

Roll No. ....

**23376**

**M. Tech. 1st Semester Civil Engg.  
(Specialization in Structural Engg.)**

**Examination – January, 2016**

**MATERIAL TECHNOLOGY**

**Paper : CE-601/MTSD-101**

*Time : Three Hours ]*

*[ Maximum 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 examination.*

**Note :** (i) All questions carry equal marks.

(ii) Attempt *five* questions in all.

(iii) Assume missing data, if any suitably.

1. (a) Describe the different types of cement in detail. 10

(b) What do you mean by heat of hydration ? Describe the structure of hydrated cement. 10

2. Describe the following properties of concrete : 20

(i) Elasticity of concrete.

- (ii) Fibre reinforced concrete.
- (iii) Shrinkage and creep of concrete.
- (iv) Durability of concrete.
- (v) Permeability of concrete.
3. (a) What are the factors affecting the strength of concrete? Describe in detail. 10
- (b) Write a short note on "chemical attack of concrete". 10
4. (a) What do you mean by hardened concrete? Describe the mechanical properties of hardened concrete. 10
- (b) Describe the properties of lightweight and high density concrete. 10
5. (a) What are the common corrosion reactions in structural metals? Describe the behaviour of corrosion in constructional metals in tension and compression. 10
- (b) What do you mean by true stress-strain curve? Explain this curve for steel in simple tension. 10

6. What is the nature of fatigue failure? Describe the fatigue properties and explain the fatigue strength for different cases. 20
7. Explain in detail the temperature and Creep properties. Also describe the creep-stress-time-temperature relations for simple tension. 20
8. (a) What do you mean by theory of dislocations? Describe in detail. 10
- (b) Describe the structure of materials and their imperfections. 10