



Eighth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Advanced Concrete Technology

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.
 2. Use of code IS:10262-2009 is permitted.
 3. Assume any missing data suitably.

PART – A

1.
 - a. Explain the importance of Bogue's compound in ordinary Portland Cement. (10 Marks)
 - b. Explain Rheology of concrete in terms of Bingham's Parameters. (06 Marks)
 - c. Discuss the importance of transition zone of concrete. (04 Marks)

2.
 - a. Mention the different types of superplasticizer. Explain the mechanism of deflocculation of cement particles by plasticizers with a neat sketch. (10 Marks)
 - b. Discuss the effect of following on the properties of concrete :
 - (i) Fly ash
 - (ii) Silica fume. (10 Marks)

3.
 - a. Using IS code 10262:2019, design the mix proportioning for a concrete with M₃₅ grade using fly ash with following data:
 A-1: Stipulations for proportioning
 - (a) Grade Designation : M35
 - (b) Type of cement : OPC43 Confirming IS 8112.
 - (c) Type of mineral admixture : Fly ash
 - (d) Maximum nominal size of aggregate : 20 mm
 - (e) Minimum cement content : 320 kg/m³
 - (f) Maximum water-cement ratio : 0.45
 - (g) Workability : 100mm (Slump)
 - (h) Exposure conditions : Severe (for RCC)
 - (i) Method of concrete placing : Pumping
 - (j) Degree of supervision : Good
 - (k) Type of aggregate : Crushed Angular
 - (l) Maximum cement content : 450 kg/m³
 - (m) Chemical Admixture type : Superplasticizer

A-2 : Test Data for Materials (Table :1)

Materials	Sp. Gr.	W. A.	Free Moisture	
Cement	3.15	-		Type
Coarse Aggregate	2.65	0.5%		I II IS383
Fine Aggregate	2.60	1.0%	Nil	60% 40%
Superplasticizer	1.145	-		Zone-I IS383 for
Fly ash	2.2	-		fine aggregate.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Table:2 For Exposure conditions (IS:456)

Type of exposure	Plain concrete		Reinforced concrete	
	Max. W/C Ratio	Min. cement content	Max. W/C	Min. C.C.
MILD : Completely protected weather, aggressive conditions	0.70	220	0.65	250
Moderate : Sheltered from heavy wind, rain and against freezing when saturated with water	0.60	250	0.55	290
SEVERE: Exposed to sea water alternate wetting and drying, freezing while wet.	0.50	310	0.45	320

Note : (Table 2)

- (i) Minimum cement content is based on 20mm aggregate; for 40mm aggregate reduce it by 10% and for 12.5mm aggregate increase by 10%.
- (ii) When the maximum water cement ratio can be controlled, cement content is Table:2, may be reduced by 10%. (15 Marks)
- b. What are the factors affecting mix design? (05 Marks)
- 4 a. What do you understand by carbonation of concrete? Discuss how it influence the corrosion of steel. (08 Marks)
- b. Define the following terms:
 (i) Thermal diffusivity (ii) Thermal conductivity (iii) Specific Heat (03 Marks)
- c. Write a short note on following :
 (i) Plastic shrinkage (ii) Permeability of concrete (iii) Alkali Aggregate Reaction (09 Marks)
- PART – B**
- 5 a. Discuss the following concrete placing methods :
 (i) Shot crete (ii) Under-water concreting (10 Marks)
- b. What do you mean by RMC? Discuss the different steps involved for Batching process and methods of mixing in RMC. (10 Marks)
- 6 a. What is FRC? What are the different factors affecting properties of FRC? (08 Marks)
- b. Write a brief note on the technique used for construction in ferrocement. (08 Marks)
- c. List the advantages of ferrocement over normal concrete. (04 Marks)
- 7 a. Write a brief notes on :
 (i) Light Weight concrete
 (ii) High Density concrete. (10 Marks)
- b. What is High Performance Concrete? Discuss briefly properties of HPC in fresh state and in Hardened State. (10 Marks)
- 8 a. What are the different factors which affect the strength results of concrete? (04 Marks)
- b. Write a short note on following :
 (i) Rebound Hammer Test
 (ii) Pulse Velocity Method
 (iii) Capping of specimens. (12 Marks)
- c. What are the different factors affecting the measurement of pulse velocity. (04 Marks)

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