Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV (NEW) EXAMINATION – WINTER 2018

Subject Code:2140608   **Date:01/12/2018**

Subject Name:Concrete Technology

Time: 02:30 PM TO 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.**

			MARKS
Q.1	**(a)**	How is the cement checked on site? How is the field testing important?	**03**
	(b)	Differentiate between 1. Mortar and concrete 2. Setting and Hardening of cement	**04**
	(c)	Determine the Fineness Modulus for the given Sieve analysis performed on Fine aggregate	**07**

IS sieve size	10 mm	4.75 mm	2.36 mm	1.18 mm	600 μ	300 μ	150 μ
Weight retained gm	0	25	45	50	95	175	80

Q.2	**(a)**	Explain the effect of size, shape, texture and grading on concrete.	**03**
	(b)	Discuss the various factors affecting the workability of concrete.	**04**
	(c)	Explain different methods of curing procedure.	**07**

OR

	(c)	Explain soundness test in detail with neat sketch and also specify its Indian standards.	**07**

Q.3	**(a)**	What is alkali-silica reactivity (ASR) and how is it avoided?	**03**
	(b)	What are the essential characteristics of water that can be used for mixing and curing of concrete?	**04**
	(c)	Write short note on air entrained concrete.	**07**

OR

Q.3	**(a)**	Make a list of all the factors that affect Durability of Concrete structures.	**03**
	(b)	Draw the typical stress-strain curve of concrete and explain the various modulus of elasticity	**04**
	(c)	Write short note on ready mix concrete	**07**

Q.4	**(a)**	Briefly explain Gel-space ratio.	**03**
	(b)	Write a brief note on "Rotary Kiln".	**04**
	(c)	The results of compressive strength test on 15 cubes of a batch in MPa are 19, 18, 21, 24, 19, 18.5, 20, 21.5, 22, 23, 19.5, 17.5, 24, 21, 20. Find Standard Deviation and Coefficient of Variation for the batch.	**07**

OR

Q.4	**(a)**	Define admixtures and creep.	**03**
	(b)	Define the term "Bulking of aggregates". Explain its significance with reference to concrete making.	**04**
	(c)	What are Bouge's compounds? Explain in detail how each one of these compounds influences the strength and setting properties of cement.	**07**

Q.5 **(a)** What are the Principles of concrete mix design? **03**
     (b) Explain the adverse effect of excessive use of admixture? **04**
     (c) What is non-destructive testing of in-situ fresh and hardened concretes? Discuss the pulse velocity method. **07**

OR

Q.5 **(a)** Using IS-10262(2009) method of mix design, find out proportions of concrete for following data: **14**
     Grade of Concrete: M 25
     Degree of Control: Very good
     Maximum size of Aggregate: 10 mm
     Specific gravity of Cement: 3.15
     Specific gravity of FA: 2.70
     Specific gravity of CA: 2.82
     Condition of Exposure: severe
     Workability: Slump 75-100 mm
      Refer table 1 to 4.

Table 1						
	RCC		PCC		Min Grade	
EXPOSURE	**MINIMUM CEMENT CONTENT**	**MAX FREE W/C RATIO**	**MINIMUM CEMENT CONTENT**	**MAX FREE W/C RATIO**	**PCC**	**RCC**
MILD	300	0.55	220	0.6		M20
MODERATE	300	0.50	240	0.6	M15	M25
SEVERE	320	0.45	250	0.5	M20	M30
VERY SEVERE	340	0.45	260	0.45	M20	M35
EXTREME	360	0.40	280	0.4	M25	M40

Table 2		
No.	Grade	Std. deviation
1	10	3.5
2	15	
3	20	4
4	25	
5	30	5
6	35	
7	40	

TABLE 3		
No	Max. size of aggregate (mm)	Maximum Water Content (kg)
1	10	208
2	20	186
3	40	165

TABLE 4				
Nominal Maximum size of aggregate, mm	Volume of coarse aggregate per unit volume of total aggregate for different zones of fine aggregate (For w/c ratio of 0.5			
	Zone IV	Zone III	Zone II	Zone I
10	0.5	0.48	0.46	0.44
20	0.66	0.64	0.62	0.6
40	0.75	0.73	0.71	0.69
Volume of coarse aggregate per unit volume of total aggregate needs to be changed at the rate of -/+ 0.01 for every +-0.05 change in w/c ratio				