CUET 2026 May 20 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. In an AC circuit, the rms value of current is 5 A. The peak current is:

(A) 3.54 A

(B) 5 A

(C) 7.07 A

(D) 10 A

Correct Answer: (C) 7.07 A

Solution:

For alternating current:

$$I_{\text{rms}} = \frac{I_0}{\sqrt{2}}$$

where:

- $I_{\text{rms}} =$ rms current
- $I_0 =$ peak current

Given:

$$I_{\text{rms}} = 5\text{ A}$$

Step 1: Find peak current

$$I_0 = \sqrt{2}\, I_{\text{rms}}$$

Substituting the value:

$$I_0 = \sqrt{2} \times 5$$

$$I_0 = 1.414 \times 5$$

$$I_0 = 7.07 \text{ A}$$

Thus:

$$\boxed{I_0 = 7.07 \text{ A}}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Incorrect
- Option (C): Correct
- Option (D): Incorrect

Therefore:

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

Quick Tip: For AC current:

$$I_{\text{rms}} = \frac{I_0}{\sqrt{2}}$$

Hence:

$$I_0 = \sqrt{2}\, I_{\text{rms}}$$

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2. A capacitor of capacitance $50\ \mu$F is connected to an AC source of frequency 50 Hz. The capacitive reactance is approximately:

(A) 31.8 Ω

(B) 63.7 Ω

(C) 95.5 Ω

(D) 127.4 Ω

Correct Answer: (B) 63.7 Ω

Solution:

Capacitive reactance is given by:

$$X_C = \frac{1}{2\pi f C}$$

where:

- $f = 50$ Hz
- $C = 50\ \mu\text{F} = 50 \times 10^{-6}$ F

Step 1: Substitute the values

$$X_C = \frac{1}{2\pi(50)(50 \times 10^{-6})}$$

Step 2: Simplify

$$X_C = \frac{1}{2 \times 3.14 \times 50 \times 50 \times 10^{-6}}$$

$$X_C \approx 63.7\ \Omega$$

Thus:

$$\boxed{X_C \approx 63.7\ \Omega}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Correct
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

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

Quick Tip: Capacitive reactance:

$$X_C = \frac{1}{2\pi f C}$$

It decreases when:

$$f \text{ or } C$$

increases.

3. In Young's Double Slit Experiment, if the wavelength of light used is doubled while keeping all other quantities constant, the fringe width becomes:

(A) Half

(B) Double

(C) Four times

(D) Unchanged

Correct Answer: (B) Double

Solution:

In Young's Double Slit Experiment, fringe width is given by:

$$\beta = \frac{\lambda D}{d}$$

where:

- β = fringe width
- λ = wavelength of light
- D = distance between screen and slits
- d = distance between slits

Step 1: Observe the relation

From the formula:

$$\beta \propto \lambda$$

Thus fringe width is directly proportional to wavelength.

Step 2: Double the wavelength

If:

$$\lambda \to 2\lambda$$

then:

$$\beta \to 2\beta$$

Hence fringe width becomes:

$$\text{double}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Correct
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

$$\boxed{(B)}$$

Quick Tip: In YDSE:

$$\beta = \frac{\lambda D}{d}$$

Fringe width increases with:

increase in wavelength

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4. In wave optics, diffraction becomes more prominent when:

(A) Aperture size is much larger than wavelength

(B) Aperture size is equal to or smaller than wavelength

(C) Frequency is very high

(D) Light intensity is increased

Correct Answer: (B) Aperture size is equal to or smaller than wavelength

Solution:

Diffraction is the bending of light waves around obstacles or through small apertures.

The effect of diffraction depends on the relation between:

aperture size

and:

wavelength of light

Step 1: Condition for prominent diffraction

Diffraction becomes significant when:

$$\text{Aperture size} \approx \lambda$$

or:

$$\text{Aperture size} < \lambda$$

where:

$$\lambda = \text{wavelength of light}$$

Step 2: Analyze the options

- If aperture is much larger than wavelength, diffraction is negligible.
- High frequency alone does not make diffraction more prominent.
- Intensity affects brightness, not diffraction pattern formation.

Thus diffraction is most noticeable when aperture size is comparable to or smaller than wavelength.

Option analysis:

- Option (A): Incorrect
- Option (B): Correct
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

$$\boxed{(B)}$$

Quick Tip: Diffraction is prominent when:

$$\text{Aperture size} \approx \lambda$$

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5. Two long parallel wires carrying currents in the same direction will:

(A) Repel each other

(B) Attract each other

(C) Produce no force

(D) Rotate about each other

Correct Answer: (B) Attract each other

Solution:

When current flows through a wire, it produces a magnetic field around it.

Two parallel current-carrying wires exert magnetic forces on each other.

Step 1: Rule for parallel currents

- Currents in the same direction:

$$\text{Attract each other}$$

- Currents in opposite directions:

$$\text{Repel each other}$$

Step 2: Apply the rule

Since both wires carry current in:

$$\text{the same direction}$$

they experience:

$$\text{mutual attraction}$$

Thus:

$$\boxed{\text{The wires attract each other}}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Correct
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

$$\boxed{(B)}$$

Quick Tip: For parallel current-carrying conductors:

$$\text{Same direction currents} \rightarrow \text{Attraction}$$

$$\text{Opposite direction currents} \rightarrow \text{Repulsion}$$

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6. The ratio of electric field amplitudes and magnetic field amplitudes in an electromagnetic wave in vacuum is equal to:

(A) Speed of light

(B) Planck's constant

(C) Gravitational constant

(D) Permittivity of vacuum

Correct Answer: (A) Speed of light

Solution:

For an electromagnetic wave in vacuum:

$$\frac{E_0}{B_0} = c$$

where:

- E_0 = amplitude of electric field
- B_0 = amplitude of magnetic field
- c = speed of light in vacuum

Step 1: Recall the relation

Electromagnetic waves consist of:

- Oscillating electric field
- Oscillating magnetic field

The ratio of their amplitudes is always:

$$c = 3 \times 10^8 \text{ m s}^{-1}$$

Step 2: Identify the correct option

Thus:

$$\frac{E_0}{B_0} = \text{Speed of light}$$

Option analysis:

- Option (A): Correct
- Option (B): Incorrect
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

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

Quick Tip: For electromagnetic waves:

$$\frac{E_0}{B_0} = c$$

where:

$$c = \text{speed of light in vacuum}$$

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7. Electromagnetic waves are:

(A) Longitudinal in nature

(B) Mechanical waves

(C) Transverse waves

(D) Stationary waves

Correct Answer: (C) Transverse waves

Solution:

Electromagnetic waves consist of:

- Oscillating electric field
- Oscillating magnetic field

These fields oscillate:

$$\text{perpendicular to each other}$$

and also perpendicular to the direction of propagation.
Thus electromagnetic waves are:

$$\text{transverse in nature}$$

Step 1: Analyze the options

- Longitudinal waves have oscillations parallel to direction of propagation.
- Mechanical waves require a material medium.
- Electromagnetic waves can travel in vacuum.
- Stationary waves do not transfer energy from one place to another.

Hence electromagnetic waves are:

$$\text{transverse waves}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Incorrect
- Option (C): Correct
- Option (D): Incorrect

Therefore:

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

Quick Tip: In electromagnetic waves:

$$\vec{E} \perp \vec{B} \perp \text{Direction of propagation}$$

Hence EM waves are transverse.

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8. In photoelectric effect, the stopping potential depends upon:

(A) Intensity of incident light

(B) Frequency of incident light

(C) Distance from source

(D) Area of metal surface

Correct Answer: (B) Frequency of incident light

Solution:

In the photoelectric effect, stopping potential is related to the maximum kinetic energy of emitted photoelectrons.

According to Einstein's photoelectric equation:

$$eV_0 = h\nu - \phi$$

where:

- V_0 = stopping potential
- h = Planck's constant
- ν = frequency of incident light
- ϕ = work function of metal

Step 1: Observe the relation

From the equation:

$$V_0 \propto \nu$$

Thus stopping potential depends on:

$$\text{frequency of incident light}$$

Step 2: Analyze other quantities

- Intensity affects photocurrent, not stopping potential.
- Distance from source does not directly determine stopping potential.
- Area of metal surface affects number of emitted electrons only.

Hence:

$$\boxed{\text{Stopping potential depends on frequency}}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Correct
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

$$\boxed{(B)}$$

Quick Tip: In photoelectric effect:

$$eV_0 = h\nu - \phi$$

Stopping potential depends on:

$$\text{frequency, not intensity}$$

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9. Light of wavelength 400 **nm falls on a metal surface. The energy of one photon is approximately:**

$$\left(h = 6.63 \times 10^{-34} \text{ J s}, \quad c = 3 \times 10^{8} \text{ m/s}\right)$$

(A) 4.97×10^{-19} J

(B) 2.5×10^{-19} J

(C) 1.2×10^{-18} J

(D) 6.63×10^{-34} J

Correct Answer: (A) 4.97×10^{-19} J

Solution:

Energy of one photon is given by:

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

where:

- $h = 6.63 \times 10^{-34}$ J s
- $c = 3 \times 10^{8}$ m/s
- $\lambda = 400$ nm $= 400 \times 10^{-9}$ m

Step 1: Substitute the values

$$E = \frac{(6.63 \times 10^{-34})(3 \times 10^{8})}{400 \times 10^{-9}}$$

Step 2: Simplify

$$E = \frac{19.89 \times 10^{-26}}{4 \times 10^{-7}}$$

$$E = 4.97 \times 10^{-19} \text{ J}$$

Thus:

$$\boxed{E = 4.97 \times 10^{-19} \text{ J}}$$

Option analysis:

- Option (A): Correct
- Option (B): Incorrect
- Option (C): Incorrect
- Option (D): Incorrect

Therefore:

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

Quick Tip: Photon energy:

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

Smaller wavelength means:

higher photon energy

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10. In an LCR circuit at resonance:

(A) Current is minimum

(B) Impedance is maximum

(C) Current is maximum

(D) Capacitive reactance is zero

Correct Answer: (C) Current is maximum

Solution:

In a series LCR circuit, resonance occurs when:

$$X_L = X_C$$

where:

- X_L = inductive reactance
- X_C = capacitive reactance

Step 1: Find impedance at resonance

Impedance is given by:

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

At resonance:

$$X_L - X_C = 0$$

Hence:

$$Z = R$$

Thus impedance becomes:

minimum

Step 2: Find current

Current in AC circuit is:

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

Since impedance is minimum at resonance:

$$I = \text{maximum}$$

Step 3: Analyze other options

- Current is not minimum.
- Impedance is not maximum.
- Capacitive reactance is not zero; it becomes equal to inductive reactance.

Therefore:

$$\boxed{\text{Current is maximum}}$$

Option analysis:

- Option (A): Incorrect
- Option (B): Incorrect
- Option (C): Correct
- Option (D): Incorrect

Hence:

$$\boxed{(C)}$$

Quick Tip: At resonance in LCR circuit:

$$X_L = X_C$$

$$Z = R \text{ (minimum)}$$

$$I = \text{maximum}$$