B.SC. HONOURS 2ND SEMESTER INTERNAL EXAMINATION 2021
KANDI RAJ COLLEGE
DEPARTMENT OF PHYSICS

SEMESTER: 2ND   **STREAM: Honours (CORE)**

Papers: (ELECTRICITY & MAGNETISM + WAVES AND OPTICS)

PAPER CODE: PHY-HCC-T-03   **Full marks: 10**

Answer any TEN questions of the following: **10×1=10**

1. The potential is constant in some region of space . The value of $\vec{E}$ is in that region is

[A] infinite   [B] depends on the location of the point   [C] zero   [D] finite

2. The work done in displacing a charge 2C through 0.5m on an equipotential surface is

[A] 0   [B] 1J   [C] 4J   [D] none of these

3. The magnetic field at the centre of a current loop is proportional to

[i] R   [ii] R^{-1} [iii] R^2 [iv] R^{-2}

4. Mark the statement which is correct in all circumstances

[i] $\vec{\nabla}\times\vec{E}$ =0   [ii] $\vec{\nabla}.\vec{B}$ =0   [iii]] $\vec{\nabla}.\vec{E}$ =0   [D] $\vec{\nabla}\times\vec{B}$ =0

5. Two parallel wires carrying currents flowing in opposite directions will

 [A] attract each other   [B] repel each other   [C] neither attract nor repel

6. The solid angle subtended at a point at the centre of a closed sphere is

[A] zero   [B] π   [C] 2π   [D] 4π

7. Current in a circuit is wattless when the phase difference between current and voltage is

[A] zero   [B] π   [C] -π   [D] π/2

8. The magnetic field outside the infinite solenoid is

[A] zero   [B] infinite   [C] $\mu_0 nI$ [D] 1/2 $\mu_0 nI$

9. The SI unit of electric displacement vector is

[A] C.m   [B] C/m   [C] C.m^2 [D] C.m^{-2}

10. The magnetic moment of an atom is due to

[A] orbital motion of electron   [B] spin of electron   [C] both orbital and spin motion [D] none of these

11. The direction of induced e.m.f in a circuit is given by

[A] Faraday's law   [B] Fleming's left hand rule   [C] Lenz's law   [D] none of these

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PAPER CODE: PHY-HCC-T-04   **Full marks: 10**

 Answer Any Five questions of the following: **2×5=10**

1. What is superposition principle?

2. What are the differences between longitudinal and transverse waves?

3. Obtain the relation between phase velocity and group velocity.

4. What is a wavefront? State Huygens principle.

5. Does Energy is conserved in Young's double slit interference experiment?

6. What are the conditions for single slit diffraction pattern?

7. What are zone plates? How it behaves?

PHY-H-GE-T-02   **Full Marks-10**

Answer any five questions   **(2×5=10)**

1. What are Lissajous figures? Explain how these figures are used to determine the difference between two nearly equal frequencies.
2. Define decibel. What is a musical scale?
3. Explain travelling and standing waves with examples.
4. Describe a method of producing linearly polarized light.
5. Describe Michelson interferometer. How can it be used to determine the refractive index of a thin mica sheet?
6. Derive an expression for the distribution of intensity in Young's double slit experiment.
7. What is viscosity? Write down Poiseuille's formula with explanation.