Seat No.: _____ Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2014

Subject code: 1722009 Date: 08-12-2014

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)**	Describe the manufacturing of OPC with flow chart? What is the oxide composition of OPC? What are the Bogueôs compounds?	**07**
	(b)	Explain the difference between rapid hardening cement and ordinary portland cement with property, application and cost. Also explain the Portland pozzolana cement.	**07**
Q.2	**(a)**	Describe the importance of quality of water used for production of concrete	**07**
	(b)	What is the effect of shape and size on the strength and workability of concrete? What is the maximum size of aggregate used in concrete as per IS 456-2000?	**07**
		OR	
	(b)	What is flakiness and elongation index and how can it be calculated.	**07**
Q.3	**(a)**	Describe sieve analysis for aggregate. What is fineness modulus? Find the fineness modulus for the given sample of aggregates. Sieve Size Mass retained (in gms) 80mm 00 40mm 00 20mm 60 10mm 800 4.75mm 140	**07**
	(b)	What is a Non destructive test? Explain the rebound hammer and ultrasonic pulse velocity test. Also mention under which circumstances this method is useful.	**07**
		OR	
Q.3	**(a)**	Enlist the destructive test performed on hardened concrete and explain flexural test in detail. Calculate the approximate compressive strength of a standard cube of concrete having compressive load of 90KN at failure.	**07**
	(b)	Calculate the gel space ratio and theoretical strength of a sample of concrete with 2000gm of cement with 0.45 w/c ratio at 60% hydration.	**07**
Q.4	**(a)**	Define Maturity concept of concrete. The strength of a fully matured concrete is found to be 30.00MPa. Find the strength of identical concrete at the age of 7 days when cured at an average temperature during day time at 18degree C and night time at 12degree C. (let A=21, B=61)	**07**
	(b)	What factors are affecting the strength of concrete	**07**
		OR	

Q.4 **(a)** Determine the quantity of fine and coarse aggregate for the following data, **07**

Mass of water/m^3 of concrete	191.6kg
Mass of cement/m^3 of concrete	436kg
Specific gravity of cement	3.15
Specific gravity of fine aggregate	2.60
Specific gravity of coarse aggregate	2.65
% Entrapped air	2%
%fine Aggregate/Total Aggregate	33.3%
Water absorption	
Coarse aggregate	0.6%
Fine aggregate	1.2%
Free (surface) moisture	
Coarse aggregate	Nil
Fine aggregate	2.0%

Design the concrete mix by volume also if the bulk density of cement , Fine Aggregate and coarse aggregate is 1450kg/m^3 , 1700kg/m^3 and 1800kg/m^3 respectively.

(b) Explain compaction of concrete. What are the different methods of compaction? **07**

Q.5 **(a)** Discuss various aspects of durability. What care should be taken to assure good durability in concrete? **07**

(b) Explain Bulking of sand. In a concrete mix of 1:1.5:3, moist sand of 18% Bulking is used. If no allowance for bulking is made what will be the corresponding mix? **07**

OR

Q.5 **(a)** State different types of chemical and mineral admixtures and differentiate between them. **07**

(b) Answer the following briefly. **07**

1. Which constituents cause unsoundness of cement?
2. What should be the size of cubes and proportion of mortar for testing compressive strength of cement?
3. List four essentials of workable concrete?
4. List the various stages of manufacture of concrete.
5. What is Revibration?
6. What is the main purpose of accelerated curing test?
7. What is nominal mix concrete?

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