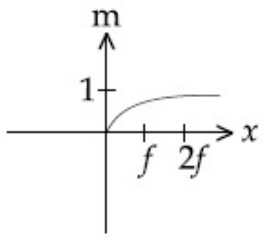
Question Type : **MCQ**
Question ID : **4050361706**
Option 1 ID : **4050366179**
Option 2 ID : **4050366180**
Option 3 ID : **4050366181**
Option 4 ID : **4050366182**
Status : **Answered**
Chosen Option : **1**

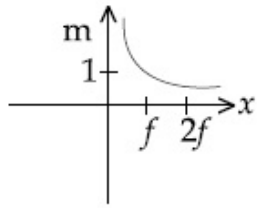
Q.7

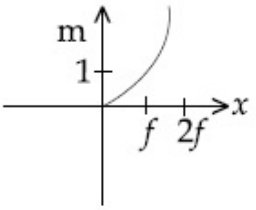
An object is gradually moving away from the focal point of a concave mirror along the axis of the mirror. The graphical representation of the magnitude of linear magnification (m) versus distance of the object from the mirror (x) is correctly given by

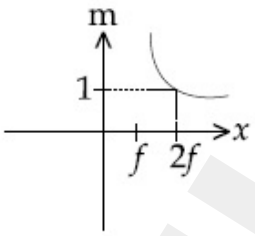
(Graphs are drawn schematically and are not to scale)

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050361709**
Option 1 ID : **4050366194**
Option 2 ID : **4050366192**
Option 3 ID : **4050366191**
Option 4 ID : **4050366193**
Status : **Answered**
Chosen Option : **3**

Q.8 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. 6.25×10^{-4} J
2. 1.13×10^{-3} J
3. 8.75×10^{-4} J
4. 8.75×10^{-3} J

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

Q.9 A particle moves such that its position vector $\vec{r}(t) = \cos\omega t\,\hat{i} + \sin\omega t\,\hat{j}$ where ω 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. $\vec{v}$ and $\vec{a}$ both are parallel to $\vec{r}$
2. $\vec{v}$ is perpendicular to $\vec{r}$ and $\vec{a}$ is directed away from the origin
3. $\vec{v}$ and $\vec{a}$ both are perpendicular 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 : **4050366135**
Option 2 ID : **4050366138**
Option 3 ID : **4050366136**
Option 4 ID : **4050366137**
Status : **Answered**
Chosen Option : **1**

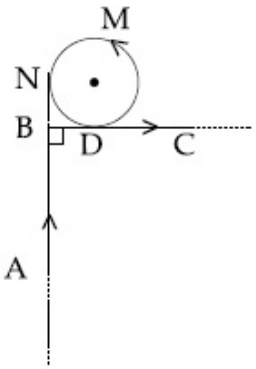
Q.10 A transverse wave travels on a taut steel wire with a velocity of v when tension in it is 2.06×10^4 N. When the tension is changed to T, the velocity changed to $v/2$. The value of T is close to :

Options

1. 10.2×10^2 N
2. 5.15×10^3 N
3. 2.50×10^4 N
4. 30.5×10^4 N

Question Type : **MCQ**
Question ID : **4050361702**
Option 1 ID : **4050366166**
Option 2 ID : **4050366164**
Option 3 ID : **4050366163**
Option 4 ID : **4050366165**
Status : **Answered**
Chosen Option : **1**

Q.11 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. $\frac{\mu_0 I}{2R}$

3. $\frac{\mu_0 I}{2\pi R}(\pi + 1)$

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

Question Type : **MCQ**
Question ID : **4050361705**
Option 1 ID : **4050366175**
Option 2 ID : **4050366177**
Option 3 ID : **4050366178**
Option 4 ID : **4050366176**
Status : **Answered**
Chosen Option : **2**

Q.12 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. 0.568
2. 0.853
3. 0.760
4. 0.672

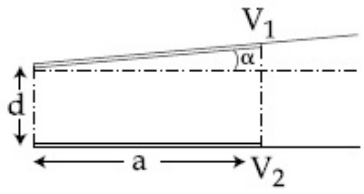
Question Type : **MCQ**
Question ID : **4050361710**
Option 1 ID : **4050366198**
Option 2 ID : **4050366195**
Option 3 ID : **4050366196**
Option 4 ID : **4050366197**
Status : **Answered**
Chosen Option : **3**

Q.13 A galvanometer having a coil resistance 100 Ω gives a full scale deflection when a current of 1 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 V ?

Options
1. 8.9 kΩ
2. 10 kΩ
3. 9.9 kΩ
4. 7.9 kΩ

Question Type : **MCQ**
Question ID : **4050361713**
Option 1 ID : **4050366207**
Option 2 ID : **4050366210**
Option 3 ID : **4050366208**
Option 4 ID : **4050366209**
Status : **Answered**
Chosen Option : **2**

Q.14 A capacitor is made of two square plates each of side 'a' making a very small angle α between them, as shown in figure. The capacitance will be close to :



Options

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

Question Type : **MCQ**
Question ID : **4050361704**
Option 1 ID : **4050366174**
Option 2 ID : **4050366173**
Option 3 ID : **4050366172**
Option 4 ID : **4050366171**
Status : **Answered**
Chosen Option : **3**

Q.15 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 λ_0 is initial de-Broglie wavelength of electron, its de-Broglie wave length at time t is given by :

Options

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

2. $\dfrac{\lambda_0}{\sqrt{2 + \dfrac{e^2E^2t^2}{m^2v_0^2}}}$

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

4. $\dfrac{\lambda_0\sqrt{2}}{\sqrt{1 + \dfrac{e^2E^2t^2}{m^2v_0^2}}}$

Question Type : **MCQ**
Question ID : **4050361711**
Option 1 ID : **4050366199**
Option 2 ID : **4050366201**
Option 3 ID : **4050366200**
Option 4 ID : **4050366202**
Status : **Not Answered**
Chosen Option : **--**

Q.16

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 :

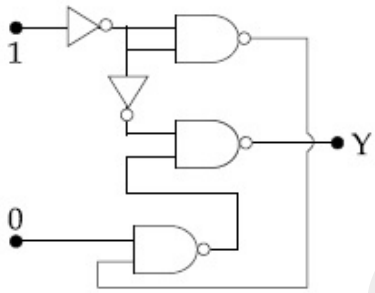
Options

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

Question Type : **MCQ**
Question ID : **4050361700**
Option 1 ID : **4050366156**
Option 2 ID : **4050366155**
Option 3 ID : **4050366157**
Option 4 ID : **4050366158**
Status : **Answered**
Chosen Option : **4**

Q.17

In the given circuit, value of Y is :

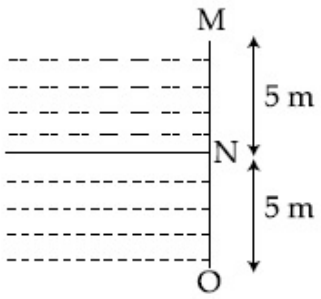


Options

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

Question Type : **MCQ**
Question ID : **4050361712**
Option 1 ID : **4050366205**
Option 2 ID : **4050366204**
Option 3 ID : **4050366203**
Option 4 ID : **4050366206**
Status : **Not Answered**
Chosen Option : **--**

Q.18



Two liquids of densities ρ_1 and $\rho_2(\rho_2 = 2\rho_1)$ are filled up behind a square wall of side 10 m as shown in figure. Each liquid has a height of 5 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. $1/2$
2. $2/3$
3. $1/4$
4. $1/3$

Question Type : **MCQ**
Question ID : **4050361699**
Option 1 ID : **4050366152**
Option 2 ID : **4050366151**
Option 3 ID : **4050366154**
Option 4 ID : **4050366153**
Status : **Answered**
Chosen Option : **1**

Q.19 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. $40/27$
2. $23/15$
3. $19/13$
4. $67/45$

Question Type : **MCQ**
Question ID : **4050361701**
Option 1 ID : **4050366162**
Option 2 ID : **4050366160**
Option 3 ID : **4050366161**
Option 4 ID : **4050366159**
Status : **Not Answered**
Chosen Option : **--**

Q.20 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. $\left(\frac{R_1}{R_2}\right)^3$
2. (R_2/R_1)
3. R_1/R_2
4. $(R_1/R_2)^2$

Question Type : **MCQ**
Question ID : **4050361703**
Option 1 ID : **4050366169**
Option 2 ID : **4050366170**
Option 3 ID : **4050366167**
Option 4 ID : **4050366168**
Status : **Not Answered**
Chosen Option : **--**

Q.21

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

Given **0.67**
Answer :

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

Q.22

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
1*l*	2*l*	--	60°C
–	1*l*	2*l*	30°C
2*l*	--	1*l*	60°C
1*l*	1*l*	1*l*	θ

The value of θ (in °C to the nearest integer) is _____.

Given **4**
Answer :

Question Type : **SA**
Question ID : **4050361716**
Status : **Answered**

Q.23 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 ms^{-2}) near the surface on that planet is _____.

Given **9.586**
Answer :

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

Q.24 An asteroid is moving directly towards the centre of the earth. When at a distance of 10 R (R is the radius of the earth) from the earths centre, it has a speed of 12 km/s. Neglecting the effect of earths 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 **1344**
Answer :

Question Type : **SA**
Question ID : **4050361715**
Status : **Answered**

Q.25 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 **15122**
Answer :

Question Type : **SA**
Question ID : **4050361718**
Status : **Answered**

Section : **Chemistry**

Q.1 Arrange the following bonds according to their average bond energies in descending order :

C – Cl, C – Br, C – F, C – I

Options
1. C – F > C – Cl > C – Br > C – I
2. C – Br > C – I > C – Cl > C – F
3. C – I > C – Br > C – Cl > C – F
4. C – Cl > C – Br > C – I > C – F

Question Type : **MCQ**
Question ID : **4050361723**
Option 1 ID : **4050366233**
Option 2 ID : **4050366235**
Option 3 ID : **4050366234**
Option 4 ID : **4050366232**
Status : **Not Answered**
Chosen Option : **--**

Q.2 Two monomers in maltose are :

Options
1. α–D–glucose and α–D–glucose
2. α–D–glucose and α–D–galactose
3. α–D–glucose and β–D–glucose
4. α–D–glucose and α–D–Fructose

Question Type : **MCQ**
Question ID : **4050361732**
Option 1 ID : **4050366269**
Option 2 ID : **4050366270**
Option 3 ID : **4050366271**
Option 4 ID : **4050366268**
Status : **Not Answered**
Chosen Option : **--**

Q.3 The correct order of the calculated spin-only magnetic moments of complexes (A) to (D) is :

(A) $Ni(CO)_4$

(B) $[Ni(H_2O)_6]Cl_2$

(C) $Na_2[Ni(CN)_4]$

(D) $PdCl_2(PPh_3)_2$

Options

1. (A) ≈ (C) < (B) ≈ (D)
2. (C) ≈ (D) < (B) < (A)
3. (C) < (D) < (B) < (A)
4. (A) ≈ (C) ≈ (D) < (B)

Question Type : **MCQ**
Question ID : **4050361730**
Option 1 ID : **4050366262**
Option 2 ID : **4050366261**
Option 3 ID : **4050366260**
Option 4 ID : **4050366263**
Status : **Not Answered**
Chosen Option : **--**

Q.4 Among the reactions (a) - (d), the reaction(s) that does/do not occur in the blast furnace during the extraction of iron is/are :

(a) $CaO + SiO_2 \rightarrow CaSiO_3$

(b) $3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$

(c) $FeO + SiO_2 \rightarrow FeSiO_3$

(d) $FeO \rightarrow Fe + \frac{1}{2}O_2$

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

Question Type : **MCQ**
Question ID : **4050361726**
Option 1 ID : **4050366246**
Option 2 ID : **4050366244**
Option 3 ID : **4050366247**
Option 4 ID : **4050366245**
Status : **Answered**
Chosen Option : **2**

Q.5 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

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

Question Type : **MCQ**
Question ID : **4050361721**
Option 1 ID : **4050366226**
Option 2 ID : **4050366224**
Option 3 ID : **4050366227**
Option 4 ID : **4050366225**
Status : **Answered**
Chosen Option : **3**

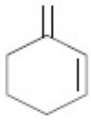
Q.6 An unsaturated hydrocarbon X absorbs two hydrogen molecules on catalytic hydrogenation, and also gives following reaction :

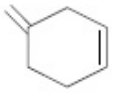
$$X \xrightarrow[Zn/H_2O]{O_3} A \xrightarrow{[Ag(NH_3)_2]^+}$$

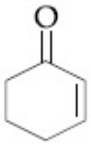
B(3-oxo-hexanedicarboxylic acid)

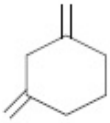
X will be :

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050361735**
Option 1 ID : **4050366280**
Option 2 ID : **4050366282**
Option 3 ID : **4050366281**
Option 4 ID : **4050366283**
Status : **Answered**
Chosen Option : **3**

Q.7 Which of the following compounds is likely to show both Frenkel and Schottky defects in its crystalline form ?

Options
1. AgBr
2. CsCl
3. KBr
4. ZnS

Question Type : **MCQ**
Question ID : **4050361724**
Option 1 ID : **4050366239**
Option 2 ID : **4050366237**
Option 3 ID : **4050366238**
Option 4 ID : **4050366236**
Status : **Answered**
Chosen Option : **1**

Q.8 The radius of the second Bohr orbit, in terms of the Bohr radius, a_0, in Li^{2+} is :

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

Question Type : **MCQ**
Question ID : **4050361722**
Option 1 ID : **4050366228**
Option 2 ID : **4050366229**
Option 3 ID : **4050366231**
Option 4 ID : **4050366230**
Status : **Not Answered**
Chosen Option : **--**

Q.9 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 true but the reason is not the correct explanation for the assertion.
3. Both assertion and reason are true and the reason is the correct explanation for the assertion.
4. Both assertion and reason are false.

Question Type : **MCQ**
Question ID : **4050361719**
Option 1 ID : **4050366218**
Option 2 ID : **4050366217**
Option 3 ID : **4050366216**
Option 4 ID : **4050366219**
Status : **Not Answered**
Chosen Option : **--**

Q.10 Preparation of Bakelite proceeds via reactions :

Options

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

Question Type : **MCQ**
Question ID : **4050361736**
Option 1 ID : **4050366285**
Option 2 ID : **4050366287**
Option 3 ID : **4050366286**
Option 4 ID : **4050366284**
Status : **Answered**
Chosen Option : **2**

Q.11 White phosphorus on reaction with concentrated NaOH solution in an inert atmosphere of CO_2 gives phosphine and compound (X). (X) on acidification with HCl gives compound (Y). The basicity of compound (Y) is :

Options

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

Question Type : **MCQ**
Question ID : **4050361729**
Option 1 ID : **4050366259**
Option 2 ID : **4050366258**
Option 3 ID : **4050366257**
Option 4 ID : **4050366256**
Status : **Not Answered**
Chosen Option : **--**

Q.12 Among (a) – (d), the complexes that can display geometrical isomerism are :

(a) $[Pt(NH_3)_3Cl]^+$

(b) $[Pt(NH_3)Cl_5]^-$

(c) $[Pt(NH_3)_2Cl(NO_2)]$

(d) $[Pt(NH_3)_4ClBr]^{2+}$

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

Question Type : **MCQ**
Question ID : **4050361731**
Option 1 ID : **4050366267**
Option 2 ID : **4050366266**
Option 3 ID : **4050366264**
Option 4 ID : **4050366265**
Status : **Not Answered**
Chosen Option : **--**

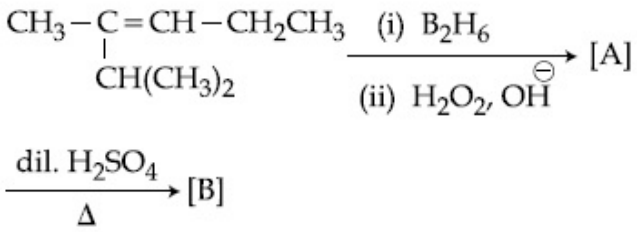
Q.13 A metal (A) on heating in nitrogen gas gives compound B. B on treatment with H_2O gives a colourless gas which when passed through $CuSO_4$ solution gives a dark blue-violet coloured solution. A and B respectively, are :

Options
1. Na and Na_3N
2. Mg and Mg_3N_2
3. Mg and $Mg(NO_3)_2$
4. Na and $NaNO_3$

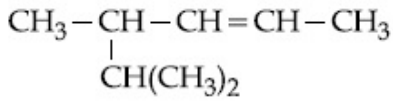
Question Type : **MCQ**
Question ID : **4050361728**
Option 1 ID : **4050366252**
Option 2 ID : **4050366253**
Option 3 ID : **4050366254**
Option 4 ID : **4050366255**
Status : **Answered**
Chosen Option : **4**

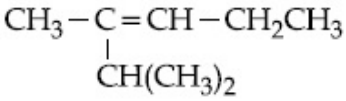
Q.14

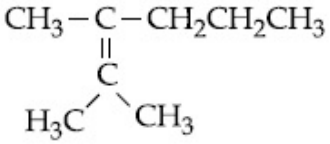
The major product [B] in the following sequence of reactions is :

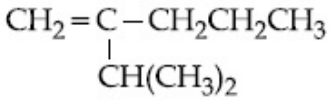


Options

1. 

2. 

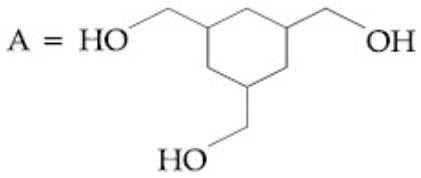
3. 

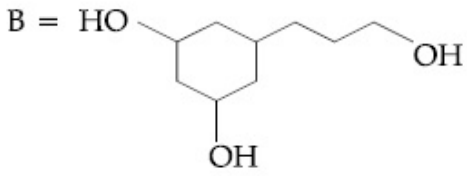
4. 

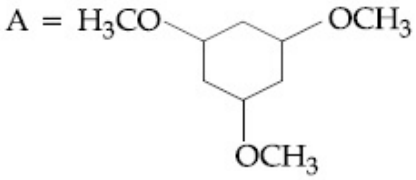
Question Type : **MCQ**
Question ID : **4050361738**
Option 1 ID : **4050366292**
Option 2 ID : **4050366294**
Option 3 ID : **4050366295**
Option 4 ID : **4050366293**
Status : **Not Answered**
Chosen Option : **--**

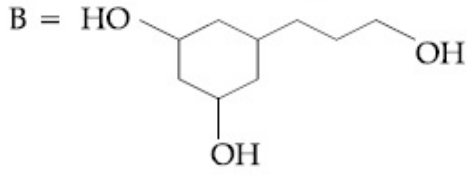
Q.15 Among the compounds A and B with molecular formula $C_9H_{18}O_3$, A is having higher boiling point the B. The possible structures of A and B are :

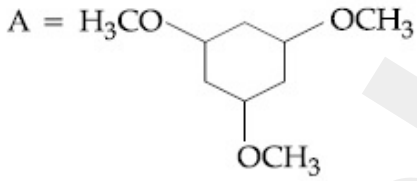
Options

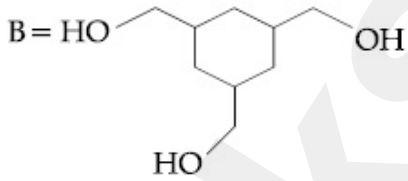
1. 

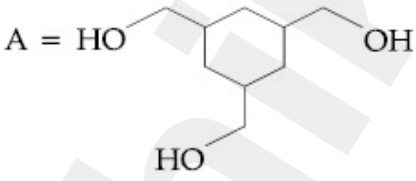


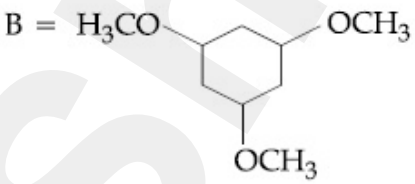
2. 



3. 



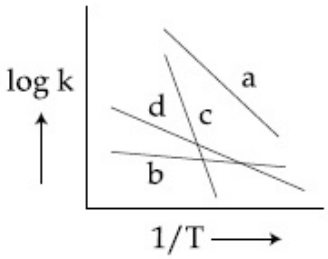
4. 



Question Type : **MCQ**
Question ID : **4050361737**
Option 1 ID : **4050366288**
Option 2 ID : **4050366290**

Option 3 ID : **4050366291**
Option 4 ID : **4050366289**
Status : **Not Answered**
Chosen Option : **--**

Q.16 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 ?

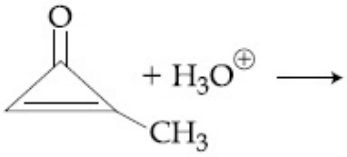


Options

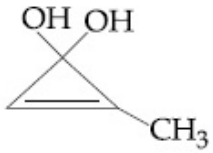
1. $E_b > E_a > E_d > E_c$
2. $E_a > E_c > E_d > E_b$
3. $E_b > E_d > E_c > E_a$
4. $E_c > E_a > E_d > E_b$

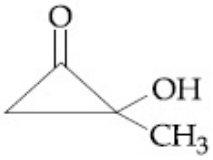
Question Type : **MCQ**
Question ID : **4050361720**
Option 1 ID : **4050366223**
Option 2 ID : **4050366221**
Option 3 ID : **4050366220**
Option 4 ID : **4050366222**
Status : **Not Answered**
Chosen Option : **--**

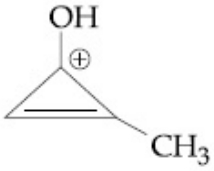
Q.17 The major product in the following reaction is :

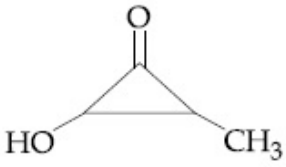


Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **4050361734**
Option 1 ID : **4050366277**
Option 2 ID : **4050366276**
Option 3 ID : **4050366279**
Option 4 ID : **4050366278**
Status : **Answered**
Chosen Option : **4**

Q.18 The increasing order of the atomic radii of the following elements is :

(a) C (b) O (c) F

(d) Cl (e) Br

Options
1. (a) < (b) < (c) < (d) < (e)
2. (c) < (b) < (a) < (d) < (e)
3. (d) < (c) < (b) < (a) < (e)
4. (b) < (c) < (d) < (a) < (e)

Question Type : **MCQ**
Question ID : **4050361725**
Option 1 ID : **4050366240**
Option 2 ID : **4050366242**
Option 3 ID : **4050366243**
Option 4 ID : **4050366241**
Status : **Answered**
Chosen Option : **1**

Q.19 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. 4
2. 3
3. 2
4. 1

Question Type : **MCQ**
Question ID : **4050361727**
Option 1 ID : **4050366251**
Option 2 ID : **4050366250**
Option 3 ID : **4050366249**
Option 4 ID : **4050366248**
Status : **Answered**
Chosen Option : **2**

Q.20 Kjeldahl's method cannot be used to estimate nitrogen for which of the following compounds ?

Options

1. $C_6H_5NO_2$
2. $NH_2-\overset{\overset{O}{\|}}{C}-NH_2$
3. $CH_3CH_2-C\equiv N$
4. $C_6H_5NH_2$

Question Type : **MCQ**
Question ID : **4050361733**
Option 1 ID : **4050366274**
Option 2 ID : **4050366272**
Option 3 ID : **4050366273**
Option 4 ID : **4050366275**
Status : **Not Answered**
Chosen Option : **--**

Q.21 For an electrochemical cell

$Sn(s)|Sn^{2+}(aq, 1M)||Pb^{2+}(aq, 1M)|Pb(s)$

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

(Given : $E^0_{Sn^{2+}|Sn} = -0.14V$, $E^0_{Pb^{2+}|Pb} = -0.13V$, $\frac{2.303RT}{F} = 0.06$)

Given **1.07**
Answer :

Question Type : **SA**
Question ID : **4050361741**
Status : **Answered**

Q.22 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 **0.1**
Answer :

Question Type : **SA**
Question ID : **4050361740**
Status : **Answered**

Q.23 In the following sequence of reactions the maximum number of atoms present in molecule 'C' in one plane is _____.

$$A \xrightarrow[\text{Cu tube}]{\text{Red hot}} B \xrightarrow[\text{Anhydrous } AlCl_3]{CH_3Cl\ (1.\ eq.)} C$$

(A is a lowest molecular weight alkyne)

Given **6**
Answer :

Question Type : **SA**
Question ID : **4050361743**
Status : **Answered**

Q.24 $NaClO_3$ 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?

_____.

$$NaClO_3(s) + Fe(s) \rightarrow O_2(g) + NaCl(s) + FeO(s)$$

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

Given **492.365**
Answer :

Question Type : **SA**
Question ID : **4050361739**
Status : **Answered**

Q.25 Complexes (ML_5) of metals Ni and Fe have ideal square pyramidal and trigonal bipyramidal geometries, respectively. The sum of the 90°, 120° and 180° L–M–L angles in the two complexes is _____.

Given **110**
Answer :

Question Type : **SA**
Question ID : **4050361742**
Status : **Answered**

Section : **Mathematics**

Q.1 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. 0.10
2. 0.20
3. 0.01
4. 0.02

Question Type : **MCQ**
Question ID : **4050361762**
Option 1 ID : **4050366375**
Option 2 ID : **4050366376**
Option 3 ID : **4050366373**
Option 4 ID : **4050366374**
Status : **Answered**
Chosen Option : **1**

Q.2 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. is a singleton.
2. is an empty set.
3. contains at least four elements.
4. contains exactly two elements.

Question Type : **MCQ**
Question ID : **4050361746**
Option 1 ID : **4050366310**
Option 2 ID : **4050366309**
Option 3 ID : **4050366312**
Option 4 ID : **4050366311**
Status : **Answered**
Chosen Option : **1**

Q.3 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. 4.01
2. 3.99
3. 3.98
4. 4.02

Question Type : **MCQ**
Question ID : **4050361761**
Option 1 ID : **4050366371**
Option 2 ID : **4050366370**
Option 3 ID : **4050366369**
Option 4 ID : **4050366372**
Status : **Not Answered**
Chosen Option : **--**

Q.4

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

Question Type : **MCQ**
Question ID : **4050361760**
Option 1 ID : **4050366365**
Option 2 ID : **4050366368**
Option 3 ID : **4050366366**
Option 4 ID : **4050366367**
Status : **Answered**
Chosen Option : **4**

Q.5 Let $f:(1,3)\to\mathbf{R}$ be a function defined by $f(x)=\frac{x[x]}{1+x^2}$, where $[x]$ denotes the greatest integer $\le x$. 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. $\left(\frac{2}{5},\frac{4}{5}\right]$
3. $\left(\frac{3}{5},\frac{4}{5}\right)$
4. $\left(\frac{2}{5},\frac{1}{2}\right)\cup\left[\frac{3}{5},\frac{4}{5}\right]$

Question Type : **MCQ**
Question ID : **4050361744**
Option 1 ID : **4050366304**
Option 2 ID : **4050366302**
Option 3 ID : **4050366301**
Option 4 ID : **4050366303**
Status : **Answered**
Chosen Option : **4**

Q.6 If α and β be the coefficients of x^4 and x^2 respectively in the expansion of $\left(x+\sqrt{x^2-1}\right)^6+\left(x-\sqrt{x^2-1}\right)^6$, then :

Options

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

Question Type : **MCQ**
Question ID : **4050361749**
Option 1 ID : **4050366323**
Option 2 ID : **4050366322**
Option 3 ID : **4050366321**
Option 4 ID : **4050366324**
Status : **Not Answered**
Chosen Option : **--**

Q.7 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. $x+2y=42$
3. $2x+5y=100$
4. $x+3y=58$

Question Type : **MCQ**
Question ID : **4050361758**
Option 1 ID : **4050366357**
Option 2 ID : **4050366359**
Option 3 ID : **4050366360**
Option 4 ID : **4050366358**
Status : **Answered**
Chosen Option : **2**

Q.8 $\lim\limits_{x\to 0}\dfrac{\int_0^x t\sin(10t)dt}{x}$ is equal to :

Options
1. 0
2. $\dfrac{1}{10}$
3. $-\dfrac{1}{10}$
4. $-\dfrac{1}{5}$

Question Type : **MCQ**
Question ID : **4050361751**
Option 1 ID : **4050366332**
Option 2 ID : **4050366330**
Option 3 ID : **4050366331**
Option 4 ID : **4050366329**
Status : **Answered**
Chosen Option : **1**

Q.9 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. $c^2 - 6c + 7 = 0$
3. $c^2 - 7c + 6 = 0$
4. $c^2 + 6c + 7 = 0$

Question Type : **MCQ**
Question ID : **4050361757**
Option 1 ID : **4050366354**
Option 2 ID : **4050366356**
Option 3 ID : **4050366353**
Option 4 ID : **4050366355**
Status : **Answered**
Chosen Option : **1**

Q.10 Let $\alpha = \frac{-1 + i\sqrt{3}}{2}$. If

$a = (1 + \alpha)\sum_{k=0}^{100} \alpha^{2k}$ and $b = \sum_{k=0}^{100} \alpha^{3k}$, 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. $x^2 - 102x + 101 = 0$
4. $x^2 - 101x + 100 = 0$

Question Type : **MCQ**
Question ID : **4050361745**
Option 1 ID : **4050366305**
Option 2 ID : **4050366306**
Option 3 ID : **4050366308**
Option 4 ID : **4050366307**
Status : **Not Answered**
Chosen Option : **--**

Q.11 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 : **4050366363**
Option 2 ID : **4050366364**
Option 3 ID : **4050366362**
Option 4 ID : **4050366361**
Status : **Answered**
Chosen Option : **4**

Q.12 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. 2
2. $2\sqrt{2}$
3. $4\sqrt{2}$
4. $\sqrt{2}$

Question Type : **MCQ**
Question ID : **4050361753**
Option 1 ID : **4050366338**
Option 2 ID : **4050366339**
Option 3 ID : **4050366340**
Option 4 ID : **4050366337**
Status : **Answered**
Chosen Option : **4**

Q.13 Which of the following statements is a tautology ?

Options

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

Question Type : **MCQ**
Question ID : **4050361763**
Option 1 ID : **4050366379**
Option 2 ID : **4050366378**
Option 3 ID : **4050366377**
Option 4 ID : **4050366380**
Status : **Not Answered**
Chosen Option : **--**

Q.14 If $I = \int_1^2 \frac{dx}{\sqrt{2x^3 - 9x^2 + 12x + 4}}$, then :

Options

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

Question Type : **MCQ**
Question ID : **4050361754**
Option 1 ID : **4050366344**
Option 2 ID : **4050366343**
Option 3 ID : **4050366341**
Option 4 ID : **4050366342**
Status : **Not Answered**
Chosen Option : **--**

Q.15 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. $6I-A$
2. $A-6I$
3. $4I-A$
4. $A-4I$

Question Type : **MCQ**
Question ID : **4050361747**
Option 1 ID : **4050366313**
Option 2 ID : **4050366316**
Option 3 ID : **4050366314**
Option 4 ID : **4050366315**
Status : **Answered**
Chosen Option : **1**

Q.16 The area (in sq. units) of the region $\{(x, y) \in R^2 : x^2 \le y \le 3-2x\}$, is :

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

Question Type : **MCQ**
Question ID : **4050361755**
Option 1 ID : **4050366347**
Option 2 ID : **4050366345**
Option 3 ID : **4050366346**
Option 4 ID : **4050366348**
Status : **Not Answered**
Chosen Option : **--**

Q.17 Let S be the set of all functions $f:[0,1]\to \mathbf{R}$, 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. $\frac{f(1)-f(c)}{1-c}=f'(c)$
2. $|f(c)-f(1)|<|f'(c)|$
3. $|f(c)+f(1)|<(1+c)|f'(c)|$
4. $|f(c)-f(1)|<(1-c)|f'(c)|$

Question Type : **MCQ**
Question ID : **4050361752**
Option 1 ID : **4050366336**
Option 2 ID : **4050366333**
Option 3 ID : **4050366335**
Option 4 ID : **4050366334**
Status : **Answered**
Chosen Option : **1**

Q.18 The differential equation of the family of curves, $x^2=4b(y+b)$, $b \in \mathbf{R}$, is :

Options

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

Question Type : **MCQ**
Question ID : **4050361756**
Option 1 ID : **4050366349**
Option 2 ID : **4050366351**
Option 3 ID : **4050366350**
Option 4 ID : **4050366352**
Status : **Not Answered**
Chosen Option : **--**

Q.19 The system of linear equations

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

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

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

Options

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

Question Type : **MCQ**
Question ID : **4050361748**
Option 1 ID : **4050366320**
Option 2 ID : **4050366319**
Option 3 ID : **4050366318**
Option 4 ID : **4050366317**
Status : **Answered**
Chosen Option : **4**

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

Options

1. $50\frac{1}{4}$
2. 100
3. 50
4. $100\frac{1}{2}$

Question Type : **MCQ**
Question ID : **4050361750**
Option 1 ID : **4050366326**
Option 2 ID : **4050366327**
Option 3 ID : **4050366325**
Option 4 ID : **4050366328**
Status : **Answered**
Chosen Option : **2**

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 **4**
Answer :

Question Type : **SA**
Question ID : **4050361767**
Status : **Answered**

Q.22 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 **6**
Answer :

Question Type : **SA**
Question ID : **4050361766**
Status : **Answered**

Q.23 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**
Answer :

Question Type : **SA**
Question ID : **4050361768**
Status : **Answered**

Q.24 The number of 4 letter words (with or without meaning) that can be formed from the eleven letters of the word 'EXAMINATION' is _____.

Given **8**
Answer :

Question Type : **SA**
Question ID : **4050361764**
Status : **Answered**

Q.25

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

_____.

Given **0**
Answer :

Question Type : **SA**
Question ID : **4050361765**
Status : **Answered**