BIEE-013

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

June, 2018

00273

BIEE-013 : ELECTRICAL AND ELECTRONICS ENGINEERING MATERIALS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted. Missing data may be suitably assumed.*

1. (a) Define primary and secondary bonds in solids. Differentiate between ionic, covalent and metallic bonds.   5

   (b) What is atomic packing factor ? Show that atomic packing factor for body centered cube is 0·68.   5

2. In a unit cell of simple cubic structure, find the angle between the normals to pairs of planes whose Miller indices are (i) (100) and (010), (ii) (121) and (111).   10

3. (a) Explain the phenomenon of thermionic emission in current carrying conductors. 5

   (b) Compare the electrical and mechanical characteristics of copper with that of aluminium for use as a conductor. 5

4. A copper conductor has resistance of 15·5 Ω at 0°C. Find its percentage conductivity at 16°C. Assume the temperature coefficient of copper as 0·00428 per °C at 0°C. 10

5. What is an intrinsic semi-conductor ? Derive the expression for current carriers in intrinsic semi-conductors considering hole mobility μ_h to be half of electron mobility μ_e. 10

6. Describe the construction and operation of Field Effect Transistor (FET). Develop its characteristics assuming proper biasing voltage across its terminals. 10

7. Compare between soft and hard magnetic materials. Draw the typical hysteresis curve for soft magnetic materials. 10

8. (a) What are the properties of magnetic materials ? 5

   (b) Discuss the principle of diamagnetism and paramagnetism with suitable diagrams. 5

9. Write short notes on any *two* of the following : 2×5=10

(a) Crystal Growth

(b) Superconductivity

(c) IGFET

(d) Ferrimagnetism

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