Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-III Regular / Remedial Examination December 2010

Subject code: 130605 **Subject Name: Concrete Technology**

Date: 18 /12 /2010 **Time: 10.30 am – 01.00 pm**

Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **No codes of practice are permitted.**

Q.1	**(a)**	Using IS method of mix design, find out proportions of concrete for following data: Grade of Concrete: M 30 Degree of Control: Very good Maximum size of Aggregate: 20 mm Specific gravity of Cement: 3.15 Specific gravity of FA: 2.60 Specific gravity of CA: 2.62 Condition of Exposure: severe Workability: 0.90 CF Note: 5% of the low results are acceptable and W/C ratio for 28 days strength of concrete is 0.49. Refer table 1 to 6.	**10**
	(b)	Explain in short the procedure for the damage assessment of structural element.	**04**
Q.2	**(a)**	What is soundness of cement? Explain the testing procedure to determine the soundness of cement with neat sketch.	**07**
	(b)	Explain the factors affecting properties of fiber reinforced concrete.	**07**
		OR	
	(b)	Describe the manufacturing of OPC with flow chart.	**07**
Q.3	**(a)**	Explain the compacting factor test. Compare it with slump test.	**07**
	(b)	Define segregation of concrete. Explain the factors affecting it.	**07**
		OR	
Q.3	**(a)**	Explain workability and factors affecting it in detail.	**07**
	(b)	What is gel/space ratio? How it will influence the strength of concrete?	**07**
Q.4	**(a)**	Explain shrinkage and factors affecting it.	**07**
	(b)	Explain the basic principle on which Schmidt's rebound hammer is working. What are the limitations of it?	**07**
		OR	
Q.4	**(a)**	Write explanatory note on shape and size of aggregates.	**07**
	(b)	Write short note in "Use of plasticizers in concrete".	**07**
Q.5	**(a)**	Explain the factors that promoting the alkali-aggregate reaction.	**07**
	(b)	Define shotcrete and explain dry mix process of it.	**07**
		OR	
Q.5	**(a)**	What is curing? Explain membrane curing.	**07**
	(b)	Define durability. Explain its significance.	**07**

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Table – 1: Suggested value of standard deviation:

Grade Concrete	Standard Deviation for Different Degree of Control		
	Very good	Good	fair
M 10	2.0	2.3	3.3
M 15	2.5	3.5	4.5
M 20	3.6	4.6	5.6
M 25	4.3	5.3	6.5
M 30	5.0	6.0	7.0

Table – 2 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 – 3 Values 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 – 4 W/C ratios as per Durability Requirements

Exposure Condition	Maximum W/C ratio
Mild	0.65
Moderate	0.55
Severe	0.45

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 in Kg	Sand as % of total aggregate by absolute volume
10	208	40
20	186	35
40	165	30

Table – 6 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