Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem - III (Civil) Examination December/January 2009-10

Subject code: 130605 Subject Name: Concrete Technology

Date: 29 / 12 / 2009 Time: 11.00 am – 1.30 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)** Justify the statement: "Strength of aggregate plays important role in quality and strength of concrete". **07**

(b) Define workability of concrete, Which are the different methods of measuring it in the laboratory? Explain any one of them. **07**

Q.2 **(a)** Enlist the different Laboratory tests of cement. Explain any one of them in detail. **07**

(b) Define Admixtures and Additives. Enlist the different admixtures used in concrete construction. Explain the function and property of any two types of admixtures **07**

OR

(b) Describe briefly the chemical composition, major compounds formed and hydration of cement. **07**

Q.3 **(a)** Enlist the different types of cement. Discuss about the properties and applications for any two types of cement in concrete construction. **05**

(b) How will you check the cement on field? How is the field testing important? **05**

(c) Explain the qualities of water required for production of concrete. **04**

OR

Q.3 **(a)** Which are the factors affecting strength of concrete? Explain any one of them. **05**

(b) Find the Fineness Modulus of aggregate for the following result of sieve analysis. What is its utility? **05**

I.S Sieve	40	20	10	4.75	2.36	1.18	600	300	150
% Passing	100	70	50	40	20	2	0	0	0

(c) Explain the effect of size, shape, texture and grading of aggregate on concrete. **04**

Q.4 **(a)** Which are the different steps needed for process of manufacturing of concrete? Describe in detail the compaction of concrete. **07**

(b) Describe in detail the segregation and bleeding **07**

OR

Q.4 **(a)** What is non destructive testing of Concrete? Discuss pulse velocity method. **07**

(b) Discuss various aspect of durability of concrete. What measures are taken by IS code to ensure durable structure? **07**

Q.5 **(a)** Write Short note on **08**

(i) Under water concrete (ii) Shotcrete

(b) Explain effect of age of concrete on its strength. What will be the effect of size of specimen on concrete strength? **06**

OR

Q.5 **(a)** For the construction of road, concrete mix design is adopted. The road is to be designed for the minimum compressive strength of 20 Mpa at 28 days. The standard deviation of 3.5 Mpa is available during the laboratory testing of the mix. The specific gravity of C.A. is 2.85 and its dry rodded bulk density is 1600kg/m^3. The maximum size of aggregate to be used is 40 mm. The specific gravity of fine aggregate is 2.6 and its fineness modulus is 2.75. A slump of 30 mm is specified. An OPC is used and it is required that note more than 2.5% test results allow to fall below specified strength. F.A. contains 5% surface moisture and C.A absorbs 3%. Work out the proportion of various ingredient material of Concrete after applying necessary correction for : **14**

(i) 1 bag of cement

(ii) 1 m^3 of Concrete

Table 1

% of result allowed to fall below min	Value 'k'
1.0	2.33
2.5	1.96
6.6	1.50
16.0	1.00

Table 2

Avg. Comp strength at 28 days (MPa)	Effective W/c Ratio(by mass)
45	0.38
40	0.43
35	0.48
30	0.55
25	0.62
20	0.70

Table:3

Water requirement for maximum size of aggregate of			
Slump	10mm	20mm	40mm
25 to 50 mm	206	182	162
75 to100 mm	226	203	177
150 to 175mm	240	212	188
Approximate entrapped air content	3%	2%	1%

Table:4

	Bulk Volume of rodded CA per unit volume of concrete of fineness modulus of sand of			
Max size of aggregate↓	Fineness modulus			
	2.4	2.6	2.8	3.0
10	0.46	0.44	0.42	0.40
20	0.65	0.63	0.61	0.59
40	0.76	0.74	0.72	0.70

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