

Question Number : 80 Question Id : 10561580 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

The curve that satisfies the differential equation  $xydy - (1 + y^2)dx = 0$  passes through  $(1, 0)$  and intersects the curve  $x^2 + 3y^2 = 3$  at an angle  $\theta$ . Then  $\frac{2\theta}{\pi} =$

Options :

- 1. ✖
- 2.
- 3. ✖
- 4. ✔

## Physics

Section Id :	1056152
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40
Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	1056152
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 10561581 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

Choose the correct statement from following.

Options :

Not all basic laws of physics are universal

1. ✘

Conservation laws have a deep connection with symmetries of nature

2. ✔

There are four to six fundamental forces in nature that govern the diverse phenomena of the world

3. ✘

Physics can generate new technology but new physics cannot come out from technology

4. ✘

Question Number : 82 Question Id : 10561582 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

If  $E$  and  $E_0$  denote energies at time  $t$  and  $t_0$  respectively, and  $L$  and  $L_0$  distance from some point at  $t$  and  $t_0$  respectively, then which of the following equations can be declared to be incorrect on dimensional grounds

A)  $E = \frac{2E_0L}{L_0}$

B)  $E = E_0 e^{-2L/L_0}$

C)  $E = 2L e^{-L/E_0}$

D)  $E = 2(E_0 / L_0) \times e^{-L/L_0}$

Options :

A, B only

1. ✘

A, C only

2. ✘

A, C, D only

3. ✖

C, D only

4. ✔

**Question Number : 83 Question Id : 10561583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

A body starts from the rest and acquires a velocity of 10 m/s in 2s. What is the acceleration of the body and the distance travelled

**Options :**

5 m/s<sup>2</sup> and 10 m

1. ✔

5 m/s<sup>2</sup> and 5 m

2. ✖

5 m/s<sup>2</sup> and 6 m

3. ✖

6 m/s<sup>2</sup> and 5 m

4. ✖

**Question Number : 84 Question Id : 10561584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

A bullet fired into a target losses one-third of its velocity after travelling a distance  $x$  meter into the target. If the bullet comes to rest by travelling a further distance  $x'$ , then the ratio  $\frac{x'}{x}$  is

**Options :**

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

1. ✖

$$\frac{1}{3}$$

2. ✖

$$\frac{4}{5}$$

3. ✔

$$\frac{4}{9}$$

4. ✖

**Question Number : 85 Question Id : 10561585 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

An ant starts from the origin and crawls 10 cm along the x – axis and then 20 cm along the y – axis. The dot product of the ant's displacement vector with the position vector of a point that makes  $45^\circ$  with the x – axis and has a magnitude of  $\sqrt{2}$  cm is

**Options :**

$$30 \text{ cm}$$

1. ✔

$$30\sqrt{2} \text{ cm}$$

2. ✖

$$\frac{30}{\sqrt{2}} \text{ cm}$$

3. ✖

$$15 \text{ cm}$$

4. ✖

**Question Number : 86 Question Id : 10561586 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Correct Marks : 1 Wrong Marks : 0

A projectile is launched with an initial speed of 40 m/s at an angle  $30^\circ$  above the ground. The projectile lands on a hillside 2.0 s later. The net displacement from where the projectile was launched to where it hits the target is  
(Take  $g = 10 \text{ m/s}^2$ )

Options :

1. ✘  $20\sqrt{3} \text{ m}$

2. ✘  $30\sqrt{2} \text{ m}$

3. ✘ 40 m

4. ✔  $20\sqrt{13} \text{ m}$

Question Number : 87 Question Id : 10561587 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

Two blocks of masses 1 kg and 2 kg connected by a light rod and the system is slipping down a rough incline angle  $45^\circ$  with the horizontal. The frictional coefficient at both the contacts is 0.4. If the acceleration of the system is  $\alpha\sqrt{2}$ , the value of  $\alpha$  is  
(Use  $g = 10 \text{ m/s}^2$ )

Options :

1. ✘ 4

2. ✔ 3

3. ✘ 2

6

4. ✖

**Question Number : 88 Question Id : 10561588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

The potential energy of an object is  $U(x) = (5x^2 - 4x^3)$  J, where x is the position in meter. The position at which the force becomes zero is

**Options :**

$$\frac{1}{2} \text{ m}$$

1. ✖

$$\frac{5}{6} \text{ m}$$

2. ✔

$$\frac{1}{3} \text{ m}$$

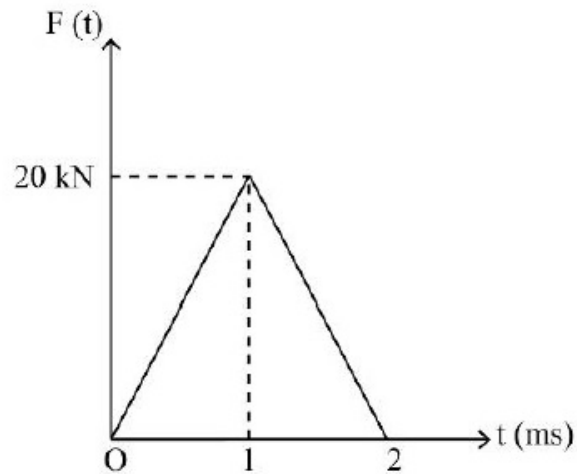
3. ✖

$$\frac{2}{3} \text{ m}$$

4. ✖

**Question Number : 89 Question Id : 10561589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

A time varying force acts on a ball of mass 100 g for 2 ms. The force versus time curve is shown below. If the initial speed of the ball is 10 m/s, then the speed of ball after 2 ms is



Options :

210 m/s

1. ✘

410 m/s

2. ✔

200 m/s

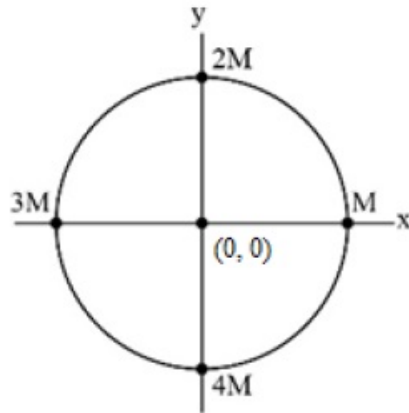
3. ✘

400 m/s

4. ✘

Question Number : 90 Question Id : 10561590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

Four masses are arranged along a circle of radius 1 m as shown in the figure. The center of mass of this system of masses is at



Options :

$$-\frac{1}{5}\hat{i}-\frac{1}{5}\hat{j}$$

1. ✓

$$\frac{1}{5}\hat{i}+\hat{j}$$

2. ✘

$$\hat{i}-\frac{1}{5}\hat{j}$$

3. ✘

$$\frac{1}{5}\hat{i}+\frac{1}{5}\hat{j}$$

4. ✘

Question Number : 91 Question Id : 10561591 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

A body starting at  $t = 0$  from origin and oscillates simple harmonically with a period of 4s. After what time will its kinetic energy be 75% of its total energy

Options :



1/2 s

1. ✖

1/3 s

2. ✔

1/4 s

3. ✖

1 s

4. ✖

Question Number : 92 Question Id : 10561592 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

Three particles, each of mass  $M$ , situated at the vertices of an equilateral triangle of side length ' $l$ '. The only forces acting on the particles are their mutual gravitational forces. It is desired that each particle moves in a circle while maintaining the original separation ' $l$ '. The initial speed that should be given to each particle is

Options :

$$\sqrt{\frac{2GM}{l}}$$

1. ✖

$$\sqrt{\frac{GM}{2l}}$$

2. ✖

$$\sqrt{\frac{GM}{l}}$$

3. ✔

$$\sqrt{\frac{3GM}{l}}$$

4. ✖

Question Number : 93 Question Id : 10561593 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
 Correct Marks : 1 Wrong Marks : 0

Match the following

Column-I

- A) Shear modulus
- B) Shearing stress
- C) Elastic fatigue
- D) Modulus of elasticity

Column-II

- I) Resistance to change in volume
- II) Proportionality constant
- III) Tangential stress
- IV) Temporary loss of elastic property
- V) Resistance to change against deformation force

The correct match is

Options :

A	B	C	D
II	V	I	III

1. ✖

A	B	C	D
V	III	IV	II

2. ✔

A	B	C	D
III	IV	II	V

3. ✖

A	B	C	D
V	II	IV	I

4. ✖

Question Number : 94 Question Id : 10561594 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

A large storage tank, open to the atmosphere at top and filled with water, develops a small hole in its side at a point 20.0 m below the water level. If the rate of flow from the hole is  $3.08 \times 10^{-5} \text{ m}^3/\text{s}$ , then the diameter of the hole is  
[Take  $g = 10 \text{ m/s}^2$ ]

Options :

1.0 mm

1. ✖

1.2 mm

2. ✖

1.4 mm

3. ✔

1.6 mm

4. ✖

Question Number : 95 Question Id : 10561595 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

An air bubble of radius 1 mm is at a depth of 8 cm below the free surface of a liquid column. If the surface tension and density of the liquid is 0.1 N/m and  $2000 \text{ Kg/m}^3$ , respectively, by what amount is the pressure inside the bubble greater than the atmospheric pressure?  
(Take  $g = 10 \text{ m/s}^2$ )

Options :

1500 N/m<sup>2</sup>

1. ✖

1800 N/m<sup>2</sup>

2. ✓

1600 N/m<sup>2</sup>

3. ✘

1700 N/m<sup>2</sup>

4. ✘

Question Number : 96 Question Id : 10561596 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

Find the ratio of the length of a steel rod and a copper rod if the steel rod is 4 cm longer than the copper rod at any temperature.

[The coefficient of linear expansion for steel and copper are  $1.1 \times 10^{-5} / ^\circ\text{C}$  and  $1.7 \times 10^{-5} / ^\circ\text{C}$  respectively]

Options :

$\frac{17}{11}$

1. ✓

$\frac{11}{17}$

2. ✘

$\frac{11}{4}$

3. ✘

$\frac{17}{4}$

4. ✘

Question Number : 97 Question Id : 10561597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

An object cools from  $100^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  in 10 minutes, when the surrounding temperature is  $10^{\circ}\text{C}$ . Then the time taken by the object to cool from  $70^{\circ}\text{C}$  to  $20^{\circ}\text{C}$  is  
[Take  $\ln 2 = 0.7, \ln 3 = 1.1, \ln 6 = 1.8$ ]

Options :

30 min

1. ✘

8.5 min

2. ✘

22.4 min

3. ✘

16.3 min

4. ✔

Question Number : 98 Question Id : 10561598 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

1.00 kg of liquid water at  $100^{\circ}\text{C}$  undergoes a phase change into steam at  $100^{\circ}\text{C}$  at 1.0 atm (take it to be  $1.00 \times 10^5$  Pa). The initial volume of the liquid water was  $1.00 \times 10^{-3} \text{ m}^3$  which is changed to  $2.001 \text{ m}^3$  of steam. Find the change in the internal energy of the system.

[Use heat of vaporization  $\approx 2000 \text{ kJ} / \text{kg}$ ]

Options :

1800 kJ

1. ✔

200 kJ

2. ✘

2000 kJ

3. ✘

180 kJ

4. ✖

Question Number : 99 Question Id : 10561599 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

A monoatomic gas does 100 J of work when it is expanded isobarically. How much of heat is given to the gas in the process

Options :

150 J

1. ✖

200 J

2. ✖

250 J

3. ✔

300 J

4. ✖

Question Number : 100 Question Id : 105615100 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes  
Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

If the root mean square (rms) speed of nitrogen molecules at room temperature is 100 m/s, then the rms speed of Helium molecule at the same temperature is

Options :

$100\sqrt{7}$  m/s

1. ✔

350 m/s

2. ✖

$50\sqrt{14}$  m/s

3. ✖

100 m/s

4. ✖

**Question Number : 101 Question Id : 105615101 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

Two waves of amplitudes  $A_1$  and  $A_2$  respectively are superimposed. The ratio between the maximum and minimum intensities of the resultant waves is 9: 4. The value of  $\frac{A_2}{A_1}$  is [Assume  $A_1 > A_2$ ]

**Options :**

0.66

1. ✖

0.20

2. ✔

0.75

3. ✖

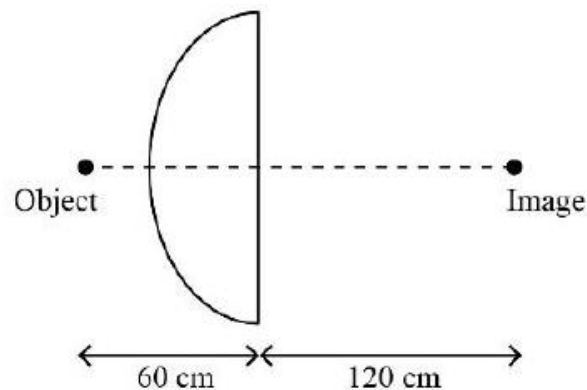
0.44

4. ✖

**Question Number : 102 Question Id : 105615102 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**



A lens is made of glass having an index of refraction 1.5. One side of the lens is flat and the other side is convex with a radius  $R$ . If an object is placed 60 cm, towards the convex side of the lens, the image is formed at 120 cm on the other side of the lens. The value of  $R$  is



Options :

20 cm

1. ✓

$\frac{40}{3}$  cm

2. ✗

33 cm

3. ✗

18 cm

4. ✗

Question Number : 103 Question Id : 105615103 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

A Young's double slit experiment apparatus has slits separated by 0.2 mm and a screen 60 cm away from the slits. The whole apparatus is immersed in a liquid medium of refractive index  $\frac{11}{9}$  and the slits are illuminated with green light ( $\lambda = 550 \text{ nm}$  in vacuum). Find the fringe width of the pattern formed on the screen.



Options :

1. ✘ 0.95 mm

2. ✘ 1.25 mm

3. ✔ 1.35 mm

4. ✘ 1.45 mm

Question Number : 104 Question Id : 105615104 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

An electron is released from a distance of 4 m from a stationary point charge 20 nC. What will be the speed of the electron when it is 2 m away from the point charge?

[Charge of electron =  $1.6 \times 10^{-19}$  C, mass of electron =  $9 \times 10^{-31}$  kg,

$$\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ S.I unit } ]$$

Options :

1. ✘  $2 \times 10^6$  m/s

2. ✔  $4 \times 10^6$  m/s

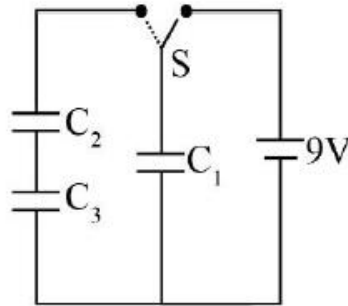
3. ✘  $1.6 \times 10^6$  m/s

4. ✘  $2.4 \times 10^6$  m/s

Question Number : 105 Question Id : 105615105 Question Type : MCQ Option Shuffling : Yes Display Question Number :

Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

The following figure shows a 9 V battery and 3 uncharged capacitors of capacitances  $C_1 = C_2 = C_3 = 1 \mu\text{F}$ . The switch is thrown to the right side until capacitor  $C_1$  is fully charged, then the switch is thrown to the left. The final charge on capacitor  $C_2$  is



Options :

1.  $1 \mu\text{C}$  ✘
2.  $2 \mu\text{C}$  ✘
3.  $3 \mu\text{C}$  ✔
4.  $4 \mu\text{C}$  ✘

Question Number : 106 Question Id : 105615106 Question Type : MCQ Option Shuffling : Yes Display Question Number :  
Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

A metal wire of length  $L$  and radius  $r$  has a resistance  $R$ . If a wire of the same metal of length  $2L$  and radius  $3r$  is taken, then what will be its resistance?

Options :

1.  $\frac{2}{9}R$  ✔

$$\frac{2}{3}R$$

2. ✖

$$\frac{2}{9\pi}R$$

3. ✖

$$\frac{2}{3\pi}R$$

4. ✖

**Question Number : 107 Question Id : 105615107 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

Balancing point of a potentiometer shifts from a length of 60 cm to 40 cm by shunting the cell with a 4 ohm resistance. What is the internal resistance of the cell?

**Options :**

$$1 \Omega$$

1. ✖

$$2 \Omega$$

2. ✔

$$4 \Omega$$

3. ✖

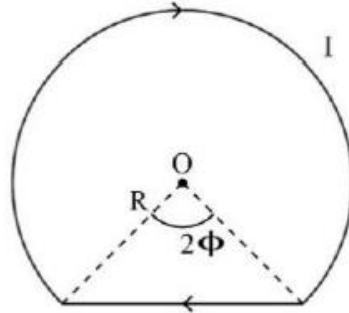
$$6 \Omega$$

4. ✖

**Question Number : 108 Question Id : 105615108 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

A current  $I = 5\text{ A}$  flows along a thin wire shaped as shown in figure. The radius of curved part of the wire is equal to  $R = 100\text{ mm}$ , the angle  $2\phi = 90^\circ$ . The magnitude of magnetic field at the point  $O$  is approximately

$$\left[ \text{Use } \frac{\mu_0}{4\pi} = 10^{-7} \text{ TmA}^{-1} \right]$$



Options :

33.6  $\mu\text{T}$

1. ✓

38.4  $\mu\text{T}$

2. ✗

48.7  $\mu\text{T}$

3. ✗

25.2  $\mu\text{T}$

4. ✗

Question Number : 109 Question Id : 105615109 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

A toroid has a core (non-ferro magnetic) of inner radius 24 cm and outer radius 26 cm around which 2000 turns of a wire is wound. If the current in the wire is 12 A, the magnetic field inside the core of the toroid is

Options :

$$1.92 \times 10^{-2} \text{ T}$$

1. ✓

$$1.88 \times 10^{-2} \text{ T}$$

2. ✘

$$2.12 \times 10^{-2} \text{ T}$$

3. ✘

$$1.98 \times 10^{-2} \text{ T}$$

4. ✘

Question Number : 110 Question Id : 105615110 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

A planet has magnetic dipole moment of  $27 \times 10^{22} \text{ Am}^2$ . If the radius of the planet is 300 km, what would be the magnetic field at its equator?

$$\frac{\mu_0}{4\pi} = 10^{-7}$$

Options :

$$1 \text{ T}$$

1. ✓

$$27 \text{ T}$$

2. ✘

$$11 \text{ T}$$

3. ✘

$$30 \text{ T}$$

4. ✘

Question Number : 111 Question Id : 105615111 Question Type : MCQ Option Shuffling : Yes Display Question Number :

Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

A long solenoid has 20 turns per cm. A small loop of area  $\frac{4}{\pi} \text{ cm}^2$  is placed inside the solenoid normal to its axis. If the current carried by the solenoid changes steadily from 1.0 A to 3.0A in 0.2 s, what is the magnitude of the induced emf in the loop while the current is changing?

Options :

2.4  $\mu\text{V}$

1. ✖

3.2  $\mu\text{V}$

2. ✔

7.2  $\mu\text{V}$

3. ✖

4.8  $\mu\text{V}$

4. ✖

Question Number : 112 Question Id : 105615112 Question Type : MCQ Option Shuffling : Yes Display Question Number :  
Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 1 Wrong Marks : 0

An AC current is given by the expression,  $I(t) = 50 \sin(200\pi t)$  in amperes. The frequency and r.m.s value of the current respectively are

Options :

100 Hz,  $50\sqrt{2}$  A

1. ✖

100 Hz,  $25\sqrt{2}$  A

2. ✔

200 Hz,  $50\sqrt{2}$  A

3. ✖

200 Hz,  $25\sqrt{2}$  A

4. ✖

Question Number : 113 Question Id : 105615113 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

An electromagnetic wave is propagating in vacuum along  $-\hat{j}$  direction. The magnetic field of the wave is given by  $\vec{B} = (2 \times 10^{-8}) \cos \left[ \pi \times 10^{15} \left( t + \frac{y}{c} \right) \right] \hat{k}$  T. The electric field  $\vec{E}$  of this wave is ( $c \equiv$  speed of light)

Options :

$$\vec{E} = (4) \cos \left[ \pi \times 10^{15} \left( t + \frac{y}{c} \right) \right] \hat{j} \text{ V/m}$$

1. ✖

$$\vec{E} = (6) \cos \left[ \pi \times 10^{15} \left( t + \frac{y}{c} \right) \right] \hat{i} \text{ V/m}$$

2. ✔

$$\vec{E} = (6) \cos \left[ \pi \times 10^{15} \left( t - \frac{y}{c} \right) \right] \hat{j} \text{ V/m}$$

3. ✖

$$\vec{E} = (4) \cos \left[ \pi \times 10^{15} \left( t - \frac{y}{c} \right) \right] \hat{i} \text{ V/m}$$

4. ✖

Question Number : 114 Question Id : 105615114 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0



For photoelectric effect which of the following statements are true.

- I) The kinetic energies of the photoelectrons do not depend on the frequency of light
- II) Photoelectric effect will always occur for highly intense light
- III) The maximum kinetic energy of photoelectron does not depend upon the intensity of the light
- IV) The escaping electron's kinetic energy is larger for larger frequency

Options :

I and II only

1. ✖

II and III only

2. ✖

III and IV only

3. ✔

IV and I only

4. ✖

Question Number : 115 Question Id : 105615115 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

Which of the following statements is NOT true?

Options :

Electromagnetic radiation is made up of particles called photons

1. ✖

Each photon moves with the speed of light

2. ✖



Photon energy is dependent on the intensity of radiation

3. ✓

Photons are not deflected by electric and magnetic field

4. ✖

Question Number : 116 Question Id : 105615116 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

The light emitted in the transition  $n = 3$  to  $n = 2$  (where  $n$  is the principal quantum number of the state) in hydrogen is called  $H_{\alpha}$ -light. Find the maximum work function that a metal can have so that  $H_{\alpha}$ -light can emit photoelectrons from it.

Options :

1.5 eV

1. ✖

2.89 eV

2. ✖

1.89 eV

3. ✓

3.5 eV

4. ✖

Question Number : 117 Question Id : 105615117 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

As the mass number  $A$  increases, which of the following quantities related to a nucleus does not change?

Options :

mass

1. ✖

volume

2. ✖

density

3. ✔

binding energy

4. ✖

**Question Number : 118 Question Id : 105615118 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

In a p-type semiconductor, which of the following statement is true?

**Options :**

Holes are majority carriers and trivalent atoms are the dopants

1. ✔

Electrons are minority carriers and pentavalent atoms are the dopants

2. ✖

Electrons are majority carriers and trivalent atoms are the dopants

3. ✖

Holes are minority carriers and pentavalent atoms are the dopants

4. ✖

**Question Number : 119 Question Id : 105615119 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0**

In a NAND Gate, A and B are inputs and Y is the output, then the correct option is

**Options :**

$A = 0, B = 0; Y = 0$

1. ✖

$$A = 0, B = 1; Y = 0$$

2. ✘

$$A = 1, B = 0; Y = 0$$

3. ✘

$$A = 1, B = 1; Y = 0$$

4. ✔

Question Number : 120 Question Id : 105615120 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0 Correct Marks : 1 Wrong Marks : 0

A TV transmission antenna is 40 m tall. How much service area it can cover if the receiving antenna is at the ground level?  
(radius of the Earth = 6400 km)

Options :

$$640 \pi \times 10^6 \text{ m}^2$$

1. ✘

$$512 \pi \times 10^6 \text{ m}^2$$

2. ✔

$$480 \pi \times 10^6 \text{ m}^2$$

3. ✘

$$440 \pi \times 10^6 \text{ m}^2$$

4. ✘

## Chemistry

Section Id :	1056153
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40