PHYSICS (SECOND YEAR)

PAPER – II (MAY – 2009)

Time : 3 Hours Max.Marks : 60

SECTION – A

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

ii) Every correct answer carries 2 marks.

iii) All are Very short answer type questions.

1. Sketch a labeled ray diagram of Ramsden's eye – piece.
2. Write the difference between a Microscope and a Telescope.
3. State the principle of working of a Vibration Magnetometer and write the expression for time period of an oscillating bar magnet.
4. The potential at the origin is zero due to electric field $\vec{E} = 20\hat{i} + 30\hat{j}\,NC^{-1}$. Find the potential at point P (2m, 2m).
5. State Kirchoff's laws in electricity.
6. What is internal resistance of a cell? Write the value of internal resistance of an ideal cell.
7. The threshold wavelength for emission of photo electrons from a metal surface is $6\times10^{-7}\,m$. What is the work function of the material of the metal surface.
8. What is meant by Mass Defect and Binding Energy?
9. What is the role of control rods in a Nuclear Reactor? What are the materials used as control rods?
10. Define Modulation. Mention on basic Method of Modulation.

SECTION – B

Note : i) Answer any **six** questions. 6×4=24

ii) Every correct answer carries 4 marks.

iii) All are Short answer type questions.

11. Explain how plane polarized light is obtained by reflection with a neat sketch.
12. Derive an expression for the magnetic induction at a point on the axial line of a bar magnet.
13. Derive the formula for equivalent capacitance of three capacitors in series combination.

14. Two unknown resistances P and Q are connected in the left and right gaps of a meter bridge and balancing point is obtained at 60 cm from the left. When a 20Ω resistance is connected in parallel to P, the balance point is at 50 cm. Calculate P and Q.

15. What are Peltier and Thomson effects? Define their co-efficients.

16. Derive an expression for the force between two parallel conductors carrying current.

17. Write Einstein's photoelectric equation and write the law of Photoelectric Emission.

18. Define half – life and average life of a Radioactive substance.

    The half – life of a radioactive substance is 69.3 days. Find its average life.

SECTION – C

Note : i) Answer any **two** of the following questions. $2\times8=16$

ii) Every correct answer carries 8 marks.

iii) All are Long answer type questions.

19. What are Harmonics? How are Stationary waves formed in a closed pipe?

    Explain the various modes of vibrations in a closed pipe and establish the relation between their frequencies.

    The frequency of the fundamental note of a tube closed at one end is 200 Hz. What will be the frequency of the fundamental note of a similar tube of same length but open at both ends?

20. Describe the construction of a moving – Coil galvanometer with a neat sketch. Explain its working with a neat sketch.

    A maximum current of 0.5 mA can be passed through a galvanometer of resistance 20Ω. Calculate the resistance to be connected in series to convert it into a voltmeter of range 0 – 5V.

21. What is a Rectifier?

    Explain the working of full wave rectifier with a neat sketch mention the expression for its efficiency.

    A full wave p – n junction diode rectifier uses a load resistance of 1300Ω. The internal resistance of each diode is 9Ω.

    Find the efficiency of this full wave rectifier.