3/246   5   Candidate's Seat No : _____

GUJARAT UNIVERSITY
B.E. Sem V (Civil) Examination
Concrete Technology

Friday, 4th January, 2008]   **[Time : 3 Hours**
Max. Marks : 100

Instructions : (1) Attempt **all** questions from each section.
           (2) Answer to the two sections must be written in **separate** answer books.
           (3) Figures to the right indicate **full** marks.
           (4) Assume suitable data if required

SECTION I

1   Attempt Any four :   (16)
     (a) Differentiate between rapid hardening and quick setting cement
     (b) What are the different methods of determining moisture content of aggregate ? Describe displacement method.
     (c) What is shrinkage? Describe it briefly.
     (d) Explain Portland pozzolana cement and rapid hardening cement.
     (e) Discuss briefly Hydration of cement.
     (f) What is the effect of finesse of cement on concrete? How can you determine in laboratory using sieve method.

2   (a) Define workability of concrete. Which are the different methods of measuring it in the laboratory? Explain any one of them.   (05)

     (b) What are the factors affecting the strength of concrete? Explain any one.   (05)

     (c) Describe in detail segregation and bleeding.   (06)

(OR)

2   (a) Define admixtures and additives. Explain the effect of air entrainment on the properties of concrete.   (08)

     (b) What do you understand by grading of aggregates? Comment about suitability of grading of aggregate for concrete.   (08)

3   Write short notes on following (Any three) :   (18)
     (1) Curing of concrete
     (2) Factors affecting modulus of elasticity
     (3) Compaction of concrete
     (4) Setting time test for cement
     (5) Impact and crushing value of aggregate

P. T. O.

SECTION – II

4 (a) What is non-destructive testing of concrete? Discuss pulse velocity method. (16)

   (b) Discuss the effect of H/D ratio on strength of concrete. Compare between cube and cylinder strength.

(OR)

4 (a) Discuss various method for curing concrete. (16)

   (b) Discuss various aspects of durability of concrete. What majors are taken by IS code to ensure durable structure ?

5 Write short notes on the following (Any three): (18)

   (1) Hot weather and cold weather concreting.

   (2) Under water concreting.

   (3) Factors affecting Alkali – Aggregate reaction.

   (4) Bulking of sand

   (5) Discuss "test cores"

6 Design a concrete mix as per IS method for following data. (16)

   (a) Characteristic strength at 28 days = 30 MPa

   (b) Maximum size of aggregate = 20 mm

   (c) Degree of workability = 0.85 (C.F.)

   (d) Quality control = Very good

   (e) Type of expouse = Moderate

   (f) Specific gravity of

      (i) Cement = 3.15

      (ii) Coarse aggregate = 2.80

      (iii) Fine aggregate = 2.60

It is found that sand falls in grade zone III. Mix is designed in such a way that only one sample fails out of 20.

Table – 1 Standard deviation N/mm^2

Grade	Degree of control		
	Very good	Good	Fair
M15	2.5	3.5	4.5
M20	3.6	4.6	5.6
M25	4.3	5.3	6.3
M30	5.0	6.0	7.0

2-3

Table – 2 Probability Factors K

% of result allowed to fall below min	Value of 'K'
0.1	3.09
0.6	2.50
1.0	2.33
2.5	1.96
6.6	1.50

Table – 3 W/C w.r.t strength

Compressive strength N/mm^2	W/C Ratio
50	0.31
45	0.34
40	0.37
35	0.40
30	0.45

Table – 4

For W/c = 0.6   CF = 0.80   sand zone - II

Max^m size of aggregate(mm)	Water/Cubic meter of concrete (kg)	Sand as % of total aggregate
10	200	40
20	186	35
40	165	30

Table – 5 Adjustment required

Change in condition	Water content	% Sand
(a) For sand zone III & IV	0	- 1.5 % zone III
(b) Increase or decrease in C.F. by 0.1	+ 3.0 %	-
(c) Each 0.05 increase or decrease in w/c ratio©		+ 1.0 %

It is to be considered that amount of entrapped air is 3%. Minimum cement content for moderate condition is 290 kg/m^3 and max^m permissible value of w/c is 0.55 i.e.w/c > 0.55. For max^m density grit – 30 %, kapachi = 70 %. Assume necessary data. Find proportion of water, sand, grit & kapachi for one bag of cement.