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ET-204(A)

B.Tech. Civil (Construction Management)

Term-End Examination

June, 2015

00331

ET-204(A) : MATERIALS SCIENCE

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **seven** questions. All questions carry equal marks. Use of calculator is permitted.*

1. (a) Distinguish between an alloy and a compound. *5*

(b) Write short notes on the following :

(i) Composites

(ii) Electronic Materials *5*

2. Explain the various types of bonding in solids. What is Brillouin Zone ? *10*

3. (a) Explain the principle of X-Ray diffraction for determining the crystal structure. *5*

(b) Write down the atom positions of a BCC structure and of a FCC structure. Also work out the number of atoms per unit cell in the two cases. *5*

4. (a) Draw the Iron – Iron carbide phase diagram and show all salient points with regards to temperature and composition. 5

(b) Differentiate between the following :

(i) Homogeneous nucleation and Heterogeneous nucleation

(ii) Nucleation and Growth 5

5. (a) Discuss the Grain boundaries and Twin boundaries imperfection of crystals. 5

(b) Explain the significance of Burgers' Vector. 5

6. Explain the dislocation theory of crystals. What is a slip plane ? How is it related to dislocation ? 10

7. (a) Explain electron hopping. 5

(b) Describe the band gap in semiconductors. 5

8. (a) Describe the Griffith theory of brittle fracture. 5

(b) Discuss the effects of grain size and temperature on mechanical properties of a material. 5

9. (a) Write a short note on Machinability of material. 5

(b) With the help of a neat sketch, explain Time – Temperature – Transformation for eutectoid steel. 5

10. (a) Discuss the effect of mechanical stresses on corrosion. *5*

(b) What is atmospheric degradation ? Discuss the degradation of polymers. *5*