M.E.CIVIL ENGINEERING FIRST YEAR SECOND SEM. EXAM. -2019

Subject: ADVANCED CONCRETE SCIENCE AND TECHNOLOGY

TIME: Three Hours **Full Marks 100**

PART-I (Marks-40)

Use a separate Answer-Script for each part

No. of questions	Answer all questions	Marks (10+10+20)=40
1.	Describe the effect of high temperature on concrete microstructure (cement paste and aggregate).	10
2.	Describe different type of chemical attack occurred in concrete in marine environment?	10
3. a)	What do you mean by high performance concrete? Give example.	2
b)	What do you mean by self compacting concrete and write down the properties of Self-compacting concrete and also write down the benefits of Self compacting concrete	2+2+2=6
c)	Describe the J-ring test for measuring the passing ability of Self-compacting concrete with neat sketch.	12

M.E. Civil Engineering - First Year - Second Semester

Advanced Concrete Science and Technology (SE)

PART-II

Time: Three Hours

Full Marks 100
(40 marks for 2nd part)

Use a separate Answer-Script for each part

[IS 456, IS 383 is allowed. Assume any other relevant data]

No. of questions	Part I (Answer Any four of from question number 2 to 6 questions.)	Marks (6X10=60)
1) a)	Design a mix proportion of a concrete of grade M35 using fly ash as a part replacement of OPC with the following data a) Grade designation- M40 b) Type of cement -OPC 43 grade conforming to IS 8112 c) Type of mineral admixture -Fly ash conforming to IS 3812 (Part I) d) Maximum nominal size of aggregate -20mm e) Minimum cement content -320 kg/m' f) Maximum water-cement ratio -0.45 g) Workability-75 mm (slump) h) Exposure condition -mild (for reinforced concrete) j) Method of concrete placing- Pumping k) Degree of supervision -Good m) Type of aggregate -Crushed angular aggregate n) Maximum cement (OPC) content-450 kg/m' p) Chemical admixture type- Superplasticizer TEST DATA FOR MATERIALS a) Cement used- OPC 43 grade conforming to IS 8112 b) Specific gravity of cement- 3.15 c) Fly ash Conforming to- IS 3812 (Part I) d) Specific gravity of fly ash - 2.2 e) Chemical admixture- Superplasticizer conforming to IS 9103 f) Specific gravity of: 1) Coarse aggregate-2.74 2) Fine aggregate-2.74 g) Water absorption: 1) Coarse aggregate-0.5% 2) Fine aggregate-1% h) Free (surface) moisture: 1) Coarse aggregate-Nil 2) Fine aggregate-Nil	(20)

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PART-II

Time: Three Hours

Full Marks 100
(40 marks for 2nd part)

Use a separate Answer-Script for each part

[IS 456, IS 383 is allowed. Assume any other relevant data]

No. of questions	Part-I (Answer Any four of from question number 2 to 6 questions.)	Marks (6X10=60)
	g) Sieve analysis: 1) Coarse aggregate :	

IS Sieve Sizes mm	*Analysis of Coarse Aggregate Fraction* I	II	*Percentage of Different Fractions* I 60 percent	II 40 percent	Combined 100 percent	*Remarks*
20	100	100	60	40	100	
10	0	71.20	0	28.5	28.5	Conforming to Table 2 of IS 383
4.75		9.40		3.7	3.7	
2.36		0				

2) Fine aggregate : Conforming to grading Zone I of Table 4 of IS 383

2)a)	What is admixture? What is the difference between plasticizer and super plasticizer?	3+3
b)	How super plasticizer acts on concrete? Explain with diagram.	4
3)a)	Microstructure of hydrated cement paste highlighting calcium silicate hydrate, calcium hydroxide calcium sulphoaluminate hydrate.	6
b)	Write short note on water in the hydrated cement paste from the microstructural pont of view.	4
4)a)	Write down the chemical reaction taken pace in fly ash cement.	5
b)	Write down the chemical composition of fly ash cement.	5
5)a)	How Fly ash can be used in Cement Concrete? Describe the process briefly.	5
b)	How fly ash works with Cement in Concrete?	5
6)a)	Write a short note on dry process and wet process of shot-crete.	5
b)	Write a note on fiber reinforced concrete?	5