PAPER – II (MARCH – 2010)

Time : 3 Hours Max.Marks 60

SECTION – A

Note : i) Answer **all** the questions. $10 \times 2 = 20$

ii) Every correct answer carries 2 marks.

iii) All are Very short answer type questions.

1. Give the expressions for the magnetic induction due to a long Bar Magnet on

   i) The axial line ii) The equatorial line

2. When a charge of $1\mu C$ is placed in an electric field, it experiences a force of $2 \times 10^{-3} N$, find the intensity of the field.

3. Write two differences between emf and p.d.

4. How many electrons flow through a wire, when 1A current passes for on milli second?

5. Define Self induction and Mutual induction.

6. What type of transformer is used in a bed lamp? What is the phenomenon involved in the working of a transformer?

7. Write two uses of Photo electric cells.

8. What is a p – n junction diode? Define Depletion layer.

9. Draw the circuit symbols for p – n – p and n – p – n transistors.

10. Define modulation. Why is it necessary?

SECTION – B

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

ii) Every correct answer carries 4 marks.

iii) All are Short answer type questions.

11. Describe the construction and working of an optical fibre. State its two uses.

12. Write any four applications of Polarization of Light.

13. Explain tan A and tan B positions of a Deflection Magnetometer.

14. Derive the balancing condition of a Wheatsone Bridge.

15. What are Peltier and Thomson effects? Define their coefficients.

16. A Galvanometer has a resistance of 100Ω. A current of $10^{-3}\mathrm{A}$ passes through the galvanometer. How can it be converted into :

    a) Ammeter of range 0 – 10 A

    b) Voltmeter of range 0 – 10 V

17. What is Moseley's law? Discuss briefly its importance.

18. What is Rectification? Describe how a semi – conductor diode is used as a half – wave rectifier.

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 is Doppler Shift? Derive an expression for the apparent frequency heard by a moving listener, when the source of sound is at rest.

    A fire engine with its bell ringing with a frequency of 200 Hz is moving with a velocity of 54kmph towards an observer at rest near a hut on fire. What is the apparent frequency of sound heard by the observer? (Velocity of sound in air = $300\mathrm{ms}^{-1}$)

20. Describe the construction and working of Moving coil Galvan meter with a neat sketch.

    A rectangular coil of wire of 500 turns of area $10\times5\mathrm{cm}^2$ carries a current of 2A in a magnetic field of induction $2\times10^{-3}\mathrm{T}$. If the plane of the coil is parallel to the field, then calculate the torque on the coil.

21. Explain the construction and working of a Nuclear Reactor with the help of a labeled diagram. If one micro gram if $^{235}_{92}\mathrm{U}$ is completely destroyed in an atom bomb, how much energy will be released?