B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Electrical and Electronics Engineering

PH 133 — PHYSICS — II

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   What is an equipotential surface?

2.   State Gauss' theorem.

3.   What is pair production?

4.   State and explain uncertainty principle.

5.   What are fissile and fertile materials?

6.   What is nuclear fusion?

7.   What are Miller indices?

8.   Draw the crystal planes with Miller indices (110) and (111).

9.   What are the limitations of the magnetic particle inspection?

10.   What is thermography?

PART B — (5 × 16 = 80 marks)

11.   (a)   Describe the construction, working and uses of a Carey-Foster's bridge.

Or

(b)   Describe the phenomenon of electrical conductivity in conductors and derive an expression for the conductivity in terms of relaxation time of conduction electron.

12. (a) (i) Derive Einstein's mass-energy relation. (6)

   (ii) Obtain an expression for the Compton shift. (10)

Or

(b) Write down the Schrödinger's equation for a particle in a box and solve the problem.

13. (a) Draw the schematic diagram of the fission process and obtain the four factor formula and explain the conditions for criticality.

Or

(b) Give an account on fusion reactors. Explain the laser induced fusion.

14. (a) (i) Name the seven crystal systems and give the relationship between the basic lattice parameters. (7)

   (ii) Calculate the packing factor for body centered cubic structure and simple cubic structure. (9)

Or

(b) (i) What are point, line and surface imperfections in crystalline materials? (6)

   (ii) With suitable diagrams explain the edge dislocations and screw dislocations in crystals. What is a Burger vector? (10)

15. (a) Write short notes on liquid penetrant method and magnetic particle method of nondestructive testing.

Or

(b) Give an account on Ultrasonic flaw detector. Write down the applications of ultrasound in metallurgy and medicine.

Time

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