

JEE 2023 Session-1 24th Jan to 1st Feb 2023

Application No	
Candidate Name	
Roll No	
Test Date	29/01/2023
Test Time	9:00 AM - 12:00 PM
Subject	B TECH

Section : Physics Section A

Q.1 A stone is projected at angle 30° to the horizontal. The ratio of kinetic energy of the stone at point of projection to its kinetic energy at the highest point of flight will be -

- Options
1. 1 : 4
 2. 4 : 1
 3. 1 : 2
 4. 4 : 3

Question Type : MCQ

Question ID : 3666942015

Option 1 ID : 3666946233

Option 2 ID : 3666946236

Option 3 ID : 3666946234

Option 4 ID : 3666946235

Status : Answered

Chosen Option : 2

Q.2 Match List I with List II:

List I (Physical Quantity)	List II (Dimensional Formula)
A. Pressure gradient	I. $[M^0L^2T^{-2}]$
B. Energy density	II. $[M^1L^{-1}T^{-2}]$
C. Electric Field	III. $[M^1L^{-2}T^{-2}]$
D. Latent heat	IV. $[M^1L^1T^{-3}A^{-1}]$

Choose the **correct** answer from the options given below:

- Options
1. A-III, B-II, C-I, D-IV
 2. A-III, B-II, C-IV, D-I
 3. A-II, B-III, C-I, D-IV
 4. A-II, B-III, C-IV, D-I

Question Type : MCQ

Question ID : 3666942007

Option 1 ID : 3666946203

Option 2 ID : 3666946204

Option 3 ID : 3666946201

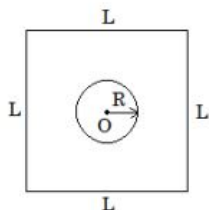
Option 4 ID : 3666946202

Status : Answered

Chosen Option : 2

Q.3

Find the mutual inductance in the arrangement, when a small circular loop of wire of radius ' R ' is placed inside a large square loop of wire of side L ($L \gg R$). The loops are coplanar and their centres coincide :



Options

1. $M = \frac{2\sqrt{2}\mu_0 R}{L^2}$
2. $M = \frac{\sqrt{2}\mu_0 R}{L^2}$
3. $M = \frac{\sqrt{2}\mu_0 R^2}{L}$
4. $M = \frac{2\sqrt{2}\mu_0 R^2}{L}$

Question Type : MCQ

Question ID : 3666942012

Option 1 ID : 3666946222

Option 2 ID : 3666946224

Option 3 ID : 3666946223

Option 4 ID : 3666946221

Status : Not Answered

Chosen Option : --

Q.4

If the height of transmitting and receiving antennas are 80 m each, the maximum line of sight distance will be:

Given: Earth's radius = 6.4×10^6 m

Options

1. 36 km
2. 28 km
3. 64 km
4. 32 km

Question Type : MCQ

Question ID : 3666942023

Option 1 ID : 3666946267

Option 2 ID : 3666946266

Option 3 ID : 3666946268

Option 4 ID : 3666946265

Status : Not Answered

Chosen Option : --

Q.5

In a cuboid of dimension $2L \times 2L \times L$, a charge q is placed at the center of the surface 'S' having area of $4L^2$. The flux through the opposite surface to 'S' is given by

Options

1. $\frac{q}{6\epsilon_0}$
2. $\frac{q}{12\epsilon_0}$
3. $\frac{q}{3\epsilon_0}$
4. $\frac{q}{2\epsilon_0}$

Question Type : MCQ

Question ID : 3666942008

Option 1 ID : 3666946206

Option 2 ID : 3666946207

Option 3 ID : 3666946205

Option 4 ID : 3666946208

Status : Answered

Chosen Option : 2

Q.6

If a radioactive element having half-life of 30 min is undergoing beta decay, the fraction of radioactive element remains undecayed after 90 min. will be

Options

1. $\frac{1}{4}$
2. $\frac{1}{16}$
3. $\frac{1}{2}$
4. $\frac{1}{8}$

Question Type : MCQ

Question ID : 3666942025

Option 1 ID : 3666946274

Option 2 ID : 3666946276

Option 3 ID : 3666946273

Option 4 ID : 3666946275

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.7 A block of mass m slides down the plane inclined at angle 30° with an acceleration $\frac{g}{4}$. The value of coefficient of kinetic friction will be:

Options

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

Question Type : MCQ

Question ID : 3666942016

Option 1 ID : 3666946239

Option 2 ID : 3666946237

Option 3 ID : 3666946238

Option 4 ID : 3666946240

Status : Answered

Chosen Option : 4

Q.8 A bicycle tyre is filled with air having pressure of 270 kPa at 27°C . The approximate pressure of the air in the tyre when the temperature increases to 36°C is

Options

1. 278 kPa
2. 360 kPa
3. 262 kPa
4. 270 kPa

Question Type : MCQ

Question ID : 3666942021

Option 1 ID : 3666946259

Option 2 ID : 3666946260

Option 3 ID : 3666946257

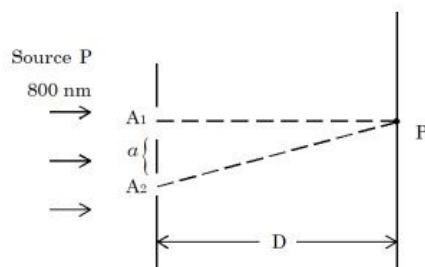
Option 4 ID : 3666946258

Status : Answered

Chosen Option : 3

Q.9

In a Young's double slit experiment, two slits are illuminated with a light of wavelength 800 nm. The line joining A_1P is perpendicular to A_1A_2 as shown in the figure. If the first minimum is detected at P , the value of slits separation 'a' will be:



The distance of screen from slits $D = 5 \text{ cm}$

Options 1. 0.2 mm

2. 0.4 mm

3. 0.5 mm

4. 0.1 mm

Question Type : MCQ

Question ID : 3666942014

Option 1 ID : 3666946229

Option 2 ID : 3666946232

Option 3 ID : 3666946231

Option 4 ID : 3666946230

Status : Not Answered

Chosen Option : --

Q.10

Ratio of thermal energy released in two resistors R and $3R$ connected in parallel in an electric circuit is :

Options 1. 3 : 1

2. 1 : 1

3. 1 : 27

4. 1 : 3

Question Type : MCQ

Question ID : 3666942009

Option 1 ID : 3666946212

Option 2 ID : 3666946210

Option 3 ID : 3666946211

Option 4 ID : 3666946209

Status : Answered

Chosen Option : 2

Q.11 The threshold wavelength for photoelectric emission from a material is $5500 \text{ \AA}$. Photoelectrons will be emitted, when this material is illuminated with monochromatic radiation from a

- A. 75 W infra-red lamp
- B. 10 W infra-red lamp
- C. 75 W ultra-violet lamp
- D. 10 W ultra-violet lamp

Choose the correct answer from the options given below:

Options 1. B and C only

2. C only

3. A and D only

4. C and D only

Question Type : **MCQ**

Question ID : **3666942024**

Option 1 ID : **3666946272**

Option 2 ID : **3666946269**

Option 3 ID : **3666946270**

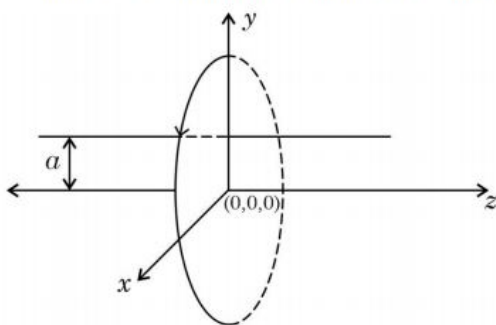
Option 4 ID : **3666946271**

Status : **Answered**

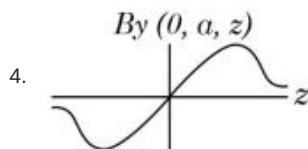
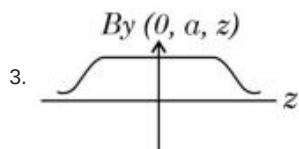
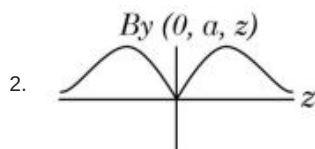
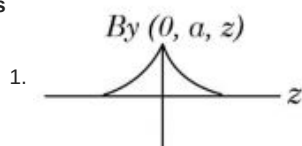
Chosen Option : **2**

Q.12

A single current carrying loop of wire carrying current I flowing in anticlockwise direction seen from +ve z direction and lying in xy plane is shown in figure. The plot of $\hat{j}$ component of magnetic field (B_y) at a distance ' a ' (less than radius of the coil) and on yz plane vs z coordinate looks like



Options



Question Type : MCQ

Question ID : 3666942010

Option 1 ID : 3666946213

Option 2 ID : 3666946215

Option 3 ID : 3666946216

Option 4 ID : 3666946214

Status : Answered

Chosen Option : 4

Q.13 Which one of the following statement is not correct in the case of light emitting diodes?

- A. It is a heavily doped p-n junction.
- B. It emits light only when it is forward biased.
- C. It emits light only when it is reverse biased.
- D. The energy of the light emitted is equal to or slightly less than the energy gap of the semiconductor used.

Choose the correct answer from the options given below:

- Options**
- 1. A
 - 2. B
 - 3. C and D
 - 4. C

Question Type : **MCQ**

Question ID : **3666942026**

Option 1 ID : **3666946277**

Option 2 ID : **3666946278**

Option 3 ID : **3666946280**

Option 4 ID : **3666946279**

Status : **Answered**

Chosen Option : **3**

Q.14 Two particles of equal mass 'm' move in a circle of radius 'r' under the action of their mutual gravitational attraction. The speed of each particle will be :

Options

- 1. $\sqrt{\frac{Gm}{r}}$
- 2. $\sqrt{\frac{Gm}{2r}}$
- 3. $\sqrt{\frac{4Gm}{r}}$
- 4. $\sqrt{\frac{Gm}{4r}}$

Question Type : **MCQ**

Question ID : **3666942018**

Option 1 ID : **3666946245**

Option 2 ID : **3666946247**

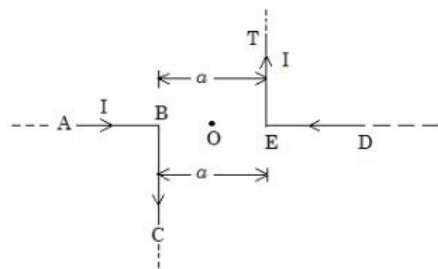
Option 3 ID : **3666946248**

Option 4 ID : **3666946246**

Status : **Answered**

Chosen Option : **3**

- Q.15 The magnitude of magnetic induction at mid point O due to current arrangement as shown in Fig will be



- Options
1. $\frac{\mu_0 I}{2\pi a}$
 2. 0
 3. $\frac{\mu_0 I}{\pi a}$
 4. $\frac{\mu_0 I}{4\pi a}$

Question Type : MCQ

Question ID : 3666942011

Option 1 ID : 3666946220

Option 2 ID : 3666946217

Option 3 ID : 3666946218

Option 4 ID : 3666946219

Status : Not Attempted and
Marked For Review

Chosen Option : --

- Q.16 A person observes two moving trains, 'A' reaching the station and 'B' leaving the station with equal speed of 30 m/s. If both trains emit sounds with frequency 300 Hz, (Speed of sound: 330 m/s) approximate difference of frequencies heard by the person will be:

- Options
1. 55 Hz
 2. 80 Hz
 3. 33 Hz
 4. 10 Hz

Question Type : MCQ

Question ID : 3666942022

Option 1 ID : 3666946262

Option 2 ID : 3666946264

Option 3 ID : 3666946263

Option 4 ID : 3666946261

Status : Answered

Chosen Option : 2

Q.17

Given below are two statements: One is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A: If dQ and dW represent the heat supplied to the system and the work done on the system respectively. Then according to the first law of thermodynamics $dQ = dU - dW$.

Reason R: First law of thermodynamics is based on law of conservation of energy.

In the light of the above statements, choose the **correct** answer from the options given below:

Options

1. Both A and R are correct and R is the correct explanation of A
2. A is correct but R is not correct
3. A is not correct but R is correct
4. Both A and R are correct but R is not the correct explanation of A

Question Type : MCQ

Question ID : 3666942020

Option 1 ID : 3666946253

Option 2 ID : 3666946255

Option 3 ID : 3666946256

Option 4 ID : 3666946254

Status : Answered

Chosen Option : 3

Q.18

Surface tension of a soap bubble is $2.0 \times 10^{-2} \text{ Nm}^{-1}$. Work done to increase the radius of soap bubble from 3.5 cm to 7 cm will be:

Take $\left[\pi = \frac{22}{7} \right]$

Options

1. $9.24 \times 10^{-4} \text{ J}$
2. $5.76 \times 10^{-4} \text{ J}$
3. $0.72 \times 10^{-4} \text{ J}$
4. $18.48 \times 10^{-4} \text{ J}$

Question Type : MCQ

Question ID : 3666942019

Option 1 ID : 3666946249

Option 2 ID : 3666946251

Option 3 ID : 3666946250

Option 4 ID : 3666946252

Status : Not Answered

Chosen Option : --

Q.19 Which of the following are true?

- A. Speed of light in vacuum is dependent on the direction of propagation.
- B. Speed of light in a medium is independent of the wavelength of light.
- C. The speed of light is independent of the motion of the source.
- D. The speed of light in a medium is independent of intensity.

Choose the correct answer from the options given below:

- Options
- 1. A and C only
 - 2. B and C only
 - 3. B and D only
 - 4. C and D only

Question Type : MCQ

Question ID : 3666942013

Option 1 ID : 3666946225

Option 2 ID : 3666946226

Option 3 ID : 3666946227

Option 4 ID : 3666946228

Status : Answered

Chosen Option : 1

Q.20 A car is moving on a horizontal curved road with radius 50 m. The approximate maximum speed of car will be, if friction between tyres and road is 0.34. [take $g = 10 \text{ ms}^{-2}$]

- Options
- 1. 22.4 ms^{-1}
 - 2. 17 ms^{-1}
 - 3. 3.4 ms^{-1}
 - 4. 13 ms^{-1}

Question Type : MCQ

Question ID : 3666942017

Option 1 ID : 3666946244

Option 2 ID : 3666946242

Option 3 ID : 3666946241

Option 4 ID : 3666946243

Status : Answered

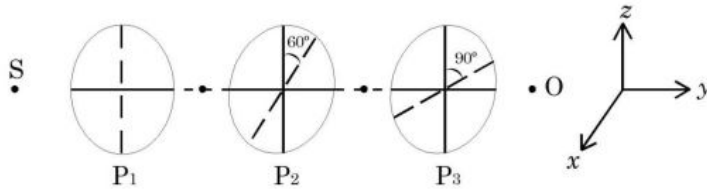
Chosen Option : 2

Section : Physics Section B

Q.21

As shown in the figure, three identical polaroids P_1 , P_2 and P_3 are placed one after another. The pass axis of P_2 and P_3 are inclined at angle of 60° and 90° with respect to axis of P_1 . The source S has an intensity of $256 \frac{W}{m^2}$.

The intensity of light at point O is $\frac{W}{m^2}$.



Given --
Answer :

Question Type : SA

Question ID : 3666942036

Status : Not Answered

Q.22

A solid sphere of mass 2 kg is making pure rolling on a horizontal surface with kinetic energy 2240 J. The velocity of centre of mass of the sphere will be ms^{-1} .

Given --
Answer :

Question Type : SA

Question ID : 3666942030

Status : Not Answered

Q.23

In a metre bridge experiment the balance point is obtained if the gaps are closed by 2Ω and 3Ω . A shunt of $X\Omega$ is added to 3Ω resistor to shift the balancing point by 22.5 cm. The value of X is _____

Given --
Answer :

Question Type : SA

Question ID : 3666942034

Status : Not Answered

Q.24

Two simple harmonic waves having equal amplitudes of 8 cm and equal frequency of 10 Hz are moving along the same direction. The resultant amplitude is also 8 cm. The phase difference between the individual waves is _____ degree.

Given --
Answer :

Question Type : SA

Question ID : 3666942028

Status : Not Answered

Q.25

A certain elastic conducting material is stretched into a circular loop. It is placed with its plane perpendicular to a uniform magnetic field $B = 0.8 \text{ T}$. When released the radius of the loop starts shrinking at a constant rate of 2 cm s^{-1} . The induced emf in the loop at an instant when the radius of the loop is 10 cm will be _____ mV.

Given --
Answer :

Question Type : SA
Question ID : 3666942035
Status : Not Answered

Q.26

A point charge $q_1 = 4q_0$ is placed at origin. Another point charge $q_2 = -q_0$ is placed at $x = 12 \text{ cm}$. Charge of proton is q_0 . The proton is placed on x axis so that the electrostatic force on the proton is zero. In this situation, the position of the proton from the origin is _____ cm.

Given 12
Answer :

Question Type : SA
Question ID : 3666942033
Status : Answered

Q.27

A radioactive element ${}_{92}^{242}\text{X}$ emits two α -particles, one electron and two positrons. The product nucleus is represented by ${}_{\text{P}}^{234}\text{Y}$. The value of P is _____

Given 92
Answer :

Question Type : SA
Question ID : 3666942027
Status : Answered

Q.28

A tennis ball is dropped on to the floor from a height of 9.8 m . It rebounds to a height 5.0 m . Ball comes in contact with the floor for 0.2 s . The average acceleration during contact is _____ ms^{-2} .

(Given $g = 10 \text{ ms}^{-2}$)

Given 7
Answer :

Question Type : SA
Question ID : 3666942032
Status : Answered

Q.29

A 0.4 kg mass takes 8 s to reach ground when dropped from a certain height 'P' above surface of earth. The loss of potential energy in the last second of fall is _____ J.

(Take $g = 10 \text{ m/s}^2$)

Given 1200
Answer :

Question Type : SA
Question ID : 3666942031
Status : Answered

Q.30 A body cools from 60°C to 40°C in 6 minutes. If, temperature of surroundings is 10°C . Then, after the next 6 minutes, its temperature will be _____ $^{\circ}\text{C}$.

Given 20
Answer :

Question Type : SA

Question ID : 3666942029

Status : Answered

