Reg. No. : | | | | | | | | | | | |

Q 2456

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Second Semester

Chemical Engineering

PH 134 — PHYSICS – II

(Common to B.Tech. Industrial Biotechnology/Leather Technology/
Polymer Technology/Textile Chemistry/Textile Technology/Fashion Technology)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A charge subjected to a potential difference of 50V experiences a force of 25N. Find the charge.

2. Define characteristic impedance of a medium.

3. Mention any two experiments, which proved the particle nature of radiation.

4. What is known as pair production?

5. Outline the difference between atomic spectra and molecular spectra.

6. List any two merits of vector atom model.

7. Outline the difference between crystalline and non – crystalline solids. Give an example for each type.

8. What is the lattice parameter of a cubic crystal which has the inter planar spacing of 2.9 $\mathring{A}$ for (110) planes.

9. Outline the magnetic particle method of NDT.

10. What is the principle of thermography?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Using Gauss theorem, obtain expressions for the electric field at an arbitrary point inside, on the surface, and outside a hollow charged spherical conductor. (8)

(ii) Obtain an expression for the capacitance of a parallel plate capacitor which is filled with a dielectric material whose area is same as that of the parallel plates but the thickness is less than the distance between the parallel plates. (8)

Or

(b) Discuss the theory of Carey – Foster bridge and obtain the bridge equation. Hence explain its application to determine the specific resistance of a metallic wire. (10 + 6)

12. (a) Explain the theory, experimental procedure and the results of the compton effect. (16)

Or

(b) Discuss in detail the theory of particle – in – a – box problem and explain the nature of energy spectrum. (12 + 4)

13. (a) Explain the theory and experimental method to study the Raman effect in liquids. Enumerate its applications. (12 + 4)

Or

(b) With a neat schematic diagram, explain the working of various parts of a nuclear fission reactor. (16)

14. (a) Deduce the packing factors of FCC and HCP crystal structures. (6 + 10)

Or

(b) (i) State and prove Bragg's law of X – ray diffraction. (6)

(ii) Describe the powder – X – ray – diffraction method of determining the lattice parameter of cubic crystals. (10)

15. (a) Discuss the theory of differential absorption of radiation in materials. Hence explain the X – ray radiographic method of NDT. (8 + 8)

Or

(b) Explain :

(i) Ultrasonic method of NDT, and

(ii) Liquid penetrant method of NDT. (8 + 8)
