PAPER – II (MARCH – 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. What is the tan A position of a deflection magnetometer?
2. Define the intensity of an electric field and an electric potential.
3. Define specific resistance. Write its S.I. unit
4. What is the force acting on a charged particle of magnitude q enters into uniform magnetic field of induction B with a velocity V? When will the force acting on the particle be maximum?
5. When is a parallel combination of cells preferred?
6. The current in a coil changes from 5 Amperes to 10 Amperes in 10^{-2} seconds. Then an e.m.f of 50 milli volts is induced in a coil near it. Calculate the mutual inductance of the coil.
7. State any two significances of Moseley's law.
8. State the majority and minority charge carriers in a p – type semiconductor.
9. Draw the circuit system of p – n – p and n – p – n transistors.
10. Define "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 the working of Ramsden's eye piece with a neat diagram. Write its advantages and disadvantages.
12. Write any four applications of interference of light.
13. Derive an equation for the couple acting on a bar magnet placed in a uniform magnetic field of induction B is making an angle θ with the direction of the field.
14. Two point charges of magnitude $6\mu c$ and $8\mu c$ are separated by a certain distance in air. The force between them is 27 N. Find the force between them if

a) The distance between them is increased by 3 times.

b) The distance between them is decreased by 3 times.

15. Derive an expression for the balancing condition of a Wheatstone Bridge by applying Kirchhoff's laws.

16. a) Define Peltier effect. What is the Peltier coefficient?

    b) Define Thomson effect. What is the Thomson coefficient?

17. State the laws of photo-electric effect.

18. What is rectification? Explain the working of a full wave rectifier with a diagram.

SECTION – C

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

ii) Every correct answer carries 8 marks.

iii) All are Long answer type questions.

19. Define a stationary wave. Derive an expression for the fundamental frequency of vibrations of a stretched string. State the laws of transverse vibrations of a stretched string.Find the velocity of propagation of a transverse wave, if a string of length 0.5 mts produces a fundamental note of frequency 300 Hz.

20. State the principle of a moving coil galvanometer. Explain the working and construction with a neat diagram. Derive the relation between current and deflection of the coil.

21. With a neat diagram, explain the working and construction of a nuclear reactor. Mention two uses of a nuclear reactor.