

Total No. of Questions :6]

SEAT No. :

P190

[Total No. of Pages :3

Oct./BE/Insem. - 506

B.E. (Civil Engineering)

ADVANCED CONCRETE TECHNOLOGY

(2015 Course) (Semester - I) (401004 C) (Elective - I)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 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) Explain plain Air permeability Test with Sketch for Fineness of cement. [5]

b) Define flaky and elongated particle of aggregate. Explain how the laboratory sample is obtained to perform flakiness index test on coarse aggregate. [5]

OR

Q2) a) Write Note on balking Of Sand. [5]

b) What is heat of hydration? Explain the factor affecting heat of hydration. [5]

Q3) a) Explain Light Weight Aggregate Concrete. [5]

b) Write detail note on design of no fines Concrete Mixes. [5]

OR

Q4) a) Explain how High Performance Concrete Differs From High Strength Concrete. [5]

b) Explain Under Water Concreting. [5]

Q5) a) Enlist various method of non destructive Testing & Explain any one of them. [5]

b) State difference between Cracking, Sapling & Staining. [5]

OR

P.T.O.

**Q6)** Using Indian Standard recommended guidelines, design 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 : M50,
  - ii) Standard deviation,  $s = 5$
  - iii) Type of cement : OPC 53 grade conforming to IS 8112
  - iv) Maximum water-cement ratio: 0.5
  - v) Workability : 100 mm(slump)
  - vi) Degree of supervision : Good
  - vii) Type of aggregate : Crushed Angular aggregate,
  - viii) Maximum Cement content:  $450\text{kg/m}^3$
  - ix) Minimum Cement content:  $320\text{kg/m}^3$
  - 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 Coarse aggregate -2.74  
Fine aggregate - 2.74
  - iv) Water absorption  
Coarse aggregates - 0.5%  
Fine aggregates-1.00%
  - v) Free surface moisture  
Coarse aggregates- Nil absorbed moisture also nil  
Fine aggregates- Nil

vi) Sieve analysis

Coarse aggregate:

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

Fine aggregate : Conforming to grading zone I.

c) Design considerations:

Table 1 : From IS10262; 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 IS10262; Volume of Coarse Aggregate per Unit Volume of Total Aggregate.

Sl. No.	Nominal Maximum Size of Aggregate (mm)	Volume of Coarse Aggregate Per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
		Zone IV	Zone III	Zone II	Zone I
(1)	(2)				
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

