

M.C.E 1<sup>st</sup> SEMESTER EXAMINATION 2017

SUBJECT: Concrete Science and Technology

Time : 3 hours

Full marks : 100

**Draw neat sketches wherever necessary.**

**Answer question no 1 and three from rest.**

**I.S codes and Handbooks are not allowed in the examination hall**

1. a) What method will you adopt to cure concrete in areas of water shortage?
- b) when the slump loss parameter is important in concrete construction?
- c) What is the difference between sample and specimen in concrete technology? How the compressive strength test result of a sample is determined?
- d) Why concrete should be transported in closed container during hot or cold weather ?
- e) What is high strength concrete as per IS 456-2000? What is the relation between standard cylinder strength and standard cube strength of a concrete mix?
- f) How does the rate of loading affect the compressive strength of concrete?
- g) What are the differences between strain controlled and stress controlled compression testing machine?
- h) Suggest at least two methods by which you can reduce the bleeding of a concrete mixture.
- i) What is the difference between entrained air and entrapped air in concrete technology?
- j) what is light weight concrete ?
- k) Why the fine aggregate of Zone – IV is not suitable for good concrete ?
- l) The process of mix proportioning of concrete cannot be computerized – Why?

2+2+2+2+2+2+2+2+2+2+3=25

2. a) The mix proportion of a concrete provided at the site for M25 is cement : sand : coarse aggregate ( by weight under SSD condition) = 1: 1.6: 2.8 with water cement ratio of 0.41. The following data are noted at the site :

Specific Gravity of Sand = 2.6

Specific Gravity of Coarse Aggregate = 2.65

Surface Moisture content of Sand = 3%

Surface Moisture content of Coarse Aggregate = 0.5%

What will be the mix proportion at the site for the mix?

- b) Discuss about the types of cement to be chosen depending on the sulphate content in soil/ground water?

c) Define creep and shrinkage of concrete. Why are the creep and shrinkage treated together? What are the factors that affect the creep and shrinkage of concrete?

8+8+9=25

- 3 (a) Discuss a suitable non destructive test for concrete along with its limitations.  
(b) What is a chemical admixture ? What are the different types of chemical admixtures? Name the important properties are to be tested for a chemical admixture?  
c) Name five typical mineral admixtures used in concrete. Mention their sources. Name the factors to be considered for suitability in concrete.  
d) What are the other sources of fine aggregates if the natural sand is not available regularly?

7+6+6+6=25

4. Write Short notes:

- a) Roller compacted concrete
- b) Carbonation of concrete
- c) Ready mix concrete
- d) Test for bleeding of concrete
- e) Admixture – cement compatibility

5x5=25

5. a) What is the difference between soundness of cement and soundness of aggregate ?

b) What are the uses of fiber reinforced concrete? What are the different types of fiber used in fiber reinforced concrete? What are problems of having higher amount of fiber volume content?

c) What are the differences between OPC, PSC and PPC?

d) Why sea water cannot be used in reinforced concrete?

6+6+8+5 =25