



NCF-003-020204 Seat No. _____

M. Sc. (Sem. II) (CBCS) Examination

April / May - 2017

Physics : CT-08

(Solid State Physics)

(Old Course)

Faculty Code : 003

Subject Code : 020204

Time : Hours]

[Total Marks : 70

- Instructions :** (1) Attempt all questions.
(2) All questions carry equal marks.
(3) Mathematical symbols have equal meanings.

- 1** Answer in brief any **seven** : **14**
- (a) Define Bravais Lattice and unit cell. **2**
 - (b) Draw (100) and (111) planes in cubic crystal? **2**
 - (c) What are Schottky and Frenkel defects? **2**
 - (d) What are Brillouin zones? **2**
 - (e) Define phonon and magnon. **2**
 - (f) Define superconductivity. **2**
 - (g) Define isotope effect in superconductors. **2**
 - (h) Comment on susceptibility for different magnetic materials. **2**
 - (i) What are different contributions of permanent moment of atoms in paramagnetic materials? **2**
 - (j) What are ferrites? **2**
- 2** Answer any two of following questions : **14**
- (a) Write a note on symmetry elements. **7**
 - (b) State and prove the Bragg's law of X-ray diffraction. Comment on constructive and destructive interference. **7**
 - (c) What are different experimental techniques of X-ray Diffraction? **7**

- 3 (a) Write a note on vacancy defects. Derive the expression for number of vacancies in solids. 7
- (b) Write a note on self interstitial defects in elemental solids. 7

OR

- (a) Write a note on Bloch theorem. 7
- (b) Discuss in detail the tight binding approximation. 7
- 4 Answer any two of following questions : 14
- (a) Discuss in detail the two types of superconductors. 7
- (b) Write a detailed note on BCS theory and its outcomes. 7
- (c) Write a note on Josephson tunnelling. 7
- 5 Answer any two of following questions : 14
- (a) Discuss in detail various contributions of magnetic moment of atoms in paramagnetic materials. 7
- (b) What are the limitations of Langevin's classical theory of paramagnetism? Write a note on quantum theory of paramagnetism. 7
- (c) Write a note on ferromagnetism. 7
- (d) Discuss the temperature dependence of saturation magnetization in ferromagnetic materials. 7
