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BIME-005

B.Tech. – VIEP – MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

00552

December, 2016

BIME-005 : MATERIAL SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *All the questions are to be answered in English language only. Attempt any* ***seven*** *questions. All questions carry equal marks.*

1. What do you understand by atomic packing factor ? Calculate the atomic packing factor for a Hexagonal Closed Packed and Base Centred Cube (BCC) Crystal System. *10*

2. Distinguish between fatigue failure and fatigue strength. Briefly explain the measures that may be taken to increase the resistance to fatigue failure of a metal alloy. *10*

3. Draw the Fe-C phase diagram. Level all the phases and temperature properly. Also differentiate between hypoeutectoid and hypereutectoid steels. *10*

4. Define the term Heat Treatment ? Why are steels heat treated ? Discuss the major defects in steel due to faulty Heat Treatment. *10*

5. Explain the working of Cupola Furnace with the help of a neat sketch. *10*

6. Define a semiconductor and a transistor. Using energy band model, explain the electrical conduction of an intrinsic semiconductor. *10*

7. Draw a magnetic hysteresis loop for hard and soft magnets, and explain the difference in behaviour in response to alternating field with emphasis on the magnetization parameters. *10*

8. Name the different methods of hardness testing of a mild steel specimen. Explain any one hardness test in detail. *10*

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

(a) Slip and Twinning

(b) Superconductivity and its Application

(c) Ductile and Brittle Fracture

(d) Mechanism of Creep