Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – WINTER 2013

Subject Code: 130605 **Date: 26-11-2013**

Subject Name: Concrete Technology

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What is workability? Explain compaction factor test to measure workability.	**07**
	(b)	Explain various types of vibrator used for compaction.	**07**
Q.2	**(a)**	Explain cracks repair by injection grouting.	**07**
	(b)	What is initial and final setting time of cement? Explain test for the same.	**07**
		OR	
	(b)	Explain in brief calcium silicate hydrates and calcium aluminate hydrates.	**07**
Q.3	**(a)**	Explain methods of measurement of moisture content in aggregate.	**07**
	(b)	Give purpose of using admixtures in concrete.	**07**
		OR	
Q.3	**(a)**	What are the effects of impurities in water on concrete?	**07**
	(b)	Write short note on silica fume.	**07**
Q.4	**(a)**	Discuss effect of age on strength of concrete.	**07**
	(b)	What are the factors affection on permeability?	**07**
		OR	
Q.4	**(a)**	Explain ultrasonic pulse velocity test for hardened concrete.	**07**
	(b)	Write short note on pumped concrete.	**07**
Q.5	**(a)**	List various aggressive environment for concrete. How sulphate attack on concrete?	**07**
	(b)	State different types of special concrete and describe aerated concrete.	**07**
		OR	
Q.5	**(a)**	Describe methods of mixing of concrete in brief.	**07**
	(b)	Design the concrete mix by using IS method. (Use Table - 1 to 5) Grade of Concrete: M30 Standard deviation: 5.3 Maximum size of aggregate: 20mm Specific gravity of cement: 3.15 Specific gravity of fine aggregate: 2.65 Specific gravity of coarse aggregate: 2.85 Condition for exposure: Mild Notes: (i) Only 5% low results accepted. (ii) w/c ratio from 28 days compressive strength cement. (iii) No correction required for water content and sand content as per zone of sand and workability.	**07**

Table – 1 Value of 't'	
Accepted Proportion of Low Results	Value of 't'
1 in 5	0.84
1 in 10	1.28
1 in 15	1.50
1 in 20	1.65
1 in 40	1.86
1 in 100	2.33

Table – 2Values of W/C ratio and compressive strength	
Compressive Strength in N/mm^2 at 28 days	W/C ratio
20	0.60
25	0.525
30	0.48
35	0.42
40	0.375
45	0.335

Table – 3 W/C ratios as per Durability Requirements	
Exposure Condition	Maximum W/C ratio
Mild	0.65
Moderate	0.55
Severe	0.45

Table – 4 Approximate Air Content	
Nominal Maximum size of Aggregate (mm)	Entrapped air as % of volume of concrete
10	3.0
20	2.0
40	1.0

Table – 5 Approximately sand and water content per m3 of concrete for grade up to M 35		
Nominal maximum size of aggregate (mm)	Water content per meter cube of concrete (kg)	Sand as % of total aggregate by absolute volume
10	208	40
20	186	35
40	165	30

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