

6. (a) What do you mean by fatigue properties? Explain the factors influencing fatigue strength. (10)

(b) Describe "fatigue strength with superimposed static stress" in detail. (10)

7. Explain in detail the properties of materials at high temperature and Creep. Also describe the creep-stress-strain curves for simple tension. (20)

8. (a) Describe the structure of materials and their imperfections. (10)

(b) Describe "mechanisms of creep in tension and deformation creep". (10)

Roll No.

23376

**M. Tech. 1st Sem. Civil Engg.
(Specialisation in Structural
Engineering) Examination-
December, 2016**

MATERIAL TECHNOLOGY

Paper : CE-601/MTSD-101

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 any **five** questions. Assume missing data, if any suitable. All questions carry equal marks.

1. (a) Describe the Portland cement and its chemical composition. Also explain the advantages of it. (10)

(b) Explain the mechanical strength of cement gel. (10)

2. Describe the following properties of concrete:

(a) Elasticity of concrete

(b) Shrinkage and creep of concrete.

(c) Durability of concrete

(d) Permeability of concrete

(e) Air-entrained concrete (20)

3. (a) What are the mechanical properties of concrete? (10)

(b) Write a short note on "Chemical attack on concrete". (10)

4. Explain the following :

(i) Theories of failure and yield surfaces for metals

(ii) Mix design of concrete

(iii) Statistical quality control of concrete mass.

(iv) Biaxial strength of concrete (20)

5. (a) What are the common constructional metals? Describe the behaviour of common constructional metals in tension and compression. (10)

(b) What do you mean by true stress-strain curve? Explain this curve for mild steel in simple tension. (10)