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BIME-005

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

Term-End Examination

00053

December, 2018

BIME-005 : MATERIAL SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks.*

1. (a) What do you understand by atomic models ? Name them and explain in detail Rutherford's nuclear atomic model. 7

   (b) State how carbon content influences the strength and ductility of plain carbon steels. 7

2. (a) Explain the necessity of heat treatment for different steels. Describe the process of quenching. 7

   (b) Explain the phenomenon of yielding in mild steel. Why is the yield point in copper not distinct ? 7

3. (a) What is creep ? Draw a typical creep curve and explain the different stages of creep. 7

(b) What is meant by metal fatigue ? How does it differ from creep ? 7

4. (a) Briefly describe the Iron-Carbon phase diagram with the help of a neat sketch. 7

(b) Define Carburizing. Describe in brief the various carburization processes. 7

5. List out the various types of furnaces. Explain the working of cupola furnace with the help of a neat sketch. Mention its industrial applications. 14

6. (a) Name the different methods of hardness testing of a plain carbon steel specimen. Explain Brinell hardness in detail. 7

(b) Differentiate between ceramics and glass. What is the glass transition temperature ? Explain in brief. 7

7. (a) What do you mean by dislocation ? Explain edge dislocation and line dislocation with a sketch. 7

(b) What is corrosion ? Describe the factors which accelerate the corrosion process. List out the various techniques used in preventing corrosion of metals. 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Slip and Twinning

(b) Ductility Fracture

(c) Atomic Packing Factor

(d) Dielectric Materials

(e) Magnetostriction

(f) Brittle Material