T.Y.B.SC. SEM – V (2014 COURSE) : SUMMER - 2018
SUBJECT: PHYSICS SOLID STATE PHYSICS

Day : **Monday** Time: **03.00 PM TO 05.00 PM**
Date : **16/04/2018** **S-2018-0742** Max. Marks: 40.

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate full marks.
3) Draw neat and labelled diagrams **WHEREVER** necessary.

Q.1 Attempt any **TWO** of the following: **(10)**

a) Explain Bragg's law for X–ray diffraction in crystal.
b) What is the Bravais lattice? What are different space lattices in the cubic system?
c) Give the assumption of classical theory of lattice specific heat. What are its limitations?

Q.2 Attempt any **TWO** of the following: **(10)**

a) What are Miller indices? Explain how they are determined.
b) What is Hall Effect? Obtain the expression for Hall coefficient.
c) Based on Band theory of solids, explain nature of conductors, semiconductors and insulators.

Q.3 Attempt any **TWO** of the following: **(10)**

a) Describe FCC structure. Find out packing factor for FCC.
b) Explain Einstein's theory of specific heat for solids.
c) Discuss the method of investigating the structure of single crystal using X-ray.

Q.4 Attempt any **FIVE** of the following: **(10)**

a) Define: (i) Lattice (ii) Co-ordination number
b) What is mean by the atomic radii in a crystal?
c) What is band gap of material? Sketch the band diagram for semiconductor.
d) What are the limitations of Einstein's theory over the Dybe's theory?
e) What is the Fermi energy?
f) What are symmetry operations?
g) What is specific heat of the substance? How it depend on the temperature?

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