Paper Code: STR-32B	**Roll No.**									

M.Tech.
THIRD SEMESTER EXAMINATION, 2016-2017
DURABILITY OF CONCRETE STRUCTURES

[Time: 3Hours] [Total Marks: 100]

Note:- Attempt all questions. All questions carry equal marks.

1. Attempt any two parts of the following:- **(10x2=20)**

(a) Enlist different types of cement. Discuss about the properties and applications for any two types of cement in concrete construction.
(b) Explain the effect of size, shape, texture and grading of aggregate in concrete.
(c) Find the Fineness Modulus of aggregate for the following result of sieve analysis. What is its utility?

I.S Sieve	40	20	10	4.75	2.36	1.18	600	300	150
% Passing	100	70	50	40	20	2	0	0	0

2. Attempt any two parts of the following:- **(10x2=20)**

(a) Explain the factors that promote the alkali-aggregate reaction.
(b) State different types of chemical & mineral admixtures and differentiate between them.
(c) What do you understand by workability of concrete? Give details of slump test and Compacting factor test for measuring workability of concrete.

3. Attempt any two parts of the following:- **(10x2=20)**

(a) Why curing of concrete is required? Explain water ponding and membrane curing methods.
(b) Define durability of concrete. What are the factors affecting durability of concrete structures? Discuss the chloride and sulphate attack on concrete.
(c) What are the various stages of manufacturing of concrete? Describe in detail the compaction of concrete along with various methods of curing.

4. Attempt any two parts of the following:- **(10x2=20)**

(a) (i) How does w/c affect the strength of concrete?

(ii) Predict theoretical compressive strength of concrete having w/c = 0.5, cement content= 300gm and degree of hydration= 100% using (i) Abram's law (Given values of A and B are 98 MPa and 7 respectively.) and (ii) Power's equation.
(b) What is maturity of concrete cured at 30 degrees for 14 days?
(c) How will you determine the tensile strength of concrete? Explain in detail.

5. Attempt any two parts of the following:- **(10x2=20)**

(a) Design a concrete mix for construction of an elevated water tank. The specified design strength of concrete (characteristic strength) is 30 MPa at 28 days measured on standard cylinders. Standard deviation can be taken as 4 MPa. The specific gravity of FA and C.A. are 2.65 and 2.7 respectively. The dry bulk density of C.A. is 1600 kg/m^3, and fineness modulus of FA is 2.80. Ordinary Portland cement (Type I) will be used. A slump of 50 mm is necessary. C.A. is found to be absorptive to the extent of 1% and free surface moisture in sand is found to be 2 per cent. Assume any other essential data.

(b) Explain the durability considerations in the design of concrete mixes as per IS 456-2000.

(c) The strength of a sample of fully matured concrete is found to be 40.00 MPa find the strength of identical concrete at the age of 7 days when cured at an average temperature during day time at 20°C, and night time at 10°C.