

Roll No.

23397

**M.Tech 1st Semester Civil Engg.
(Specialisation in Structural
Design) Examination-May, 2014**

MATERIAL SCIENCE

Paper MTSD-110

Time : 3 hours

Max. Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

Note : Attempt **five** questions in all. Assume missing data if any, suitably. All questions carry equal marks.

1. (a) Describe material selection chart and performance index. 10
- (b) Describe the different types of cement along with their properties. 10

2. (a) Describe diffusion mechanism of solid and its applications. 10
- (b) What do you mean by crystal structure and crystal plane ? Describe crystalline and non-crystalline structure in detail. 10
3. (a) What is the phase rule ? Describe in detail iron carbon phase diagram. 10
- (b) Define phase transformation. What is the use of TTT diagram ? Explain briefly. 10
4. (a) What do you mean by fatigue ? Explain the factors affecting fatigue life. 10
- (b) Explain Hume-Rothery rules for alloy formation. Also describe the effect of alloying elements on steel. 10
5. (a) What do you mean by hardenability of steel ? Explain the factors affecting hardenability of steel. 10
- (b) Describe "case carburizing" and "carbonitriding" related with steel. 10

6. (a) Define ceramic materials. Explain the general structure and different characteristics of ceramics. 10
- (b) What are the oxide and non-oxide ceramics ? Explain in detail. 10
7. (a) Define polymerization. Describe the structure and important properties of different organic materials. 10
- (b) What are the different types of composite materials ? Explain in detail along with their applications. 10
8. (a) What do you mean by high strength concrete ? Explain the different types of admixtures ? 10
- (b) Explain the different types of corrosion with diagram. Also describe their preventive measures. 10
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