**Printed Pages: 02** **Sub Code: EEE403**

**Paper Id:** **120406** **Roll No.** | | | | | | | | | |

# B. TECH.
## (SEM IV) THEORY EXAMINATION 2017-18
## ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

**Time: 3 Hours** **Total Marks: 100**

**Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

## SECTION A

**1. Attempt all questions in brief. 2 x10 = 20**

a. What do you mean by unit cell?
b. What is coordination number?
c. Explain space lattice.
d. Why Molybdenum is harder than Vanadium?
e. What are the general properties of conductor?
f. Explain resistivity and factor affecting resistivity of electrical materials
g. What are the characteristic of semiconductor materials?
h. What are the differences between intrinsic and extrinsic semiconductor?
i. What are magnetic domains?
j. What are the applications of magnetostriction?

## SECTION B

**2. Attempt any three of the following: 10 x 3 = 30**

a) List the various X-ray diffraction techniques and explain any two of them in detail.
b) Explain the properties and use of Copper, Aluminium and steel as conductor material.
c) What s PN junction diode? explain its working and characteristic.
d) Explain Hall Effect and its applications also derive the relation for determining the mobility using this effect.
e) What are ferrites? Explain their magnetic and electric characteristics.

## SECTION C

**3. Attempt any one part of the following: 10 x 1 = 10**

(a) Explain atomic packaging factor and calculate its value for simple cube and body centered cube.
(b) What do you mean by Miller indices? Explain the procedure of finding Miller indices and its important features.

**4. Attempt any one part of the following: 10 x 1 = 10**

(a) A coil of copper wire has a resistance of 100 ohm at 25ºC. Calculate its resistance at 60 ºC. The temperature co-efficient of resistance is 0.00427 at 0ºC.
(b) Explain (i) Photo electric effect (ii) Super conductivity in detail.

**5. Attempt any one part of the following: 10 x 1 = 10**

(a) The mobility of silicon are $\mu_e = 0.17\ m^2/V\text{-}s$ and $\mu_h = 0.035\ m^2/V\text{-}s$ at room temperature. If the carrier density in the material is known to be $1.1 \times 10^{16} / m^3$, calculate the resistivity of silicon.

(b) Explain the difference between doping and alloying. Also explain Thermister and Zener diode.

**6. Attempt any one part of the following: 10 x 1 = 10**

(a) Classify the magnetic materials in detail.

(b) What do you mean by magnetic anisotropy? Explain the characteristics of soft magnetic materials.

**7. Attempt any one part of the following: 10 x 1 = 10**

(a) Explain different types of losses in magnetic materials.

(b) Explain Meissner effect and relation for heat developed in current carrying conductor.