Oct./BE/Insem 506  B.E. (Civil Engineering)  ADVANCED CONCRETE TECHNOLOGY  (2015 Course) (Semester - I) (401004 C) (Elective - I)  Time: 1 Hour!  Instructions to the condidates:  1) Answer 21 or Q2, Q3 or Q4, Q5 or Q6.  2) Near 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 1S Code 10262,456 is not allowed.  6) Define flaky and elongated particle of aggregate. Explain how the laboratory sample is obtained to perform flakiness index test on coarse aggregate.  Q1) a) Write Note on balking Q1 Sand.  b) What is heat of hydration? Explain the factor affecting heat of hydration. [5]  Q3) a) Explain Light Weight Aggregate Concrete.  b) Write detail note on design of no fines Concrete Mixes.  Corecte.  [5]  Q4) a) Explain how High Performance Concrete Differs From High Strength Concrete.  [5]  D5) Explain Under Water Concreting.  [5]  Q5) a) Enlist various method of non destructive Testing & Explain any one of them.  [5]  OR  Q5) a) Enlist various method of non destructive Testing & Explain any one of them.  [5]  D6) State difference between Cracking, Sapling & Staining.  [5]	Total	l No	o. of Questions :6]	SEAT No.:					
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- 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: 450kg/m<sup>3</sup>
    - ix) Minimum Cement content:320kg/m<sup>3</sup>
    - 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

## Sieve analysis vi)

Coarse aggregate:

IS Sieve		Analysis of		centage of		Remark
sizes (mm)	Coarse Aggregate different Fractions					
		Fraction >				
	I	II S	I	II	Combined	Confirming
	6		(60%)	(40%)	(100%)	of Table 2
	5	9				of IS 383
20	100	100	60	40	100	
10	0	71.2	0	28.5	28.5	
4.75		9.40		3.7	3.7	Co.
2.36	2	0			36	

Fine aggregate: Conforming to grading zone I.

## Design considerations:

Table 1: From IS10262; Maximum water content per cubic meter of concrete.

Sr. No.	Nominal Maximum	Maximum Water
	Size of Aggregate (mm)	Content (kg)
i)	10	208
ii)	20	186
iii)	405	165

Table 2: From IS10262; Volume of Coarse Aggregate per Unit Volume of Total Aggregate.

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