Roll No. .....

23376

M. Tech. 1st Sem. (Civil Engg.)
(Specialisation in Structural Engg.)
Examination – December, 2014

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 : Out of eight questions attempt any ***five*** questions. All questions carry equal marks.

1. (a) Discuss the phenomena of hydration of cements. How is the water content ratio related to cement paste structure. 10

(b) What is gel space ratio ? How does it validates Abram's law of water content ratio. 10

2. Explain the following types of cement highlighting how it is different from ordinary portland cement in composition. 20

(i) Sulphate resisting cement

(ii) Air entraining cement

(iii) Hydrophobic cement

(iv) High Alumina cement

3. (a) What is creep & shrinkage of concrete ? List the factors affecting creep & shrinkage of concrete. 10

(b) List & explain various factors affecting strength of concrete. 10

4. (a) What is mix design ? Explain in detail the factors governing the selection of mix design. 10

(b) Discuss the step by step procedure for mix design by Indian standard guidelines. 10

5. (a) List causes of lack of durability & explain how chloride-ion penetration affect the durability. 10

(b) Write short note on light weight density concrete. Also mention its benefits. 10

6. (a) What is an S-N curve ? What information do you draw the same. 10

(b) What is creep ? Draw a typical creep curve and explain the different stages of creep. 10

7. (a) A fatigue test was conducted in which mean stress was 50×10^6 N/m^2 & stress amplitude was 225×10^6 N/m^2. 10

(i) Compute the maximum & minimum stress level.

(ii) Compute the stress ratio.

(iii) Compute the magnitude of the stress range.

(b) Describe the phenomenon of dislocation. 10

8. (a) What is the difference between atomic structure and crystal structure ? Also differentiate between crystal structure and crystal system ? 10

(b) Write short note on behaviour of common construction metals in tension and compression. 10