

Total No. of Questions :6]

SEAT No. :

P54

OCT. -16/BE/Insem. - 106

[Total No. of Pages :4

B.E. (Civil Engineering)

ADVANCED CONCRETE TECHNOLOGY

(2012 Course) (Semester - I) (Elective - I)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) *Answer Q. 1 or 2, 3 or 4 and 5 or 6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Your answers will be valued as a whole.*
- 5) *Use of electronic pocket calculator is allowed.*
- 6) *Assume suitable data, if necessary.*
- 7) *Use of IS code 10262, 456 is not allowed.*

- Q1)** a) Differentiate between rapid hardening cement and low heat cement. [4]
- b) Write a short note related to the properties of concrete on [6]
- i) Aggregate cement bond strength.
 - ii) Effect of admixtures.

OR

- Q2)** a) Write a short note on manufactured sand as a fine aggregate. [4]
- b) Enlist the properties of concrete in plastic state and hardened state. Explain any one in detail. [6]
- Q3)** a) Explain how high performance concrete differs from high strength concrete, [4]
- b) Write a short notes on [6]
- i) Gap graded concrete
 - ii) Sulphur infiltrated concrete

OR

P.T.O.

Q4) a) What are the different types of industrial waste materials useful for construction industry? Explain any one waste material based Concrete in detail. **[4]**

b) Write a short notes on **[6]**

i) Ultra light weight concrete

ii) Pervious concrete

Q5) Using Indian Standard recommended guidelines, design a concrete mix for a reinforced concrete structure to be subjected to the very severe exposure conditions for the following requirements: **[10]**

a) Stipulations for proportioning

i) Grade designation : M40,

ii) Standard deviation, $S=5$

iii) Type of cement : OPC 43 grade conforming to IS 8112

iv) Maximum water - cement ratio : 0.45

v) Workability : 100 mm(slump)

vi) Degree of supervision : Good

vii) Type of aggregate : Crushed Angular aggregate,

viii) Maximum cement content : 450 kg/m^3

ix) Minimum Cement content : 340 kg/m^3

x) Method of concrete placing Pumping

xi) Chemical admixture type: Super plasticizer

b) Test data for materials

i) Specific gravity of cement : 3.15

ii) Specific gravity of admixture : 1.145

iii) Specific gravity of

1) Coarse aggregate - 2.74

2) Fine aggregate - 2.74

- iv) Water absorption
 - 1) Coarse aggregates - 0.5%
 - 2) Fine aggregates - 1.00%
- v) Free surface moisture
 - 1) Coarse aggregates - Nil(absorbed moisture also nil)
 - 2) Fine aggregates - Nil
- vi) Sieve analysis
 - 1) Coarse aggregate:

IS Sieve sizes (mm)	Analysis of Coarse Aggregate Fraction		Percentage of different Fractions			Remarks
	I	II	I (60%)	II (40%)	Combined (100%)	
20	100	100	60	40	100	Confirming of Table 2 of IS 383
10	0	71.2	0	28.5	28.5	
4.75		9.40		3.7	3.7	
2.36		0				

- 2) Fine aggregate: Conforming to grading zone I

- c) Design considerations:

Table 1: From IS 10262 ; Maximum water content per cubic meter of concrete

Sr. No	Nominal Maximum Size of Aggregate (mm)	Maximum Water Content (kg)
i)	10	208
ii)	20	186
iii)	40	165

Table 2 : From IS 10262; Volume of Coarse Aggregate per Unit Volume of Total Aggregate

SI. No. (1)	Nominal Maximum Size of Aggregate (mm) (2)	Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
		Zone IV	Zone III	Zone II	Zone I
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

OR

- Q6)** a) Explain the role of infrared thermography in civil engineering structures. **[4]**
- b) Write a short note on non destructive testing methods **[6]**
- i) Ground penetration radar
- ii) Stress wave propagation method,

