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A C Q M 3 &amp; M O 3 2

10CV81

**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 : (10 Marks)  
(i) Fly ash (ii) Silica fume.
- 3 a. Using IS code 10262:2019, design the mix proportioning for a concrete with M<sub>35</sub> 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/m<sup>3</sup>  
(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/m<sup>3</sup>  
(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.

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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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