H 1472

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Second Semester

Chemical Engineering

PH 134 — PHYSICS — II

(Common to Fashion Technology, Bio-Technology, Leather, Polymer, Textile Chemistry and Textile Technology)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define electric potential at a point due to an electric charge. Mention its relation with electric field.

2. What is known as the characteristic impedance of a medium?

3. What is called the dual nature of matter? Give an example.

4. Write down any two uncertainty relations.

5. What is the main difference between an atomic spectrum and a molecular spectrum?

6. Outline the significance of neutron multiplication factor (i.e. four factor) in fission reactions?

7. Define unit cell and primitive cell of crystals.

8. Mention any four imperfections of crystals.

9. List the steps involved in liquid penetrant method of NDT.

10. What is the principle of thermograpic method of NDT?

PART B — (5 × 16 = 80 marks)

11. Discuss the principle of radiography in NDT. Hence describe the X-ray radiographic method of NDT. (5 + 11)

12. (a) (i) State and prove the Gauss theorem of electrostatics. (8)

(ii) Show that there is always a loss of energy while sharing of charges between capacitors. (8)

Or

(b) Explain the theory of Carey-Foster's bridge. Using this explain the method of obtaining the specific resistance of a conductor. (13 + 3)

13. (a) Discuss the complete theory of Compton effect and explain the corresponding experimental results. (12 + 4)

Or

(b) Derive an expression for the energy spectrum of a particle-in-a-one-dimensional-box problem and obtain the corresponding normalized wave functions. (10 + 6)

14. (a) Explain the vector atom model in detail and account for the different quantum numbers of it. (16)

Or

(b) Briefly write on :

(i) Liquid drop model of nuclei

(ii) Shell model of nuclei. (8 + 8)

15. (a) (i) Explain all the symmetry elements of a cubic crystal. (10)

(ii) Calculate the number of atoms per square-millimeter of (110) planes of a simple cubic crystal with lattice parameter of 3.5 angstrom units. (6)

Or

(b) (i) Deduce the c/a ratio and hence the packing factor of a HCP crystal. (12)

(ii) Compare the inter-planar distances of (100), (110) and (111) planes of a cubic crystal structure. (4)
