AE-749

M.Sc. (Final)
Term End Examination, 2016-17

PHYSICS

Paper - I

Condensed Matter Physics & Nuclear and Particle Physics

Time : Three Hours] [*Maximum Marks* : 100
[*Minimum Pass Marks* : 36

Note : Answer **five** questions in all, selecting at least **two** questions from each Section. All questions carry equal marks.

Section - A

1. Explain X-ray interaction matter and determine the diffraction techniques with Laue powder and rotating crystal method.

2. (*a*) Write notes about Band theory with classification of solids.

(*b*) What is effective mass and also explain the theory of tight binding ?

3. (*a*) What is defects and their types ? Explain line defect in brief.

(*b*) Explain the role of dislocation in plastic deformation and crystal growth.

4. Explain superconductivity with their types and critical temperature, persistent current of superconductivity. Also explain Meissner effect of superconductivity.

5. Describe Heisenberg model and molecular field theory.

Section - B

6. Explain β-decay with the following points :

(*a*) Shape of β-spectrum

(*b*) Angular momentum and parity

(*c*) Selection rules

(*d*) Comparative half-life

7. (*a*) Explain elementary particles with their classification. What are their conservation laws ?

(*b*) Explain about SU(2) and SU(3) multi plates.

8. Write short notes on any **two** of the following :

(*a*) Exchange Forces

(*b*) Breit-Wigner Formula

(*c*) Effective Range Theory

9. Discuss about Gamma decay with their property in brief.

10. Write notes on the following :

(*a*) Gell-Mann-Okubo Mass Formula

(*b*) Collective model of Bohr and Mottelson

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