

CUET 2026 May 30 Shift 1 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. A galvanometer of resistance $50\ \Omega$ gives full-scale deflection when a current of $2\ \text{mA}$ passes through it. The value of shunt resistance required to convert it into an ammeter of range $2\ \text{A}$ is

- (A) $0.05\ \Omega$
- (B) $0.5\ \Omega$
- (C) $5\ \Omega$
- (D) $50\ \Omega$

Correct Answer: (A) $0.05\ \Omega$

Solution:

Step 1: Recall the shunt formula for ammeter conversion.

$$S = \frac{I_g G}{I - I_g}$$

where

$$I_g = 2 \times 10^{-3}\ \text{A}$$

$$G = 50\ \Omega$$

$$I = 2 \text{ A}$$

Step 2: Substitute the values.

$$S = \frac{(2 \times 10^{-3})(50)}{2 - 0.002}$$

$$S = \frac{0.1}{1.998}$$

$$S \approx 0.05 \Omega$$

Step 3: Identify the correct option.

$$S = 0.05 \Omega$$

Therefore,

(A)

is the correct answer.

Quick Tip: To convert a galvanometer into an ammeter:

$$S = \frac{I_g G}{I - I_g}$$

Ammeter $\Rightarrow$ Low resistance

Hence a small shunt resistance is connected in parallel.

2. In an AC circuit containing a pure resistor, the phase difference between voltage and current is

- (A) 90°
- (B) 180°
- (C) 45°

(D) 0°

Correct Answer: (D) 0°

Solution:

Step 1: Recall the AC behavior of a resistor.

For a pure resistor:

$$V = IR$$

At every instant, voltage and current vary together.

Step 2: Determine the phase relation.

The current reaches its maximum value at the same instant as the voltage.

Hence,

$$\phi = 0^\circ$$

Step 3: Choose the correct option.

$$\phi = 0^\circ$$

Therefore,

(D)

is the correct answer.

Quick Tip: Phase differences in AC circuits:

Resistor $\rightarrow 0^\circ$

Inductor $\rightarrow 90^\circ$

Capacitor $\rightarrow 90^\circ$

Remember:

V and I are in phase in a pure resistor

3. Two coils have mutual inductance 0.5 H . If the current in the primary coil changes at the rate of 4 A s^{-1} , the induced emf in the secondary coil is

- (A) 0.5 V
- (B) 1 V
- (C) 2 V
- (D) 4 V

Correct Answer: (C) 2 V

Solution:

Step 1: Recall the formula for induced emf due to mutual inductance.

$$e = M \frac{dI}{dt}$$

where

$$M = 0.5 \text{ H}$$

and

$$\frac{dI}{dt} = 4 \text{ A s}^{-1}$$

Step 2: Substitute the values.

$$e = 0.5 \times 4$$

$$e = 2V$$

Step 3: Choose the correct option.

$$e = 2V$$

Therefore,

(C)

is the correct answer.

Quick Tip: For mutual induction:

$$e = M \frac{dI}{dt}$$

Larger mutual inductance or faster current change produces greater induced emf.

4. Match the electromagnetic waves in Column I with their common applications in Column II.

Column I		Column II	
(A)	Gamma rays	(I)	Radar communication
(B)	X-rays	(II)	Cancer treatment
(C)	Microwaves	(III)	Bone 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 applications of EM waves.

Gamma rays $\rightarrow$ Cancer treatment

X-rays $\rightarrow$ Bone imaging

Microwaves $\rightarrow$ Radar communication

Radio waves $\rightarrow$ Broadcasting

Step 2: Match the columns.

$A \rightarrow II$

$B \rightarrow III$

$C \rightarrow I$

$D \rightarrow IV$

Step 3: Identify the correct option.

$A - II, B - III, C - I, D - IV$

Therefore,

(A)

is the correct answer.

Quick Tip: Important EM Wave Applications:

Radio Waves → Broadcasting

Microwaves → Radar

X-rays → Medical Imaging

Gamma Rays → Cancer Therapy

5. According to Bohr's atomic model, the angular momentum of an electron in the n^{th} orbit is

- (A) $\frac{nh}{2\pi}$
- (B) $\frac{2\pi n}{h}$
- (C) $\frac{n^2 h}{2\pi}$
- (D) $\frac{h}{n}$

Correct Answer: (A) $\frac{nh}{2\pi}$

Solution:

Step 1: Recall Bohr's quantization condition.

According to Bohr,

$$mvr = \frac{nh}{2\pi}$$

where

$$n = 1, 2, 3, \dots$$

Step 2: Identify the angular momentum.

Angular momentum of the electron is:

$$L = mvr$$

Hence,

$$L = \frac{nh}{2\pi}$$

Step 3: Choose the correct option.

$$L = \frac{nh}{2\pi}$$

Therefore,

(A)

is the correct answer.

Quick Tip: Bohr's most important postulate:

$$mvr = \frac{nh}{2\pi}$$

For the first orbit:

$$L = \frac{h}{2\pi}$$

This is a frequently asked CUET question.

6. A photon has energy 6 eV. The corresponding work function of a metal is 2 eV. The maximum kinetic energy of the emitted photoelectron is

(A) 2 eV

- (B) 4 eV
- (C) 6 eV
- (D) 8 eV

Correct Answer: (B) 4 eV

Solution:

Step 1: Recall Einstein's photoelectric equation.

$$K_{\max} = h\nu - \phi$$

where

$$h\nu = 6 \text{ eV}$$

and

$$\phi = 2 \text{ eV}$$

Step 2: Substitute the values.

$$K_{\max} = 6 - 2$$

$$K_{\max} = 4 \text{ eV}$$

Step 3: Identify the correct option.

$$K_{\max} = 4 \text{ eV}$$

Therefore,

(B)

is the correct answer.

Quick Tip: Photoelectric equation:

$$K_{\max} = h\nu - \phi$$

where

ϕ = Work Function

and

$h\nu$ = Photon Energy

Remember:

$$\text{Photon Energy} = \text{Work Function} + \text{Kinetic Energy}$$

7. A long straight conductor carries a current of 10 A. The magnetic field at a point 20 cm away from the conductor is ($\mu_0 = 4\pi \times 10^{-7} \text{ TmA}^{-1}$)

- (A) $1 \times 10^{-5} \text{ T}$
- (B) $2 \times 10^{-5} \text{ T}$
- (C) $5 \times 10^{-6} \text{ T}$
- (D) $4 \times 10^{-5} \text{ T}$

Correct Answer: (A) $1 \times 10^{-5} \text{ T}$

Solution:

Step 1: Recall the magnetic field due to a long straight conductor.

$$B = \frac{\mu_0 I}{2\pi r}$$

Given:

$$I = 10 \text{ A}$$

$$r = 20 \text{ cm} = 0.2 \text{ m}$$

Step 2: Substitute the values.

$$B = \frac{(4\pi \times 10^{-7})(10)}{2\pi(0.2)}$$

$$B = \frac{4 \times 10^{-6}}{0.4}$$

$$B = 1 \times 10^{-5} \text{ T}$$

Step 3: Identify the correct option.

$$B = 1 \times 10^{-5} \text{ T}$$

Therefore,

(A)

is the correct answer.

Quick Tip: Magnetic field due to a long straight wire:

$$B = \frac{\mu_0 I}{2\pi r}$$

Important observations:

$$B \propto I$$

$$B \propto \frac{1}{r}$$

Doubling the distance halves the magnetic field.

8. An object is placed 30 cm in front of a concave mirror of focal length 20 cm. The image distance is

(A) –60 cm

(B) +60 cm

(C) +30 cm

(D) -30 cm

Correct Answer: (A) -60 cm

Solution:

Step 1: Use the mirror formula.

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

For a concave mirror:

$$f = -20 \text{ cm}$$

$$u = -30 \text{ cm}$$

Step 2: Substitute the values.

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

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

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

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

$$v = -60 \text{ cm}$$

Step 3: Identify the correct option.

$$v = -60 \text{ cm}$$

The negative sign indicates that the image is real and formed in front of the mirror.

Therefore,

(A)

is the correct answer.

Quick Tip: Mirror formula:

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

For a concave mirror:

$$f < 0$$

Real image:

$$v < 0$$

Virtual image:

$$v > 0$$

Always follow the New Cartesian Sign Convention.

9. In a semiconductor, the conductivity increases with increase in temperature because

- (A) Resistance increases
- (B) Number of free charge carriers increases
- (C) Mobility becomes zero
- (D) Band gap increases

Correct Answer: (B) Number of free charge carriers increases

Solution:

Step 1: Recall the behavior of semiconductors.

Semiconductors have a small energy band gap.

At room temperature, only a limited number of electrons are available for conduction.

Step 2: Understand the effect of temperature.

When temperature increases, more electrons gain sufficient energy to jump from the valence band to the conduction band.

Thus:

Number of electrons $\uparrow$

Number of holes $\uparrow$

Step 3: Determine the effect on conductivity.

Since conductivity depends on the number of charge carriers,

$$\sigma \propto n$$

an increase in charge carriers increases conductivity.

Therefore,

Number of free charge carriers increases

Hence, the correct answer is:

(B)

Quick Tip: For semiconductors:

Temperature $\uparrow \Rightarrow$ Conductivity $\uparrow$

This is opposite to metals where:

Temperature $\uparrow \Rightarrow$ Resistance $\uparrow$

CUET frequently asks this comparison.

10. Two capacitors of capacitances $6\mu F$ and $3\mu F$ are connected in series across a battery. The

equivalent capacitance of the combination is

- (A) $9\mu F$
- (B) $2\mu F$
- (C) $4.5\mu F$
- (D) $18\mu F$

Correct Answer: (B) $2\mu F$

Solution:

Step 1: Recall the formula for capacitors in series.

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2}$$

Given:

$$C_1 = 6\mu F$$

$$C_2 = 3\mu F$$

Step 2: Substitute the values.

$$\frac{1}{C_{eq}} = \frac{1}{6} + \frac{1}{3}$$

$$\frac{1}{C_{eq}} = \frac{1}{6} + \frac{2}{6}$$

$$\frac{1}{C_{eq}} = \frac{3}{6} = \frac{1}{2}$$

$$C_{eq} = 2\mu F$$

Step 3: Identify the correct option.

$C_{eq} = 2\mu F$

Therefore,

(B)

is the correct answer.

Quick Tip: Capacitors in series:

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2}$$

Capacitors in parallel:

$$C_{eq} = C_1 + C_2$$

Remember:

Series $\Rightarrow$ Capacitance decreases

Parallel $\Rightarrow$ Capacitance increases