Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 130605 **Date: 09/06/2017**

Subject Name: Concrete Technology

Time: 10:30 AM to 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.**

Q.1	**(a)**	Draw flow chart and explain manufacturing of cement by wet process.	**07**
	(b)	What are the major Bogue's compounds of cement? Discuss their role in hydration of cement.	**07**
Q.2	**(a)**	Using IS method of mix design, find out proportions of concrete for following data: Grade of Concrete: M 20 Degree of Control: Good Maximum size of Aggregate: 20 mm Specific gravity of Cement: 3.15 Specific gravity of FA: 2.5 Specific gravity of CA: 2.6 Condition of Exposure: Moderate Workability: 0.80 CF Note: 5% of the low results are acceptable and W/C ratio for 28 days strength of concrete is 0.53. Refer table 1 to 6.	**07**
	(b)	State the steps involved in choice of mix proportions and describe any two in detail.	**07**
		OR	
	(b)	State the limitations of ACI mix design method, rebound hammer test and different NDT methods.	**07**
Q.3	**(a)**	Define aggregate and classify them according to (i) size (ii) Shape (iii) source of origin and (iv) Weight criteria	**07**
	(b)	Enlist the purposes of using admixture in concrete	**07**
		OR	
Q.3	**(a)**	Describe effect of impurities in water on properties of concrete.	**07**
	(b)	State the factors affecting strength of concrete & describe any one in detail.	**07**
Q.4	**(a)**	What is bulking of sand? How it is performed in laboratory?	**07**
	(b)	Define workability. What are different tests used to measure workability, describe any one in detail?	**07**
		OR	
Q.4	**(a)**	What is curing? State different methods of curing, describe any one method.	**07**

(b) What are the stages of transformation of fresh concrete to harden concrete? Write the stages of manufacturing process of cement. **07**

Q.5 **(a)** What are the effects of shape and texture of aggregates on the strength and workability of concrete? Write the role of gypsum in cement. **07**

(b) What are the factors effecting creep of concrete. Give the definition of creep? **07**

OR

Q.5 **(a)** Distinguish between segregation and bleeding of concrete. **07**

(b) Enlist the tests perform on harden concrete and explain any one in detail **07**

Table – 1: Suggested value of standard deviation

Grade of 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	1.5
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	0.600
25	0.525
30	0.480
35	0.420
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

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