



**MCC-003-020204** Seat No. \_\_\_\_\_

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

**April / May - 2018**

**Physics : CT - 08**

**(Solid State Physics)**

**(Old Course)**

**Faculty Code : 003**

**Subject Code : 020204**

Time :  $2\frac{1}{2}$  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) What is crystalline material? **2**
  - (b) Define single crystalline and polycrystalline materials. **2**
  - (c) Define unit cell. **2**
  - (d) What is symmetry? **2**
  - (e) Give the names of line defects and plane defects. **2**
  - (f) What is aliovalence? **2**
  - (g) Define polaron and magnon. **2**
  - (h) What is the total energy of ferromagnetic domains? **2**
  - (i) What is persistent current ? **2**
  - (j) Draw the spin arrangements of paramagnetic ferromagnetic and antiferromagnetic materials. **2**
- 2** Answer any **two** of following questions : **14**
- (a) Write a note on symmetry elements. **7**
  - (b) Explain in detail the three diffraction methods. **7**
  - (c) Discuss the Bragg's law. **7**

- 3 (a) Write a note on reciprocal lattice with its construction. 7  
(b) Discuss in detail the geometrical structure factor. 7

**OR**

- 3 (a) Explain the Bloch theorem. 7  
(b) Write a note on tight binding approximation. 7

4 Answer any two of following questions : 14

- (a) Explain the vacancy defects in materials. 7  
(b) Define and discuss in detail the Schottky defects in ionic crystals. 7  
(c) Write a detailed note on diffusion in solids. 7

5 Answer any **two** of following questions : 14

- (a) Discuss in detail the Langevin's theory of diamagnetism. 7  
(b) Discuss in brief about : 7  
(i) Zero electrical resistance  
(ii) Critical field  
(iii) Meissner effect and  
(iv) Isotope effect in superconductors.  
(c) Write a note on BCS theory. 7  
(d) Write a note on Weiss molecular field theory. 7