

Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name : Solid State Physics

Subject Code : 5SC02PHC3

Branch: M.Sc(Physics)

Semester : 2

Date : 09/05/2016

Time : 10:30 To 1:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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SECTION – I

Q-1 **Attempt the Following questions** **(7)**

- a. Define the Unit Cell.
- b. Draw the crystal structure of CsCl.
- c. What is packing fraction of simple cubic?
- d. What is called point defect?
- e. What is called energy band?
- f. What is unit cell parameter of tetragonal lattice system?
- g. What is called Bloch function?

Q-2 **Attempt all questions** **(14)**

- a. What are Miller indices? Illustrate the steps to get miller indices for a crystal plane. **5**
- b. Derive Bragg's law for X-ray diffraction. **5**



- c. Explain the crystal structure of NaCl. 4

OR

Q-2 Attempt all questions (14)

- a. Explain Electron diffraction of crystal in detail. 7
b. Explain in detail Hexagonal Close-packed structure. 7

Q-3 Attempt all questions (14)

- a. Explain about one dimensional defect with appropriate figure. 7
b. Obtain an equation of the approximate number of Schottky defects present at temperature T. 7

OR

Q-3 a. Describe the Bloch theorems. 7

- b. Explain Frenkel defects in ionic solids; interstitial impurity in metals and Non stoichiometry. 7

SECTION – II

Q-4 Attempt the Following questions (07)

- a. What is unit of magnetic susceptibility?
b. What is called superconductor?
c. Give the two names of type-1 superconductor
d. What is called magnetic moment?
e. What is D.C. Josephson effect?
f. Define: Isotope effect.
g. Give the equation of Larmor frequency

Q-5 Attempt all questions (14)



- a. Write a note on: type-1 and type-2 superconductor. 7
- b. Explain about the BCS theory of superconductor. 7

OR

- Q-5** a. Explain the Weiss theory of ferro magnetism. 7
- b. Discuss ferromagnetic Domains. 7

- Q-6** **Attempt all questions** (14)
- a. Write short note on Meissner effect. 5
- b. Discuss the properties of super conductor. 5
- c. Briefly discuss the application of super conductor. 4

OR

- Q-6** **Attempt all Questions**
- a. Derive an expression for diamagnetic susceptibility of solids using classical approach. 7
- b. Explain quantum theory of Para-magnetism. 7

