CUET 2026 May 31 Shift 2 Physics

Question Paper (Memory-Based) with Solutions

Conducted by National Testing Agency (NTA)

General Instructions

(i) The examination will be conducted in Computer-Based Test (CBT) mode.

(ii) Each question carries +5 marks for correct answer and -1 mark for wrong answer.

(iii) The total number of questions are 50.

(iv) Duration of the exam is 1 hour (60 minutes).

1. Two charges $+4\,\mu C$ and $+9\,\mu C$ are separated by a distance of $3\,m$ in vacuum. The electrostatic force between them is ($k = 9 \times 10^9\, N m^2 C^{-2}$)

(A) $0.018\,N$

(B) $0.036\,N$

(C) $0.054\,N$

(D) $0.072\,N$

Correct Answer: (B) $0.036\,N$

Solution:

Step 1: Recall Coulomb's law.

$$F = \frac{kq_1q_2}{r^2}$$

Given:

$$q_1 = 4 \times 10^{-6} C$$

$$q_2 = 9 \times 10^{-6} C$$

$$r = 3m$$

Step 2: Substitute the values.

$$F = \frac{(9 \times 10^9)(4 \times 10^{-6})(9 \times 10^{-6})}{3^2}$$

$$F = \frac{9 \times 36 \times 10^{-3}}{9}$$

$$F = 36 \times 10^{-3}$$

$$F = 0.036N$$

Step 3: Choose the correct option.

$$\boxed{F = 0.036N}$$

Therefore,

$$\boxed{\text{(B)}}$$

is the correct answer.

Quick Tip: Coulomb's Law:

$$\boxed{F = \frac{kq_1q_2}{r^2}}$$

Important:

$$F \propto q_1q_2$$

$$F \propto \frac{1}{r^2}$$

Doubling distance reduces force by a factor of 4.

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2. Given below are two statements:

Assertion (A): In a pure inductive AC circuit, current lags voltage by 90°.

Reason (R): An inductor opposes the change in current flowing through it.

Choose the correct answer from the options given below:

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A

(C) A is true but R is false

(D) A is false but R is true

Correct Answer: (A) Both A and R are true and R is the correct explanation of A

Solution:

Step 1: Examine the Assertion.

For a pure inductor:

$$V = L\frac{dI}{dt}$$

Current lags behind voltage by:

$$\boxed{90^\circ}$$

Hence,

$$\boxed{\text{Assertion (A) is True}}$$

Step 2: Examine the Reason.

An inductor produces self-induced emf which opposes any change in current.

$$\boxed{\text{Reason (R) is True}}$$

Step 3: Determine the relationship.

Because the inductor opposes change in current, the current cannot rise instantly and hence lags the voltage.

Thus, Reason correctly explains Assertion.

Therefore,

$$\boxed{\text{Both A and R are true and R is the correct explanation of A}}$$

Hence,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Phase Difference in AC Circuits: Resistor → 0° | Inductor → 90° | Capacitor → 90°

Remember: Current lags in Inductor | Current leads in Capacitor

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3. A resistor of resistance $20\,\Omega$ is connected across a $10\,V$ battery. The current flowing through the resistor is

(A) $0.2A$

(B) $0.5A$

(C) $2A$

(D) $5A$

Correct Answer: (B) $0.5A$

Solution:

Step 1: Recall Ohm's Law.

$$V = IR$$

Therefore,

$$I = \frac{V}{R}$$

Step 2: Substitute the given values.

$$I = \frac{10}{20}$$

$$I = 0.5A$$

Step 3: Identify the correct option.

$$\boxed{I = 0.5A}$$

Therefore,

$$\boxed{\text{(B)}}$$

is the correct answer.

Quick Tip: Ohm's Law:

$$\boxed{V = IR}$$

Useful forms:

$$\boxed{I = \frac{V}{R}}$$

$$\boxed{R = \frac{V}{I}}$$

One of the most important formulas in Current Electricity.

4. Match the semiconductor devices in Column I with their functions in Column II.

Column I		Column II	
(A)	LED	(I)	Voltage Regulation
(B)	Zener Diode	(II)	Light Emission
(C)	Photodiode	(III)	Light Detection
(D)	Solar Cell	(IV)	Converts Solar Energy into Electrical Energy

Choose the correct answer from the options given below:

(A) A-II, B-I, C-III, D-IV

(B) A-I, B-II, C-IV, D-III

(C) A-III, B-I, C-II, D-IV

(D) A-II, B-IV, C-I, D-III

Correct Answer: (A) A-II, B-I, C-III, D-IV

Solution:

Step 1: Recall the functions of semiconductor devices.

$$\text{LED} \rightarrow \text{Light Emission}$$

$$\text{Zener Diode} \rightarrow \text{Voltage Regulation}$$

$$\text{Photodiode} \rightarrow \text{Light Detection}$$

$$\text{Solar Cell} \rightarrow \text{Converts Solar Energy into Electrical Energy}$$

Step 2: Match the columns.

$$A \rightarrow II$$

$$B \rightarrow I$$

$$C \rightarrow III$$

$$D \rightarrow IV$$

Step 3: Choose the correct option.

$$\boxed{A-II,\ B-I,\ C-III,\ D-IV}$$

Therefore,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Important Semiconductor Devices:

LED → Light Emitting Diode

Zener Diode → Voltage Regulator

Photodiode → Light Sensor

Solar Cell → Photovoltaic Device

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5. The energy of an electron in the first Bohr orbit of hydrogen atom is $-13.6\,eV$. The energy of the electron in the third orbit is

(A) $-1.51\,eV$

(B) $-3.4\,eV$

(C) $-13.6\,eV$

(D) $-0.85\,eV$

Correct Answer: (A) $-1.51\,eV$

Solution:

Step 1: Recall Bohr's energy formula.

$$E_n = \frac{-13.6}{n^2}\,eV$$

For the third orbit: n=3

Step 2: Substitute the value of n.

$$E_3 = \frac{-13.6}{3^2}$$

$$E_3 = \frac{-13.6}{9}$$

$$E_3 = -1.51\,eV$$

Step 3: Choose the correct option.

$$\boxed{E_3 = -1.51\,eV}$$

Therefore,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Bohr Energy Formula:

$$\boxed{E_n = \frac{-13.6}{n^2}\,eV}$$

For hydrogen atom:

$$E_1 = -13.6\,eV$$

$$E_2 = -3.4\,eV$$

$$E_3 = -1.51\,eV$$

Frequently asked CUET numerical.

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6. Given below are two statements:

Assertion (A): Electromagnetic waves can travel through vacuum.

Reason (R): Electromagnetic waves consist of oscillating electric and magnetic fields.

Choose the correct answer from the options given below:

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A

(C) A is true but R is false

(D) A is false but R is true

Correct Answer: (A) Both A and R are true and R is the correct explanation of A

Solution:

Step 1: Examine the Assertion.

Electromagnetic waves do not require any material medium for propagation.

Hence they can travel through vacuum.

$$\boxed{\text{Assertion (A) is True}}$$

Step 2: Examine the Reason.

EM waves are produced by mutually perpendicular oscillating electric and magnetic fields.

$$\boxed{\text{Reason (R) is True}}$$

Step 3: Determine the relationship.

The changing electric field produces magnetic field and vice versa.

Therefore EM waves are self-propagating and do not require a medium.

Thus Reason correctly explains Assertion.

Hence,

$$\boxed{\text{Both A and R are true and R is the correct explanation of A}}$$

Therefore,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Properties of Electromagnetic Waves:

$$\boxed{\text{Do not require a medium}}$$

$$\boxed{\text{Travel with speed } c = 3 \times 10^8\, m/s}$$

$$\boxed{E \perp B}$$

$$\boxed{E \perp \text{Direction of Propagation}}$$

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7. A convex lens has a focal length of $20\,cm$. An object is placed $30\,cm$ from the lens. The image distance is

(A) $60\,cm$

(B) $30\,cm$

(C) $20\,cm$

(D) $15\,cm$

Correct Answer: (A) $60\,cm$

Solution:

Step 1: Recall the lens formula.

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

Given:

$$f = +20\,cm$$

$$u = -30\,cm$$

Step 2: Substitute the values.

$$\frac{1}{20} = \frac{1}{v} + \frac{1}{30}$$

$$\frac{1}{v} = \frac{1}{20} - \frac{1}{30}$$

$$\frac{1}{v} = \frac{3-2}{60} = \frac{1}{60}$$

$$v = 60\,cm$$

Step 3: Choose the correct option.

$$\boxed{v = 60\,cm}$$

Therefore,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Lens Formula:

$$\boxed{\frac{1}{f} = \frac{1}{v} - \frac{1}{u}}$$

For a convex lens:

$$\boxed{f > 0}$$

Always use the Cartesian sign convention.

8. Match the following electromagnetic waves with their applications.

Column I		Column II	
(A)	Gamma Rays	(I)	Radar Communication
(B)	X-rays	(II)	Cancer Treatment
(C)	Microwaves	(III)	Medical Imaging
(D)	Radio Waves	(IV)	Broadcasting

Choose the correct answer from the options given below:

(A) A-II, B-III, C-I, D-IV

(B) A-I, B-II, C-IV, D-III

(C) A-II, B-IV, C-I, D-III

(D) A-III, B-II, C-IV, D-I

Correct Answer: (A) A-II, B-III, C-I, D-IV

Solution:

Step 1: Recall common applications of EM waves.

$$\text{Gamma Rays} \rightarrow \text{Cancer Treatment}$$

$$\text{X-rays} \rightarrow \text{Medical Imaging}$$

$$\text{Microwaves} \rightarrow \text{Radar Communication}$$

$$\text{Radio Waves} \rightarrow \text{Broadcasting}$$

Step 2: Match the columns.

$$A \rightarrow II$$

$$B \rightarrow III$$

$$C \rightarrow I$$

$$D \rightarrow IV$$

Step 3: Choose the correct option.

$$\boxed{A-II,\ B-III,\ C-I,\ D-IV}$$

Therefore,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Important EM Wave Applications:

$$\boxed{\text{Radio Waves} \rightarrow \text{Broadcasting}}$$

$$\boxed{\text{Microwaves} \rightarrow \text{Radar}}$$

$$\boxed{\text{X-rays} \rightarrow \text{Medical Imaging}}$$

$$\boxed{\text{Gamma Rays} \rightarrow \text{Cancer Therapy}}$$

Very frequently asked in CUET Physics.

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9. A photon of wavelength $500\,nm$ is incident on a metal surface. The energy of the photon is approximately ($h = 6.63 \times 10^{-34}\,Js,\ c = 3 \times 10^{8}\,m/s$)

(A) $1.99 \times 10^{-19}\,J$

(B) $3.98 \times 10^{-19}\,J$

(C) $5.97 \times 10^{-19}\,J$

(D) $7.96 \times 10^{-19}\,J$

Correct Answer: (B) $3.98 \times 10^{-19}\,J$

Solution:

Step 1: Recall the photon energy relation.

$$E = \frac{hc}{\lambda}$$

Given:

$$h = 6.63 \times 10^{-34}\,Js$$

$$c = 3 \times 10^8\, m/s$$

$$\lambda = 500 \times 10^{-9}\, m$$

Step 2: Substitute the values.

$$E = \frac{(6.63 \times 10^{-34})(3 \times 10^8)}{500 \times 10^{-9}}$$

$$E = \frac{19.89 \times 10^{-26}}{5 \times 10^{-7}}$$

$$E = 3.98 \times 10^{-19}\, J$$

Step 3: Choose the correct option.

$$\boxed{E = 3.98 \times 10^{-19}\, J}$$

Therefore,

$$\boxed{\text{(B)}}$$

is the correct answer.

Quick Tip: Photon Energy:

$$\boxed{E = \frac{hc}{\lambda}}$$

Useful shortcut:

$$\boxed{E(eV) = \frac{1240}{\lambda(nm)}}$$

For shorter wavelength:

$$\boxed{\text{Higher Energy}}$$

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10. Given below are two statements:

Assertion (A): In a nuclear reactor, control rods are used to control the rate of fission reaction.

Reason (R): Control rods absorb excess neutrons produced during fission.

Choose the correct answer from the options given below:

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true but R is not the correct explanation of A

(C) A is true but R is false

(D) A is false but R is true

Correct Answer: (A) Both A and R are true and R is the correct explanation of A

Solution:

Step 1: Examine the Assertion.

Control rods are inserted into the reactor core to regulate the chain reaction.

$$\boxed{\text{Assertion (A) is True}}$$

Step 2: Examine the Reason.

Control rods made of cadmium or boron absorb excess neutrons.

$$\boxed{\text{Reason (R) is True}}$$

Step 3: Determine the relationship.

Since neutrons are responsible for sustaining the chain reaction, absorbing excess neutrons controls the rate of fission.

Thus Reason correctly explains Assertion.

Hence,

$$\boxed{\text{Both A and R are true and R is the correct explanation of A}}$$

Therefore,

$$\boxed{\text{(A)}}$$

is the correct answer.

Quick Tip: Components of a Nuclear Reactor:

$$\boxed{\text{Fuel} \rightarrow U^{235}}$$

$$\boxed{\text{Moderator} \rightarrow \text{Slows Neutrons}}$$

$$\boxed{\text{Control Rods} \rightarrow \text{Absorb Neutrons}}$$

$$\boxed{\text{Coolant} \rightarrow \text{Removes Heat}}$$

A very important CUET Physics topic.