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

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

7. Explain in detail the temperature and Creep properties. Also describe the creep-stress-time-temperature relations for simple tension. (20)

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

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

Roll No. .....

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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 thermal 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)