

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.

(2)

- (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) multiplets.

(3)

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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