V. P. & R. P. T. P. Science College

Vallabh Vidyanagar 388 120

T. Y. B. Sc. (Sem-5) PHYSICS US05CPHY03 First Internal Test

3rd October, 2016 Tuesday Time: 11.00 am to 12.30 pm Mark:25

Q-1 Multiple Choice Question **3**

The energy of X-ray used for crystal diffraction experiments are

1 (a) 10 to 50 eV (c) 10 to 50 KeV

(b) 10 to 50 MeV (d) 10 to 50 GeV

According to the free electron theory, the_____ electron is roaming in the metal.

2 (a) Conduction (c) ionized

(b) Valence (d) core

In the intrinsic semiconductors, the donor levels are close to _____

3 (a) Conduction band (c) Fermi Band

(b) Valence band (d) Dirac Band

Q-2 Short questions: attempt any two **4**

1. When electron diffraction techniques are used.
2. What is free electron?
3. What is Extrinsic Semiconductor?

Q-3 Long question: **6**

1. Explain the geometrical construction of reciprocal space.

OR

1. Explain the construction and working of Laue Method.

Q-4 Long question: **6**

1. What is Hall effect? Derive the necessary equations for Hall coefficient, Hall angle and Mobility of the charge carrier.

OR

1. Discuss the effect of temperature on Fermi-Dirac Distribution function.

Q-5 Long question: **6**

1. Discuss Photoelectric effect.

OR

2. Explain the metal-semiconductor junction theory with energy level diagram.