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II

Total No. of Questions - **21**

Total No. of Printed Pages - **2**

Regd. No.

Part - III

PHYSICS, Paper - II

(English Version)

Time : 3 hours ***Max. Marks : 60***

SECTION A

Note : i) Answer **all** questions. **10 × 2 = 20**

ii) Each question carries **two** marks.

iii) All are **very short answer** type questions.

1. What is the position of an object relative to the objective of a compound microscope? Where is its image formed?

2. Why is an eyepiece used in any optical instrument?

3. What is Curie temperature?

4. A charge q of mass m starting from rest is allowed to move between two points having a potential difference of V volts. What is the final velocity of the charge?

5. Which of the two meters, voltmeter or potentiometer, is preferred to measure the emf of a battery? Why?

6. If a circular coil of 100 turns and radius 10cm carries a current of 1A, find the magnetic dipole moment of the coil.

7. What is deBroglie's hypothesis? Write the expression for the wavelength associated with a moving particle.

8. What is a Fermi energy level? What is its position in case of an intrinsic semiconductor?

9. What is a thermal neutron? What is its importance?

10. What is the difference between amplitude modulation and frequency modulation?

SECTION B

Note : i) Answer **any six** of the following questions. $6 \times 4 = 24$

ii) Each question carries **four** marks.

iii) All are **short answer** type questions.

11. What is critical angle? Explain it with a neat ray diagram.

12. Write about the main features in which the Fraunhofer and Fresnel approaches of diffraction differ.

13. Derive an expression for magnetic induction at a point on the equitorial line of a bar magnet.

14. What is the capacity of a conductor? Explain the principle of a capacitor.

15. A current of 5A is passing through a metallic wire of length 5m and cross-sectional area of $10^{-5}m^2$. If the density of the electrons in the wire is $6.25 \times 10^{26}\ m^3$, find the time taken by the electrons to travel from one end of the wire to the other.

16. Explain neutral and inversion temperatures with the help of a graph between the thermo emf and the temperature of the hot junction in a thermocouple.

17. Explain self-induction of a coil. Arrive at an expression for the induced emf in a coil and the rate of change of current in it.

18. Explain avalanche breakdown in a diode and zener breakdown in a zener diode.

SECTION C

Note : i) Answer **any two** of the following questions. **$2 \times 8 = 16$**

ii) Each question carries **eight** marks.

iii) All are **long answer** type questions.

19. State the laws of transverse vibrations in stretched strings. Give the procedures for verifying them using a sonometer.

20. What is a photoelectric effect? Write any three laws of the photoelectric effect. Explain these laws by Einstein's equation of the photoelectric effect.

21. What is radioactivity? Show that radioactive decay is exponential in nature. The half-life of a certain substance is 5 days. How many days does this substance take for $31/32^{th}$ of the initial mass to disintegrate?