

35074-A

M.Sc. DEGREE EXAMINATION, OCTOBER 2015.

THIRD SEMESTER

Physics

Paper - IV (A) — CONDENSED MATTER PHYSICS—I

Time : Three hours

Maximum : 75 marks

(No additional sheet will be supplied)

PART A — (5 × 3 = 15 marks)

Answer any FIVE questions.

Each question carries 3 marks.

Each answer should not exceed 1 page.

1. Define nucleation and explain various types.
2. Write a note on colour centres.
3. Explain the terms dipole moment and polarizability.
4. Briefly explain the classification of ferroelectric materials.
5. Write a note on ferromagnetic domains.
6. Discuss the structure and applications of ferrites.
7. With suitable examples, explain weakly bound and tightly bound excitons.
8. Write a note on cathodoluminescence.

PART B — (4 × 15 = 60 marks)

Answer ALL questions.

Each question carries 15 marks.

Each answer should not exceed 6 pages.

9. (a) Explain various types crystal growth techniques
(b) Explain Bridgeman technique for the growth of single crystals

Or

10. (a) What is creep? Explain its importance
(b) Explain the experimental determination of creep activation energy
11. (a) What are dielectric materials? Mention their applications
(b) Write a note on orientational polarization

Or

12. (a) Distinguish between piezoelectric, pyro electric and ferroelectric materials.
(b) Discuss the oxygen ion displacement theory of ferroelectrics
13. (a) What are ferromagnetic materials and explain Heisenberg model?
(b) Write a note on Bloch wall.

Or

14. (a) Write a note on ferrimagnetism.
(b) What are multiferroics and mention their applications
15. (a) Explain the experimental determinations photoconductivity
(b) Explain the influence of traps and space charge effects on photoconductivity

Or

16. (a) What is thermoluminescence? Explain the applications of thermoluminescence
(b) Write a note on electro luminescence.

