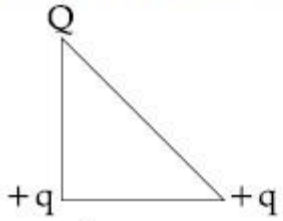
**JEE MAIN 2019 Question Paper and Answer Key – Paper 1 (Jan 11, Shift)**

# Section : Physics

**Q.1** Three charges Q, +q and +q are placed at the vertices of a right-angle isosceles triangle as shown below. The net electrostatic energy of the configuration is zero, if the value of Q is :




**Options**

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

Question ID : **4165299160**
Option 1 ID : **41652936098**
Option 2 ID : **41652936101**
Option 3 ID : **41652936100**
Option 4 ID : **41652936099**
Status : **Answered**
Chosen Option : **4**

**Q.2** A rigid diatomic ideal gas undergoes an adiabatic process at room temperature. The relation between temperature and volume for this process is $TV^x = \text{constant}$, then $x$ is :

**Options**

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

Question ID : **4165299155**
Option 1 ID : **41652936079**
Option 2 ID : **41652936080**
Option 3 ID : **41652936078**
Option 4 ID : **41652936081**
Status : **Answered**
Chosen Option : **1**

**Q.3** A satellite is revolving in a circular orbit at a height h from the earth surface, such that h<<R where R is the radius of the earth. Assuming that the effect of earth's atmosphere can be neglected the minimum increase in the speed required so that the satellite could escape from the gravitational field of earth is :

**Options**

1. $\sqrt{2gR}$
2. $\sqrt{gR}$

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

4. $\sqrt{gR}(\sqrt{2}-1)$

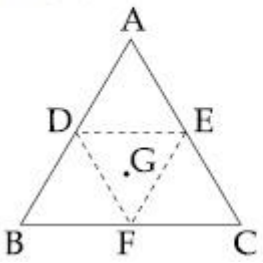
Question ID : **4165299153**
Option 1 ID : **41652936071**
Option 2 ID : **41652936070**
Option 3 ID : **41652936073**
Option 4 ID : **41652936072**
Status : **Answered**
Chosen Option : **4**

**Q.4** Ice at $-20^{\circ}C$ is added to 50 g of water at $40^{\circ}C$. When the temperature of the mixture reaches $0^{\circ}C$, it is found that 20 g of ice is still unmelted. The amount of ice added to the water was close to
( Specific heat of water $= 4.2\ J/g/^{\circ}C$
Specific heat of Ice $= 2.1\ J/g/^{\circ}C$
Heat of fusion of water at $0^{\circ}C = 334\ J/g$ )

**Options**
1. 50 g
2. 60 g
3. 40 g
4. 100 g

Question ID : **4165299154**
Option 1 ID : **41652936076**
Option 2 ID : **41652936074**
Option 3 ID : **41652936075**
Option 4 ID : **41652936077**
Status : **Answered**
Chosen Option : **3**

**Q.5** An equilateral triangle ABC is cut from a thin solid sheet of wood. (See figure) D, E and F are the mid-points of its sides as shown and G is the centre of the triangle. The moment of inertia of the triangle about an axis passing through G and perpendicular to the plane of the triangle is $I_0$. If the smaller triangle DEF is removed from ABC, the moment of inertia of the remaining figure about the same axis is I. Then :




**Options**

1. $I=\frac{15}{16}I_0$

2. $I=\frac{3}{4}I_0$

3. $I=\frac{I_0}{4}$

4. $I=\frac{9}{16}I_0$

Question ID : **4165299152**
Option 1 ID : **41652936069**
Option 2 ID : **41652936067**
Option 3 ID : **41652936066**
Option 4 ID : **41652936068**
Status : **Answered**
Chosen Option : **1**

**Q.6** A hydrogen atom, initially in the ground state is excited by absorbing a photon of wavelength 980Å. The radius of the atom in the excited state, in terms of Bohr radius $a_0$, will be :
(hc = 12500 eV-Å)

**Options**

1. $25a_0$
2. $9a_0$
3. $4a_0$
4. $16a_0$

Question ID : **4165299171**
Option 1 ID : **41652936145**
Option 2 ID : **41652936143**
Option 3 ID : **41652936142**
Option 4 ID : **41652936144**
Status : **Answered**
Chosen Option : **4**

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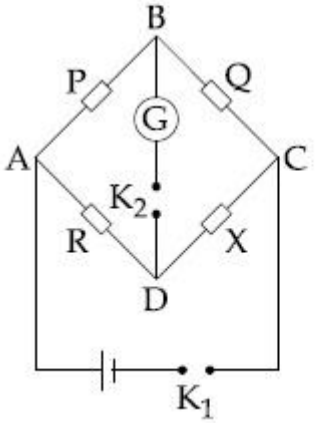
**Q.7** In a Wheatstone bridge(see fig.), Resistances P and Q are approximately equal. When R = 400 Ω, the bridge is balanced. On interchanging P and Q, the value of R, for balance, is 405 Ω. The value of X is close to :




**Options**

1. 401.5 ohm

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2. 404.5 ohm

3. 403.5 ohm

4. 402.5 ohm

Question ID : **4165299163**
Option 1 ID : **41652936110**
Option 2 ID : **41652936111**
Option 3 ID : **41652936113**
Option 4 ID : **41652936112**
Status : **Answered**
Chosen Option : **4**

**Q.8** A liquid of density $\rho$ is coming out of a hose pipe of radius a with horizontal speed $v$ and hits a mesh. 50% of the liquid passes through the mesh unaffected. 25% looses all of its momentum and 25% comes back with the same speed. The resultant pressure on the mesh will be :

**Options**

1. $\frac{3}{4}\rho v^2$

2. $\rho v^2$

3. $\frac{1}{2}\rho v^2$

4. $\frac{1}{4}\rho v^2$

Question ID : **4165299149**
Option 1 ID : **41652936056**
Option 2 ID : **41652936057**
Option 3 ID : **41652936055**
Option 4 ID : **41652936054**
Status : **Answered**
Chosen Option : **1**

**Q.9** An object is at a distance of 20 m from a convex lens of focal length 0.3 m. The lens forms an image of the object. If the object moves away from the lens at a speed of 5 m/s, the speed and direction of the image will be :

**Options**

1. $1.16 \times 10^{-3}$ m/s towards the lens
2. $3.22 \times 10^{-3}$ m/s towards the lens
3. $0.92 \times 10^{-3}$ m/s away from the lens
4. $2.26 \times 10^{-3}$ m/s away from the lens

Question ID : **4165299168**
Option 1 ID : **41652936131**
Option 2 ID : **41652936132**
Option 3 ID : **41652936133**
Option 4 ID : **41652936130**
Status : **Answered**
Chosen Option : **1**

**Q.10** Equation of travelling wave on a stretched string of linear density 5 g/m is $y = 0.03 \sin(450\ t - 9x)$ where distance and time are measured in SI units. The tension in the string is :

**Options**

1. 5 N
2. 7.5 N
3. 10 N
4. 12.5 N

Question ID : **4165299158**
Option 1 ID : **41652936090**
Option 2 ID : **41652936091**
Option 3 ID : **41652936092**
Option 4 ID : **41652936093**
Status : **Answered**

Chosen Option : **4**

**Q.11** A body of mass 1 kg falls freely from a height of 100 m, on a platform of mass 3 kg which is mounted on a spring having spring constant $k = 1.25 \times 10^6$ N/m. The body sticks to the platform and the spring's maximum compression is found to be $x$. Given that $g = 10\ ms^{-2}$, the value of $x$ will be close to :

**Options**

1. 8 cm
2. 4 cm
3. 80 cm
4. 40 cm

Question ID : **4165299150**

Option 1 ID : **41652936059**

Option 2 ID : **41652936058**

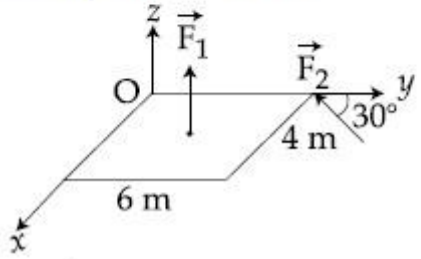
Option 3 ID : **41652936061**

Option 4 ID : **41652936060**

Status : **Answered**

Chosen Option : **2**

**Q.12** A slab is subjected to two forces $\vec{F}_1$ and $\vec{F}_2$ of same magnitude F as shown in the figure. Force $\vec{F}_2$ is in XY-plane while force $F_1$ acts along z-axis at the point $\left(2\vec{i}+3\vec{j}\right)$. The moment of these forces about point O will be :

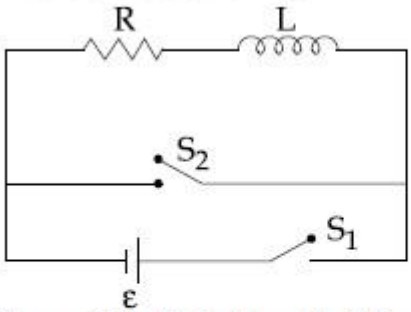



**Options**

1. $\left(3\hat{i}-2\hat{j}+3\hat{k}\right)$F
2. $\left(3\hat{i}+2\hat{j}+3\hat{k}\right)$F
3. $\left(3\hat{i}-2\hat{j}-3\hat{k}\right)$F
4. $\left(3\hat{i}+2\hat{j}-3\hat{k}\right)$F

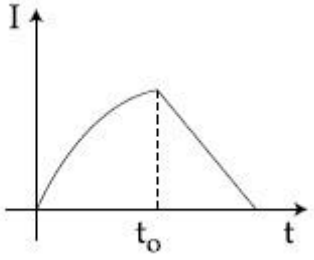
Question ID : **4165299151**
Option 1 ID : **41652936063**
Option 2 ID : **41652936064**
Option 3 ID : **41652936065**
Option 4 ID : **41652936062**
Status : **Answered**
Chosen Option : **1**

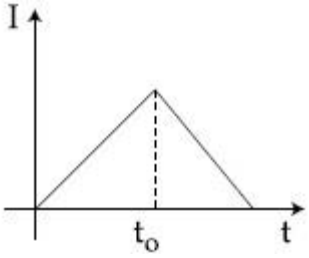
**Q.13** In the circuit shown,

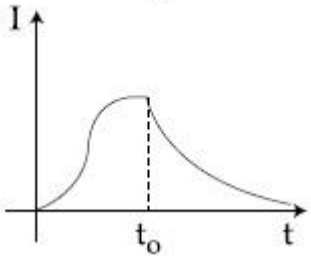


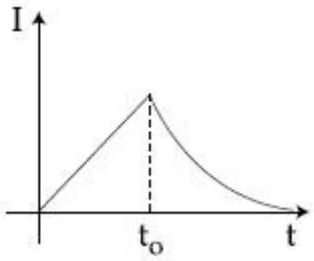

the switch $S_1$ is closed at time $t = 0$ and the switch $S_2$ is kept open. At some later time($t_0$), the switch $S_1$ is opened and $S_2$ is closed. The behaviour of the current I as a function of time 't' is given by :

**Options**

1. 


2. 


3. 

4. 

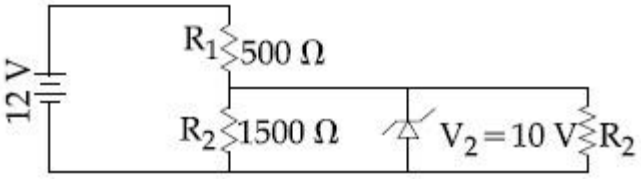

Question ID : **4165299166**
Option 1 ID : **41652936125**
Option 2 ID : **41652936124**
Option 3 ID : **41652936123**
Option 4 ID : **41652936122**
Status : **Answered**
Chosen Option : **3**

**Q.14** Two equal resistances when connected in series to a battery, consume electric power of 60 W. If these resistances are now connected in parallel combination to the same battery, the electric power consumed will be :

**Options**
1. 30 W
2. 60 W
3. 120 W
4. 240 W

Question ID : **4165299162**
Option 1 ID : **41652936109**
Option 2 ID : **41652936106**
Option 3 ID : **41652936108**
Option 4 ID : **41652936107**
Status : **Answered**
Chosen Option : **4**

**Q.15** In the given circuit the current through Zener Diode is close to :

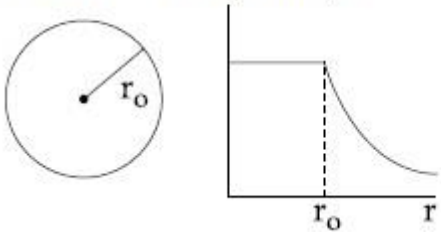



**Options**

1. 0.0 mA
2. 6.0 mA
3. 6.7 mA
4. 4.0 mA

Question ID : **4165299172**
Option 1 ID : **41652936148**
Option 2 ID : **41652936149**
Option 3 ID : **41652936146**
Option 4 ID : **41652936147**
Status : **Answered**
Chosen Option : **1**

**Q.16** The given graph shows variation (with distance r from centre) of :




**Options**

1. Electric field of a uniformly charged sphere
2. Potential of a uniformly charged spherical shell
3. Potential of a uniformly charged sphere
4. Electric field of a uniformly charged spherical shell

Question ID : **4165299161**

Option 1 ID : **41652936105**

Option 2 ID : **41652936102**

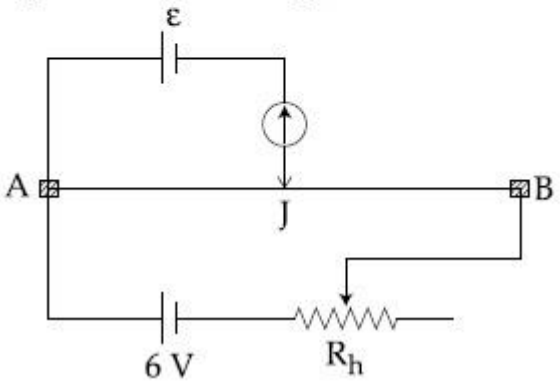
Option 3 ID : **41652936103**

Option 4 ID : **41652936104**

Status : **Answered**

Chosen Option : **2**

**Q.17** The resistance of the meter bridge AB in given figure is 4 Ω. With a cell of emf $\varepsilon = 0.5$ V and rheostat resistance $R_h = 2\ \Omega$ the null point is obtained at some point J. When the cell is replaced by another one of emf $\varepsilon = \varepsilon_2$ the same null point J is found for $R_h = 6\ \Omega$. The emf $\varepsilon_2$ is, :




**Options**

1. 0.3 V
2. 0.5 V
3. 0.6 V
4. 0.4 V

Question ID : **4165299175**

Option 1 ID : **41652936158**

Option 2 ID : **41652936159**

Option 3 ID : **41652936161**

Option 4 ID : **41652936160**

Status : **Answered**

Chosen Option : **1**

**Q.18** A gas mixture consists of 3 moles of oxygen and 5 moles of argon at temperature T. Considering only translational and rotational modes, the total internal energy of the system is :

**Options**

1. 15 RT
2. 20 RT
3. 4 RT
4. 12 RT

Question ID : **4165299156**
Option 1 ID : **41652936084**
Option 2 ID : **41652936085**
Option 3 ID : **41652936082**
Option 4 ID : **41652936083**
Status : **Answered**
Chosen Option : **1**

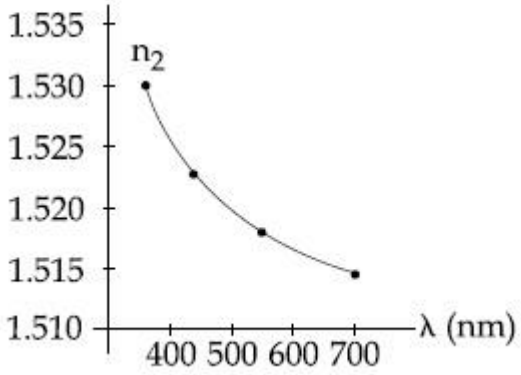
**Q.19** An amplitude modulated signal is given by $V(t) = 10[1 + 0.3\cos(2.2 \times 10^4 t)]\sin(5.5 \times 10^5 t)$. Here t is in seconds. The sideband frequencies (in kHz) are, [Given $\pi = 22/7$]

**Options**

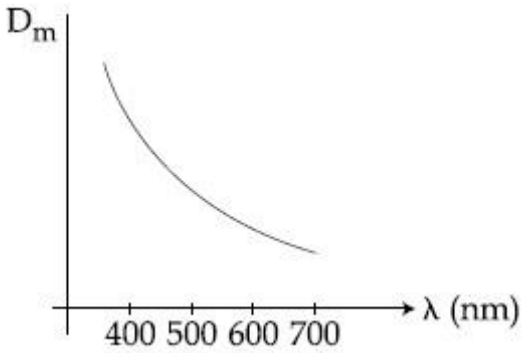
1. 1785 and 1715
2. 892.5 and 857.5
3. 178.5 and 171.5
4. 89.25 and 85.75

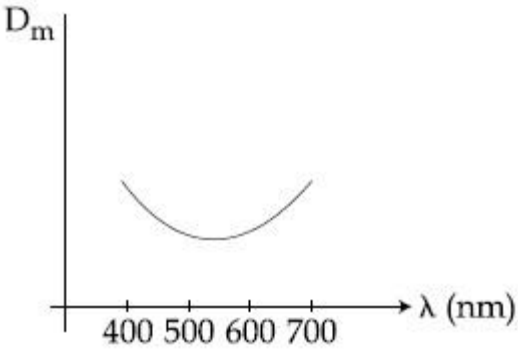
Question ID : **4165299173**
Option 1 ID : **41652936153**
Option 2 ID : **41652936150**
Option 3 ID : **41652936152**
Option 4 ID : **41652936151**
Status : **Answered**
Chosen Option : **4**

**Q.20** The variation of refractive index of a crown glass thin prism with wavelength of the incident light is shown. Which of the following graphs is the correct one, if $D_m$ is the angle of minimum deviation ?

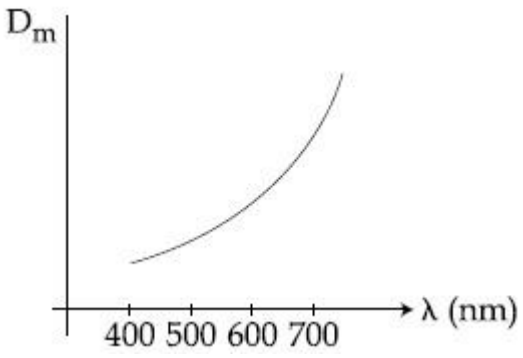



**Options**

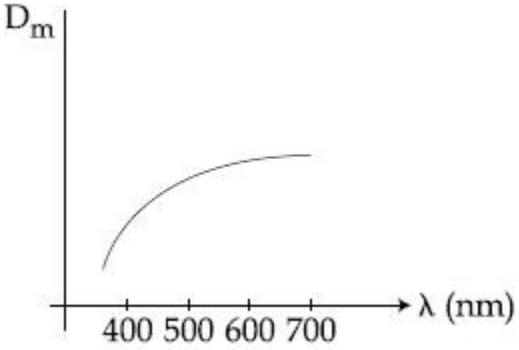
1. 


2. 

3.




4.




Question ID : **4165299174**

Option 1 ID : **41652936154**

Option 2 ID : **41652936157**

Option 3 ID : **41652936155**

Option 4 ID : **41652936156**

Status : **Answered**

Chosen Option : **1**

**Q.21** There are two long co-axial solenoids of same length *l*. The inner and outer coils have radii $r_1$ and $r_2$ and number of turns per unit length $n_1$ and $n_2$, respectively. The ratio of mutual inductance to the self-inductance of the inner-coil is :

**Options**

1. $\frac{n_2}{n_1} \cdot \frac{r_1}{r_2}$

2. $\frac{n_1}{n_2}$

3. $\frac{n_2}{n_1} \cdot \frac{r_2^2}{r_1^2}$

4. $\frac{n_2}{n_1}$

Question ID : **4165299165**
Option 1 ID : **41652936120**
Option 2 ID : **41652936121**
Option 3 ID : **41652936119**
Option 4 ID : **41652936118**
Status : **Answered**
Chosen Option : **3**

**Q.22** A particle undergoing simple harmonic motion has time dependent displacement given by $x(t) = A\sin\frac{\pi t}{90}$. The ratio of kinetic to potential energy of this particle at $t = 210$ s will be :

**Options**

1. $2$

2. $\frac{1}{9}$

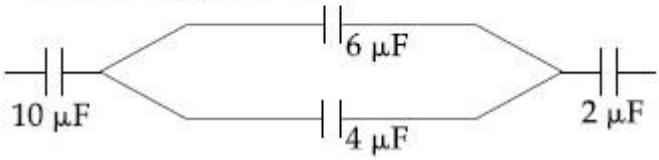
3. $1$

4. $3$

Question ID : **4165299157**
Option 1 ID : **41652936089**
Option 2 ID : **41652936088**
Option 3 ID : **41652936086**
Option 4 ID : **41652936087**
Status : **Marked For Review**
Chosen Option : **4**

**Q.23**

In the figure shown below, the charge on the left plate of the 10 μF capacitor is −30 μC. The charge on the right plate of the 6 μF capacitor is :




**Options**

1. $+18\ \mu C$
2. $+12\ \mu C$
3. $-18\ \mu C$
4. $-12\ \mu C$

Question ID : **4165299159**
Option 1 ID : **41652936094**
Option 2 ID : **41652936096**
Option 3 ID : **41652936095**
Option 4 ID : **41652936097**
Status : **Answered**
Chosen Option : **3**

**Q.24**

An electromagnetic wave of intensity $50\ Wm^{-2}$ enters in a medium of refractive index 'n' without any loss. The ratio of the magnitudes of electric fields, and the ratio of the magnitudes of magnetic fields of the wave before and after entering into the medium are respectively, given by :

**Options**

1. $\left(\frac{1}{\sqrt{n}}, \sqrt{n}\right)$
2. $\left(\frac{1}{\sqrt{n}}, \frac{1}{\sqrt{n}}\right)$
3. $\left(\sqrt{n}, \frac{1}{\sqrt{n}}\right)$

4. $(\sqrt{n}, \sqrt{n})$

Question ID : **4165299167**
Option 1 ID : **41652936126**
Option 2 ID : **41652936129**
Option 3 ID : **41652936127**
Option 4 ID : **41652936128**
Status : **Not Answered**
Chosen Option : **--**

**Q.25** The force of interaction between two atoms is given by $F = \alpha\beta \exp\left(-\frac{x^2}{\alpha kt}\right)$ ; where $x$ is the distance, k is the Boltzmann constant and T is temperature and $\alpha$ and $\beta$ are two constants. The dimension of $\beta$ is :

**Options**
1. $MLT^{-2}$
2. $M^2L^2T^{-2}$
3. $M^0L^2T^{-4}$
4. $M^2LT^{-4}$

Question ID : **4165299146**
Option 1 ID : **41652936042**
Option 2 ID : **41652936043**
Option 3 ID : **41652936044**
Option 4 ID : **41652936045**
Status : **Answered**
Chosen Option : **4**

**Q.26** In an experiment, electrons are accelerated, from rest, by applying a voltage of 500 V. Calculate the radius of the path if a magnetic field 100 mT is then applied.
[Charge of the electron $= 1.6 \times 10^{-19}$ C
Mass of the electron $= 9.1 \times 10^{-31}$ kg]

**Options**

1. $7.5 \times 10^{-3}$ m
2. 7.5 m
3. $7.5 \times 10^{-2}$ m
4. $7.5 \times 10^{-4}$ m

Question ID : **4165299164**
Option 1 ID : **41652936117**
Option 2 ID : **41652936114**
Option 3 ID : **41652936115**
Option 4 ID : **41652936116**
Status : **Answered**
Chosen Option : **4**

**Q.27** A particle is moving along a circular path with a constant speed of 10 $ms^{-1}$. What is the magnitude of the change in velocity of the particle, when it moves through an angle of 60° around the centre of the circle ?

**Options**

1. $10\sqrt{2}$ m/s
2. $10\sqrt{3}$ m/s
3. 10 m/s
4. zero

Question ID : **4165299147**
Option 1 ID : **41652936048**
Option 2 ID : **41652936047**
Option 3 ID : **41652936049**
Option 4 ID : **41652936046**
Status : **Answered**
Chosen Option : **3**

**Q.28** A body is projected at $t=0$ with a velocity $10\ ms^{-1}$ at an angle of $60^\circ$ with the horizontal. The radius of curvature of its trajectory at $t=1s$ is R. Neglecting air resistance and taking acceleration due to gravity $g=10\ ms^{-2}$, the value of R is :

**Options**

1. 2.5 m
2. 2.8 m
3. 10.3 m
4. 5.1 m

Question ID : **4165299148**
Option 1 ID : **41652936050**
Option 2 ID : **41652936052**
Option 3 ID : **41652936053**
Option 4 ID : **41652936051**
Status : **Answered**
Chosen Option : **2**

**Q.29** If the deBroglie wavelength of an electron is equal to $10^{-3}$ times the wavelength of a photon of frequency $6\times10^{14}$ Hz, then the speed of electron is equal to :
(Speed of light $=3\times10^{8}$ m/s
Planck's constant $=6.63\times10^{-34}$ J .s
Mass of electron $=9.1\times10^{-31}$ kg)

**Options**

1. $1.45\times10^{6}$ m/s
2. $1.1\times10^{6}$ m/s
3. $1.7\times10^{6}$ m/s
4. $1.8\times10^{6}$ m/s

Question ID : **4165299170**
Option 1 ID : **41652936139**
Option 2 ID : **41652936140**
Option 3 ID : **41652936141**
Option 4 ID : **41652936138**

Status : **Answered**

Chosen Option : **1**

**Q.30** In a Young's double slit experiment, the path difference, at a certain point on the screen, between two interfering waves is $\frac{1}{8}$ th of wavelength. The ratio of the intensity at this point to that at the centre of a bright fringe is close to :

**Options**

1. 0.94
2. 0.80
3. 0.74
4. 0.85

Question ID : **4165299169**

Option 1 ID : **41652936137**

Option 2 ID : **41652936135**

Option 3 ID : **41652936134**

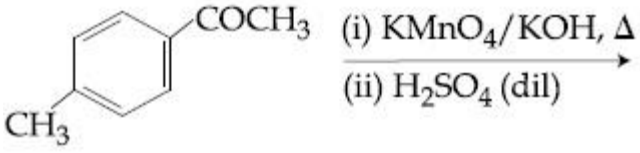
Option 4 ID : **41652936136**

Status : **Answered**

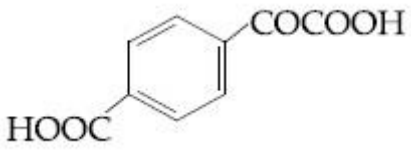
Chosen Option : **4**

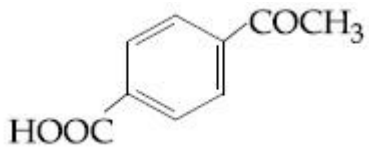
## Section : Chemistry

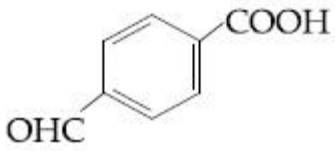
**Q.1** The major product of the following reaction is

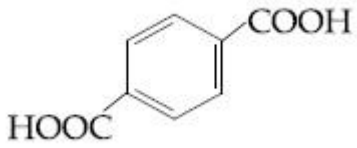



**Options**

1. 

2. 

3. 

4. 

Question ID : **4165299178**
Option 1 ID : **41652936170**
Option 2 ID : **41652936173**
Option 3 ID : **41652936172**
Option 4 ID : **41652936171**
Status : **Answered**
Chosen Option : **4**

**Q.2** The correct statements among (a) to (d) regarding $H_2$ as a fuel are :

(a) It produces less pollutants than petrol.

(b) A cylinder of compressed dihydrogen weighs ~30 times more than a petrol tank producing the same amount of energy.

(c) Dihydrogen is stored in tanks of metal alloys like $NaNi_5$.

(d) On combustion, values of energy released per gram of liquid dihydrogen and LPG are 50 and 142 kJ, respectively.

**Options**

1. (a) and (c) only

2. (b) and (d) only

3. (b), (c) and (d) only

4. (a), (b) and (c) only

Question ID : **4165299189**
Option 1 ID : **41652936214**
Option 2 ID : **41652936216**
Option 3 ID : **41652936215**
Option 4 ID : **41652936217**
Status : **Marked For Review**
Chosen Option : **1**

**Q.3** An organic compound is estimated through Dumus method and was found to evolve 6 moles of $CO_2$, 4 moles of $H_2O$ and 1 mole of nitrogen gas. The formula of the compound is :

**Options**

1. $C_{12}H_8N_2$

2. $C_{12}H_8N$

3. $C_6H_8N_2$

4. $C_6H_8N$

Question ID : **4165299185**
Option 1 ID : **41652936198**
Option 2 ID : **41652936199**
Option 3 ID : **41652936200**
Option 4 ID : **41652936201**
Status : **Answered**
Chosen Option : **3**

**Q.4** An example of solid sol is :

**Options**

1. Butter

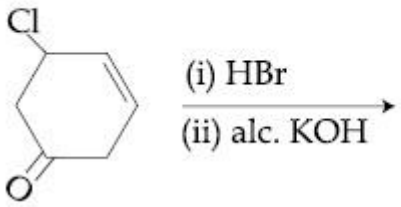
2. Paint

3. Hair cream

4. Gem stones

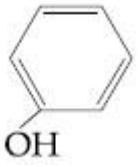
Question ID : **4165299205**
Option 1 ID : **41652936280**
Option 2 ID : **41652936279**
Option 3 ID : **41652936281**
Option 4 ID : **41652936278**
Status : **Answered**
Chosen Option : **4**

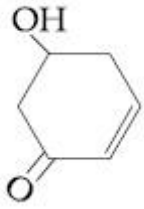
**Q.5** The major product of the following reaction is :

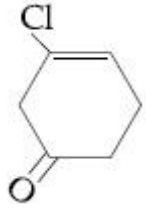



**Options**

1. 


2. 


3. 


4. 


Question ID : **4165299180**
Option 1 ID : **41652936179**

Option 2 ID : **41652936180**

Option 3 ID : **41652936178**

Option 4 ID : **41652936181**

Status : **Answered**

Chosen Option : **4**

**Q.6** Heat treatment of muscular pain involves radiation of wavelength of about 900 nm. Which spectral line of H-atom is suitable for this purpose ?

$[R_H = 1 \times 10^5\ cm^{-1},\ h = 6.6 \times 10^{-34}\ Js,\ c = 3 \times 10^8\ ms^{-1}]$

**Options**

1. Balmer, $\infty \rightarrow 2$
2. Paschen, $5 \rightarrow 3$
3. Lyman, $\infty \rightarrow 1$
4. Paschen, $\infty \rightarrow 3$

Question ID : **4165299198**

Option 1 ID : **41652936251**

Option 2 ID : **41652936252**

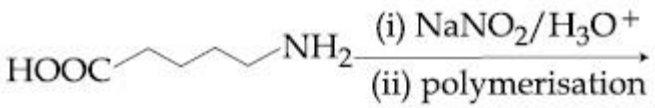
Option 3 ID : **41652936250**

Option 4 ID : **41652936253**

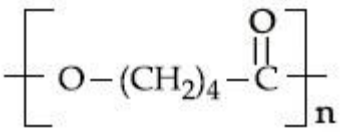
Status : **Answered**

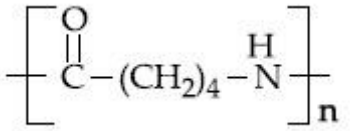
Chosen Option : **4**

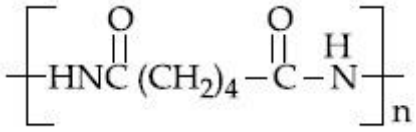
**Q.7** The polymer obtained from the following reactions is :

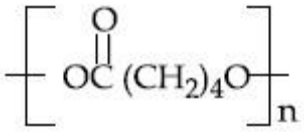



**Options**

1. 

2. 

3. 

4. 

Question ID : **4165299177**
Option 1 ID : **41652936168**
Option 2 ID : **41652936169**
Option 3 ID : **41652936167**
Option 4 ID : **41652936166**
Status : **Answered**
Chosen Option : **1**

**Q.8** NaH is an example of :

**Options**

1. saline hydride
2. metallic hydride
3. molecular hydride
4. electron-rich hydride

Question ID : **4165299188**
Option 1 ID : **41652936212**
Option 2 ID : **41652936210**
Option 3 ID : **41652936211**
Option 4 ID : **41652936213**
Status : **Answered**
Chosen Option : **1**

**Q.9** Consider the reaction

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

The equilibrium constant of the above reaction is $K_p$. If pure ammonia is left to dissociate, the partial pressure of ammonia at equilibrium is given by (Assume that $P_{NH_3} << p_{total}$ at equilibrium)

**Options**

1. $\frac{3^{3/2} K_p^{1/2} P^2}{4}$

2. $\frac{3^{3/2} K_p^{1/2} P^2}{16}$

3. $\frac{K_p^{1/2} P^2}{4}$

4. $\frac{K_p^{1/2} P^2}{16}$

Question ID : **4165299202**

Option 1 ID : **41652936267**

Option 2 ID : **41652936269**

Option 3 ID : **41652936268**

Option 4 ID : **41652936266**

Status : **Answered**

Chosen Option : **1**

**Q.10** The chloride that CANNOT get hydrolysed is :

**Options**

1. $CCl_4$

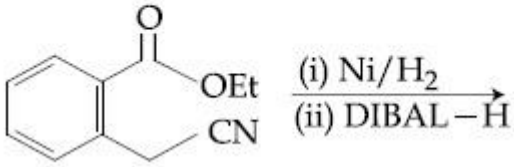
2. $PbCl_4$

3. $SnCl_4$

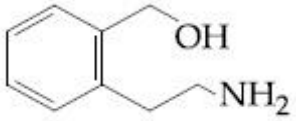
4. $SiCl_4$

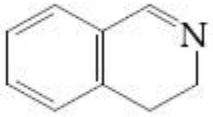
Question ID : **4165299191**
Option 1 ID : **41652936222**
Option 2 ID : **41652936225**
Option 3 ID : **41652936224**
Option 4 ID : **41652936223**
Status : **Answered**
Chosen Option : **1**

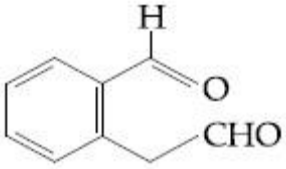
**Q.11** The major product of the following reaction is :

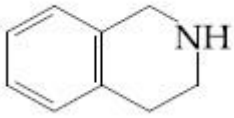



**Options**

1. 


2. 


3. 

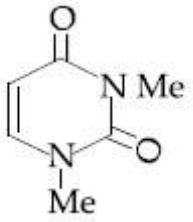

4. 

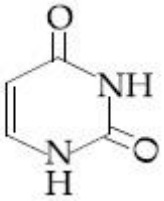

Question ID : **4165299182**
Option 1 ID : **41652936189**
Option 2 ID : **41652936187**
Option 3 ID : **41652936186**
Option 4 ID : **41652936188**
Status : **Answered**

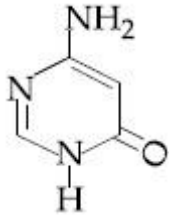
Chosen Option : **4**

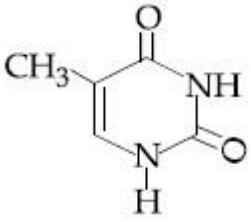
**Q.12** Among the following compounds, which one is found in RNA ?

**Options**

1. 

2. 

3. 

4. 

Question ID : **4165299176**

Option 1 ID : **41652936165**

Option 2 ID : **41652936162**

Option 3 ID : **41652936163**

Option 4 ID : **41652936164**

Status : **Not Answered**

Chosen Option : **--**

**Q.13** Peroxyacetyl nitrate (PAN), an eye irritant is produced by :

**Options**

1. photochemical smog

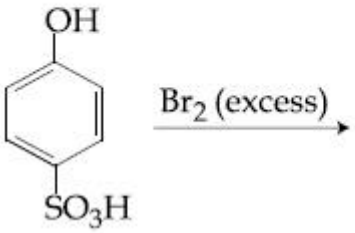
2. organic waste

3. acid rain

4. classical smog

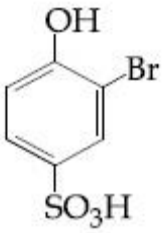
Question ID : **4165299195**
Option 1 ID : **41652936240**
Option 2 ID : **41652936239**
Option 3 ID : **41652936238**
Option 4 ID : **41652936241**
Status : **Answered**
Chosen Option : **1**

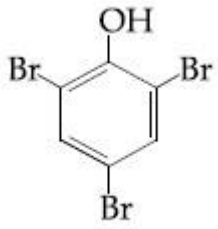
**Q.14** The major product of the following reaction is :

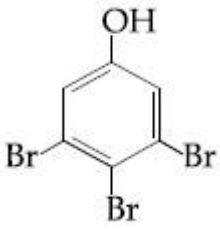



**Options**

1. 


2. 

3. 


4. 


Question ID : **4165299179**
Option 1 ID : **41652936174**
Option 2 ID : **41652936175**
Option 3 ID : **41652936177**
Option 4 ID : **41652936176**
Status : **Answered**
Chosen Option : **3**

**Q.15** If a reaction follows the Arrhenius equation, the plot lnk vs $^{1}/_{(RT)}$ gives straight line with a gradient $(-y)$ unit. The energy required to activate the reactant is :

**Options**

1. $y$ unit
2. $y/R$ unit
3. $-y$ unit
4. $yR$ unit

Question ID : **4165299204**
Option 1 ID : **41652936275**
Option 2 ID : **41652936277**
Option 3 ID : **41652936276**
Option 4 ID : **41652936274**

Status : **Answered**

Chosen Option : **1**

**Q.16** The correct match between item (I) and item (II) is :

| | Item - I | Item - II |
|---|---|---|
| (A) | Norethindrone | (P) Anti-biotic |
| (B) | Ofloxacin | (Q) Anti-fertility |
| (C) | Equanil | (R) Hypertension |
| | | (S) Analgesics |

**Options**

1. (A)→(R); (B)→(P); (C)→(S)
2. (A)→(Q); (B)→(P); (C)→(R)
3. (A)→(Q); (B)→(R); (C)→(S)
4. (A)→(R); (B)→(P); (C)→(R)

Question ID : **4165299184**

Option 1 ID : **41652936194**

Option 2 ID : **41652936197**

Option 3 ID : **41652936196**

Option 4 ID : **41652936195**

Status : **Answered**

Chosen Option : **2**

**Q.17** For the chemical reaction $X \rightleftharpoons Y$, the standard reaction Gibbs energy depends on temperature T (in K) as

$$\Delta_r G^\circ \text{ (in kJ mol}^{-1}) = 120 - \frac{3}{8}T.$$

The major component of the reaction mixture at T is :

**Options**

1. Y if $T = 300$ K
2. Y if $T = 280$ K
3. X if $T = 315$ K
4. X if $T = 350$ K

Question ID : **4165299199**
Option 1 ID : **41652936255**
Option 2 ID : **41652936257**
Option 3 ID : **41652936256**
Option 4 ID : **41652936254**
Status : **Answered**
Chosen Option : **3**

**Q.18** The element that usually does **NOT** show variable oxidation states is :

**Options**
1. Sc
2. V
3. Ti
4. Cu

Question ID : **4165299192**
Option 1 ID : **41652936226**
Option 2 ID : **41652936229**
Option 3 ID : **41652936228**
Option 4 ID : **41652936227**
Status : **Answered**
Chosen Option : **1**

**Q.19** Match the ores **(column A)** with the metals **(column B)** :

| **(Column A) Ores** | | **(Column B) Metals** | |
|---|---|---|---|
| (I) | Siderite | (a) | Zinc |
| (II) | Kaolinite | (b) | Copper |
| (III) | Malachite | (c) | Iron |
| (IV) | Calamine | (d) | Aluminium |

**Options**
1. (I) - (c); (II) - (d); (III) - (a); (IV) - (b)
2. (I) - (a); (II) - (b); (III) - (c); (IV) - (d)
3. (I) - (b); (II) - (c); (III) - (d); (IV) - (a)

4. (I) - (c); (II) - (d); (III) - (b); (IV) - (a)

Question ID : **4165299187**
Option 1 ID : **41652936209**
Option 2 ID : **41652936206**
Option 3 ID : **41652936208**
Option 4 ID : **41652936207**
Status : **Answered**
Chosen Option : **4**

**Q.20**

The correct match between items I and II is :

| Item - I (Mixture) | | Item - II (Seperation method) | |
|---|---|---|---|
| (A) | $H_2O$ : Sugar | (P) | Sublimation |
| (B) | $H_2O$ : Aniline | (Q) | Recrystallization |
| (C) | $H_2O$ : Toluene | (R) | Steam distillation |
| | | (S) | Differential extraction |

**Options**

1. (A)→(R); (B)→(P); (C)→(S)
2. (A)→(Q); (B)→(R); (C)→(S)
3. (A)→(S); (B)→(R); (C)→(P)
4. (A)→(Q); (B)→(R); (C)→(P)

Question ID : **4165299183**
Option 1 ID : **41652936190**
Option 2 ID : **41652936192**
Option 3 ID : **41652936191**
Option 4 ID : **41652936193**
Status : **Answered**
Chosen Option : **2**

**Q.21**

The freezing point of a diluted milk sample is found to be $-0.2^{\circ}C$, while it should have been $-0.5^{\circ}C$ for pure milk. How much water has been added to pure milk to make the diluted sample ?

**Options**

1. 1 cup of water to 2 cups of pure milk
2. 2 cups of water to 3 cups of pure milk
3. 3 cups of water to 2 cups of pure milk
4. 1 cup of water to 3 cups of pure milk

Question ID : **4165299201**

Option 1 ID : **41652936262**

Option 2 ID : **41652936263**

Option 3 ID : **41652936264**

Option 4 ID : **41652936265**

Status : **Not Answered**

Chosen Option : **--**

**Q.22**

For the cell $Zn(s)|Zn^{2+}(aq)||M^{x+}(aq)|M(s)$, different half cells and their standard electrode potentials are given below :

| $M^{x+}(aq)/M(s)$ | $Au^{3+}(aq)/Au(s)$ | $Ag^{+}(aq)/Ag(s)$ | $Fe^{3+}(aq)/Fe^{2+}(aq)$ | $Fe^{2+}(aq)/Fe(s)$ |
|---|---|---|---|---|
| $E^{\circ}_{M^{x+}/M}/(V)$ | 1.40 | 0.80 | 0.77 | −0.44 |

If $E^{\circ}_{Zn^{2+}/Zn} = -0.76\,V$, which cathode will give a maximum value of $E^{\circ}_{cell}$ per electron transferred ?

**Options**

1. $Ag^{+}/Ag$
2. $Au^{3+}/Au$
3. $Fe^{3+}/Fe^{2+}$
4. $Fe^{2+}/Fe$

Question ID : **4165299203**

Option 1 ID : **41652936271**

Option 2 ID : **41652936270**

Option 3 ID : **41652936272**

Option 4 ID : **41652936273**

Status : **Answered**

Chosen Option : **2**

**Q.23** A 10 mg effervescent tablet containing sodium bicarbonate and oxalic acid releases 0.25 ml of $CO_2$ at T = 298.15 K and p = 1 bar. If molar volume of $CO_2$ is 25.0 L under such condition, what is the percentage of sodium bicarbonate in each tablet ?

[ Molar mass of $NaHCO_3 = 84\ g\ mol^{-1}$]

**Options**

1. 33.6
2. 8.4
3. 16.8
4. 0.84

Question ID : **4165299196**

Option 1 ID : **41652936245**

Option 2 ID : **41652936242**

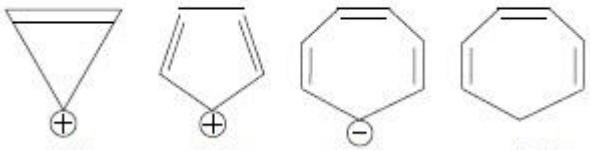
Option 3 ID : **41652936244**

Option 4 ID : **41652936243**

Status : **Answered**

Chosen Option : **2**

**Q.24** Which compound (s) out of the following is/are **not** aromatic ?




**Options**

1. (A) and (C)
2. (B), (C) and (D)

3. (C) and (D)

4. (B)

Question ID : **4165299181**
Option 1 ID : **41652936183**
Option 2 ID : **41652936184**
Option 3 ID : **41652936185**
Option 4 ID : **41652936182**
Status : **Answered**
Chosen Option : **2**

**Q.25** The correct order of the atomic radii of C, Cs, Al, and S is :

**Options**

1. $C < S < Cs < Al$

2. $S < C < Al < Cs$

3. $C < S < Al < Cs$

4. $S < C < Cs < Al$

Question ID : **4165299186**
Option 1 ID : **41652936204**
Option 2 ID : **41652936205**
Option 3 ID : **41652936203**
Option 4 ID : **41652936202**
Status : **Answered**
Chosen Option : **3**

**Q.26** Match the metals **(column I)** with the coordination compound(s)/enzyme(s) **(column II)** :

| **(column I)** | | | **(column II)** |
|---|---|---|---|
| **Metals** | | | **Coordination compound(s)/enzyme(s)** |
| (A) | Co | (i) | Wilkinson catalyst |
| (B) | Zn | (ii) | Chlorophyll |
| (C) | Rh | (iii) | Vitamin $B_{12}$ |
| (D) | Mg | (iv) | Carbonic anhydrase |

**Options**

1. (A)-(iii); (B)-(iv); (C)-(i); (D)-(ii)
2. (A)-(ii); (B)-(i); (C)-(iv); (D)-(iii)
3. (A)-(i); (B)-(ii); (C)-(iii); (D)-(iv)
4. (A)-(iv); (B)-(iii); (C)-(i); (D)-(ii)

Question ID : **4165299193**
Option 1 ID : **41652936233**
Option 2 ID : **41652936230**
Option 3 ID : **41652936232**
Option 4 ID : **41652936231**
Status : **Answered**
Chosen Option : **1**

**Q.27** Two blocks of the same metal having same mass and at temperature $T_1$ and $T_2$, respectively, are brought in contact with each other and allowed to attain thermal equilibrium at constant pressure. The change in entropy, $\Delta S$, for this process is :

**Options**

1. $2C_p \ln\left[\frac{(T_1 + T_2)^{\frac{1}{2}}}{T_1 T_2}\right]$

2. $C_p \ln\left[\frac{(T_1 + T_2)^2}{4T_1T_2}\right]$

3. $2C_p \ln\left[\frac{T_1 + T_2}{2T_1T_2}\right]$

4. $2C_p \ln\left(\frac{T_1 + T_2}{4T_1T_2}\right)$

Question ID : **4165299200**
Option 1 ID : **41652936261**
Option 2 ID : **41652936259**
Option 3 ID : **41652936260**
Option 4 ID : **41652936258**
Status : **Answered**
Chosen Option : **2**

**Q.28** The amphoteric hydroxide is :

**Options**

1. $Sr(OH)_2$

2. $Mg(OH)_2$

3. $Ca(OH)_2$

4. $Be(OH)_2$

Question ID : **4165299190**
Option 1 ID : **41652936221**
Option 2 ID : **41652936219**
Option 3 ID : **41652936220**
Option 4 ID : **41652936218**
Status : **Answered**
Chosen Option : **4**

**Q.29** A solid having density of $9 \times 10^3$ kg $m^{-3}$ forms face centred cubic crystals of edge length $200\sqrt{2}$ pm. What is the molar mass of the solid ?

[Avogadro constant $\cong 6 \times 10^{23}$ $mol^{-1}$, $\pi \cong 3$]

**Options**

1. 0.0432 kg $mol^{-1}$
2. 0.0305 kg $mol^{-1}$
3. 0.0216 kg $mol^{-1}$
4. 0.4320 kg $mol^{-1}$

Question ID : **4165299197**
Option 1 ID : **41652936246**
Option 2 ID : **41652936249**
Option 3 ID : **41652936248**
Option 4 ID : **41652936247**
Status : **Answered**
Chosen Option : **2**

**Q.30** The concentration of dissolved oxygen (DO) in cold water can go upto :

**Options**

1. 10 ppm
2. 8 ppm
3. 14 ppm
4. 16 ppm

Question ID : **4165299194**
Option 1 ID : **41652936235**
Option 2 ID : **41652936234**
Option 3 ID : **41652936236**
Option 4 ID : **41652936237**
Status : **Answered**
Chosen Option : **1**

## Section : Mathematics

**Q.1** If $y(x)$ is the solution of the differential equation $\frac{dy}{dx} + \left(\frac{2x+1}{x}\right) y = e^{-2x}, x > 0,$ where $y(1) = \frac{1}{2}e^{-2}$, then :

**Options**

1. $y(\log_e 2) = \frac{\log_e 2}{4}$
2. $y(x)$ is decreasing in $(0, 1)$
3. $y(x)$ is decreasing in $\left(\frac{1}{2}, 1\right)$
4. $y(\log_e 2) = \log_e 4$

Question ID : **4165299222**
Option 1 ID : **41652936346**
Option 2 ID : **41652936348**
Option 3 ID : **41652936349**
Option 4 ID : **41652936347**
Status : **Answered**
Chosen Option : **3**

**Q.2** The value of the integral $\int_{-2}^{2} \frac{\sin^2 x}{\left[\frac{x}{\pi}\right] + \frac{1}{2}} dx$ (where $[x]$ denotes the greatest integer less than or equal to $x$ ) is :

**Options**

1. $4$
2. $0$
3. $4 - \sin 4$
4. $\sin 4$

Question ID : **4165299220**

Option 1 ID : **41652936340**

Option 2 ID : **41652936339**

Option 3 ID : **41652936338**

Option 4 ID : **41652936341**

Status : **Answered**

Chosen Option : **2**

**Q.3**

If $\int \frac{\sqrt{1-x^2}}{x^4}\,dx = A(x)\left(\sqrt{1-x^2}\right)^m + C$,

for a suitable chosen integer m and a function A($x$), where C is a constant of integration, then $(A(x))^m$ equals :

**Options**

1. $\frac{1}{27x^6}$

2. $\frac{-1}{3x^3}$

3. $\frac{-1}{27x^9}$

4. $\frac{1}{9x^4}$

Question ID : **4165299219**

Option 1 ID : **41652936337**

Option 2 ID : **41652936335**

Option 3 ID : **41652936336**

Option 4 ID : **41652936334**

Status : **Not Answered**

Chosen Option : **--**

**Q.4** Let $a_1, a_2, ..., a_{10}$ be a G.P. If $\frac{a_3}{a_1} = 25$, then

$\frac{a_9}{a_5}$ equals :

**Options**

1. $4(5^2)$
2. $5^3$
3. $5^4$
4. $2(5^2)$

Question ID : **4165299212**
Option 1 ID : **41652936307**
Option 2 ID : **41652936308**
Option 3 ID : **41652936309**
Option 4 ID : **41652936306**
Status : **Answered**
Chosen Option : **3**

**Q.5** If q is false and $p \wedge q \leftrightarrow r$ is true, then which one of the following statements is a tautology ?

**Options**

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

Question ID : **4165299235**
Option 1 ID : **41652936400**
Option 2 ID : **41652936401**
Option 3 ID : **41652936399**
Option 4 ID : **41652936398**
Status : **Answered**
Chosen Option : **3**

**Q.6** Let $\left(-2-\frac{1}{3}i\right)^3=\frac{x+iy}{27}$ $(i=\sqrt{-1})$, where $x$ and $y$ are real numbers, then $y-x$ equals :

**Options**

1. $-85$
2. $-91$
3. $91$
4. $85$

Question ID : **4165299208**

Option 1 ID : **41652936293**

Option 2 ID : **41652936292**

Option 3 ID : **41652936290**

Option 4 ID : **41652936291**

Status : **Answered**

Chosen Option : **3**

**Q.7** If tangents are drawn to the ellipse $x^2+2y^2=2$ at all points on the ellipse other than its four vertices then the mid points of the tangents intercepted between the coordinate axes lie on the curve :

**Options**

1. $\frac{1}{2x^2}+\frac{1}{4y^2}=1$
2. $\frac{1}{4x^2}+\frac{1}{2y^2}=1$
3. $\frac{x^2}{2}+\frac{y^2}{4}=1$
4. $\frac{x^2}{4}+\frac{y^2}{2}=1$

Question ID : **4165299227**

Option 1 ID : **41652936366**

Option 2 ID : **41652936367**

Option 3 ID : **41652936368**

Option 4 ID : **41652936369**

Status : **Answered**

Chosen Option : **1**

**Q.8** The sum of an infinite geometric series with positive terms is 3 and the sum of the cubes of its terms is $\frac{27}{19}$. Then the common ratio of this series is :

**Options**

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

Question ID : **4165299213**

Option 1 ID : **41652936311**

Option 2 ID : **41652936312**

Option 3 ID : **41652936310**

Option 4 ID : **41652936313**

Status : **Answered**

Chosen Option : **4**

**Q.9** Let $[x]$ denote the greatest integer less than or equal to $x$. Then :

$$\lim_{x\to 0}\frac{\tan(\pi\sin^2 x)+\left(|x|-\sin\left(x[x]\right)\right)^2}{x^2}:$$

**Options**

1. does not exist
2. equals $0$
3. equals $\pi+1$
4. equals $\pi$

Question ID : **4165299215**
Option 1 ID : **41652936321**
Option 2 ID : **41652936319**
Option 3 ID : **41652936320**
Option 4 ID : **41652936318**
Status : **Not Answered**
Chosen Option : **--**

**Q.10**

Let $f(x)=\begin{cases}-1, & -2 \le x < 0 \\ x^2-1, & 0 \le x \le 2\end{cases}$ and

$g(x)=|f(x)|+f(|x|)$. Then, in the interval $(-2, 2)$, $g$ is :

**Options**

1. not differentiable at two points
2. differentiable at all points
3. not differentiable at one point
4. not continuous

Question ID : **4165299217**
Option 1 ID : **41652936328**
Option 2 ID : **41652936329**
Option 3 ID : **41652936327**
Option 4 ID : **41652936326**
Status : **Answered**
Chosen Option : **3**

**Q.11** A square is inscribed in the circle $x^2+y^2-6x+8y-103=0$ with its sides parallel to the coordinate axes. Then the distance of the vertex of this square which is nearest to the origin is :

**Options**

1. $6$
2. $\sqrt{137}$
3. $\sqrt{41}$
4. $13$

Question ID : **4165299225**
Option 1 ID : **41652936358**
Option 2 ID : **41652936361**
Option 3 ID : **41652936359**
Option 4 ID : **41652936360**
Status : **Answered**
Chosen Option : **3**

**Q.12** Let $A=\begin{pmatrix} 0 & 2q & r \\ p & q & -r \\ p & -q & r \end{pmatrix}$. If $AA^T = I_3$, then $|p|$ is :

**Options**

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

Question ID : **4165299209**
Option 1 ID : **41652936297**
Option 2 ID : **41652936296**
Option 3 ID : **41652936295**
Option 4 ID : **41652936294**
Status : **Answered**
Chosen Option : **4**

**Q.13** The direction ratios of normal to the plane through the points $(0, -1, 0)$ and $(0, 0, 1)$ and making an angle $\frac{\pi}{4}$ with the plane $y - z + 5 = 0$ are :

**Options**

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

Question ID : **4165299228**
Option 1 ID : **41652936372**
Option 2 ID : **41652936373**
Option 3 ID : **41652936371**
Option 4 ID : **41652936370**
Status : **Answered**
Chosen Option : **4**

**Q.14** Let $f_k(x) = \frac{1}{k}(\sin^k x + \cos^k x)$ for $k = 1, 2, 3, \ldots$. Then for all $x \in \mathbf{R}$, the value of $f_4(x) - f_6(x)$ is equal to :

**Options**

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

2. $\frac{1}{12}$

3. $\frac{-1}{12}$

4. $\frac{5}{12}$

Question ID : **4165299233**
Option 1 ID : **41652936392**
Option 2 ID : **41652936390**
Option 3 ID : **41652936391**
Option 4 ID : **41652936393**
Status : **Answered**
Chosen Option : **2**

**Q.15** Two integers are selected at random from the set {1, 2, ...., 11}. Given that the sum of selected numbers is even, the conditional probability that both the numbers are even is :

**Options**

1. $\frac{7}{10}$

2. $\frac{2}{5}$

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

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

Question ID : **4165299232**
Option 1 ID : **41652936389**
Option 2 ID : **41652936386**
Option 3 ID : **41652936388**
Option 4 ID : **41652936387**

Status : **Answered**

Chosen Option : **2**

**Q.16** Let $\vec{a}=\hat{i}+2\hat{j}+4\hat{k}$, $\vec{b}=\hat{i}+\lambda\hat{j}+4\hat{k}$ and $\vec{c}=2\hat{i}+4\hat{j}+(\lambda^2-1)\hat{k}$ be coplanar vectors. Then the non-zero vector $\vec{a}\times\vec{c}$ is :

**Options**

1. $-10\hat{i}+5\hat{j}$

2. $-14\hat{i}-5\hat{j}$

3. $-14\hat{i}+5\hat{j}$

4. $-10\hat{i}-5\hat{j}$

Question ID : **4165299230**

Option 1 ID : **41652936380**

Option 2 ID : **41652936379**

Option 3 ID : **41652936381**

Option 4 ID : **41652936378**

Status : **Answered**

Chosen Option : **1**

**Q.17** The plane containing the line $\frac{x-3}{2}=\frac{y+2}{-1}=\frac{z-1}{3}$ and also containing its projection on the plane $2x+3y-z=5$, contains which one of the following points ?

**Options**

1. $(2, 2, 0)$

2. $(2, 0, -2)$

3. $(0, -2, 2)$

4. $(-2, 2, 2)$

Question ID : **4165299229**
Option 1 ID : **41652936376**
Option 2 ID : **41652936375**
Option 3 ID : **41652936374**
Option 4 ID : **41652936377**
Status : **Not Answered**
Chosen Option : **--**

**Q.18** If $x\log_e(\log_e x) - x^2 + y^2 = 4$ ( $y > 0$ ), then $\frac{dy}{dx}$ at $x = e$ is equal to :

**Options**

1. $\frac{e}{\sqrt{4+e^2}}$

2. $\frac{(2e-1)}{2\sqrt{4+e^2}}$

3. $\frac{(1+2e)}{\sqrt{4+e^2}}$

4. $\frac{(1+2e)}{2\sqrt{4+e^2}}$

Question ID : **4165299216**
Option 1 ID : **41652936323**
Option 2 ID : **41652936322**
Option 3 ID : **41652936325**
Option 4 ID : **41652936324**
Status : **Answered**
Chosen Option : **2**

**Q.19** Let $f : \mathbf{R} \to \mathbf{R}$ be defined by $f(x)=\frac{x}{1+x^2}$, $x \in \mathbf{R}$. Then the range of $f$ is :

**Options**

1. $\mathbf{R}-\left[-\frac{1}{2}, \frac{1}{2}\right]$
2. $\left[-\frac{1}{2}, \frac{1}{2}\right]$
3. $(-1,1)-\{0\}$
4. $\mathbf{R}-[-1,1]$

Question ID : **4165299206**
Option 1 ID : **41652936282**
Option 2 ID : **41652936285**
Option 3 ID : **41652936284**
Option 4 ID : **41652936283**
Status : **Answered**
Chosen Option : **2**

**Q.20** The sum of the real values of $x$ for which the middle term in the binomial expansion of $\left(\frac{x^3}{3}+\frac{3}{x}\right)^8$ equals 5670 is :

**Options**

1. 0
2. 8
3. 6
4. 4

Question ID : **4165299211**
Option 1 ID : **41652936302**
Option 2 ID : **41652936305**
Option 3 ID : **41652936304**

Option 4 ID : **41652936303**

Status : **Answered**

Chosen Option : **1**

**Q.21** If the system of linear equations

$2x+2y+3z=a$

$3x-y+5z=b$

$x-3y+2z=c$

where a, b, c are non-zero real numbers, has more than one solution, then :

**Options**

1. $b-c-a=0$
2. $a+b+c=0$
3. $b-c+a=0$
4. $b+c-a=0$

Question ID : **4165299210**

Option 1 ID : **41652936300**

Option 2 ID : **41652936301**

Option 3 ID : **41652936299**

Option 4 ID : **41652936298**

Status : **Answered**

Chosen Option : **1**

**Q.22** The area (in sq.units) of the region bounded by the curve $x^2=4y$ and the straight line $x=4y-2$ is :

**Options**

1. $\frac{9}{8}$
2. $\frac{5}{4}$
3. $\frac{3}{4}$

4. $\frac{7}{8}$

Question ID : **4165299221**
Option 1 ID : **41652936343**
Option 2 ID : **41652936344**
Option 3 ID : **41652936342**
Option 4 ID : **41652936345**
Status : **Answered**
Chosen Option : **1**

**Q.23** If one real root of the quadratic equation $81x^2 + kx + 256 = 0$ is cube of the other root, then a value of k is :

**Options**
1. $-300$
2. $144$
3. $-81$
4. $100$

Question ID : **4165299207**
Option 1 ID : **41652936286**
Option 2 ID : **41652936288**
Option 3 ID : **41652936289**
Option 4 ID : **41652936287**
Status : **Answered**
Chosen Option : **1**

**Q.24** Two circles with equal radii are intersecting at the points (0, 1) and (0, −1). The tangent at the point (0, 1) to one of the circles passes through the centre of the other circle. Then the distance between the centres of these circles is :

**Options**
1. $1$
2. $\sqrt{2}$

3. $2$

4. $2\sqrt{2}$

Question ID : **4165299223**
Option 1 ID : **41652936351**
Option 2 ID : **41652936353**
Option 3 ID : **41652936352**
Option 4 ID : **41652936350**
Status : **Not Answered**
Chosen Option : **--**

**Q.25** The straight line $x+2y=1$ meets the coordinate axes at A and B. A circle is drawn through A, B and the origin. Then the sum of perpendicular distances from A and B on the tangent to the circle at the origin is :

**Options**

1. $4\sqrt{5}$

2. $2\sqrt{5}$

3. $\frac{\sqrt{5}}{2}$

4. $\frac{\sqrt{5}}{4}$

Question ID : **4165299224**
Option 1 ID : **41652936354**
Option 2 ID : **41652936356**
Option 3 ID : **41652936357**
Option 4 ID : **41652936355**
Status : **Answered**
Chosen Option : **3**

**Q.26** In a triangle, the sum of lengths of two sides is $x$ and the product of the lengths of the same two sides is $y$. If $x^2 - c^2 = y$, where $c$ is the length of the third side of the triangle, then the circumradius of the triangle is :

**Options**

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

Question ID : **4165299234**
Option 1 ID : **41652936395**
Option 2 ID : **41652936396**
Option 3 ID : **41652936394**
Option 4 ID : **41652936397**
Status : **Answered**
Chosen Option : **1**

**Q.27** Equation of a common tangent to the parabola $y^2 = 4x$ and the hyperbola $xy = 2$ is :

**Options**

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

Question ID : **4165299226**
Option 1 ID : **41652936364**
Option 2 ID : **41652936365**

Option 3 ID : **41652936362**

Option 4 ID : **41652936363**

Status : **Answered**

Chosen Option : **2**

**Q.28** The maximum value of the function $f(x)=3x^3-18x^2+27x-40$ on the set $S=\left\{x\in R: x^2+30\le 11x\right\}$ is :

**Options**

1. $-122$
2. $222$
3. $-222$
4. $122$

Question ID : **4165299218**

Option 1 ID : **41652936331**

Option 2 ID : **41652936332**

Option 3 ID : **41652936333**

Option 4 ID : **41652936330**

Status : **Answered**

Chosen Option : **4**

**Q.29** The outcome of each of 30 items was observed ; 10 items gave an outcome $\frac{1}{2}-d$ each, 10 items gave outcome $\frac{1}{2}$ each and the remaining 10 items gave outcome $\frac{1}{2}+d$ each. If the variance of this outcome data is $\frac{4}{3}$ then $|d|$ equals :

**Options**

1. $\frac{\sqrt{5}}{2}$

2. $2$

3. $\sqrt{2}$

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

Question ID : **4165299231**
Option 1 ID : **41652936384**
Option 2 ID : **41652936383**
Option 3 ID : **41652936382**
Option 4 ID : **41652936385**
Status : **Answered**
Chosen Option : **3**

**Q.30** The value of r for which ${}^{20}C_r\,{}^{20}C_0 + {}^{20}C_{r-1}\,{}^{20}C_1 + {}^{20}C_{r-2}\,{}^{20}C_2 + \cdots + {}^{20}C_0\,{}^{20}C_r$ is maximum, is :

**Options**

1. $10$

2. $15$

3. $20$

4. $11$

Question ID : **4165299214**
Option 1 ID : **41652936316**
Option 2 ID : **41652936315**
Option 3 ID : **41652936317**
Option 4 ID : **41652936314**
Status : **Answered**
Chosen Option : **3**