

Total No. of Questions—12]

[Total No. of Printed Pages—4+2

[3762]-109

S.E. (Civil) (Second Semester) EXAMINATION, 2010

CONCRETE TECHNOLOGY (Theory)

(2008 COURSE)

Time : Three Hours

Maximum Marks : 100

N.B. :— (i) Answer Q. No. 1 or Q. No. 2; Q. No. 3 or Q. No.4;
Q. No. 5 or Q. No. 6 from Section I and Q. No. 7 or
Q. No. 8; Q. No. 9 or Q. No. 10. Q. No. 11 or Q. No.
12 from Section II.

(ii) Answers to the two Sections should be written in separate
answer-books.

(iii) Neat diagrams must be drawn wherever necessary.

(iv) Figures to the right indicate full marks.

(v) Use of electronic pocket calculator is allowed

(vi) Assume suitable data, if necessary.

SECTION I

1. (a) Write a short note on different types of cement. [6]
- (b) Write a short note on classification of aggregate [6]
- (c) Define admixtures and additives. Explain in brief super
plasticizers [6]

P.T.O.

Or

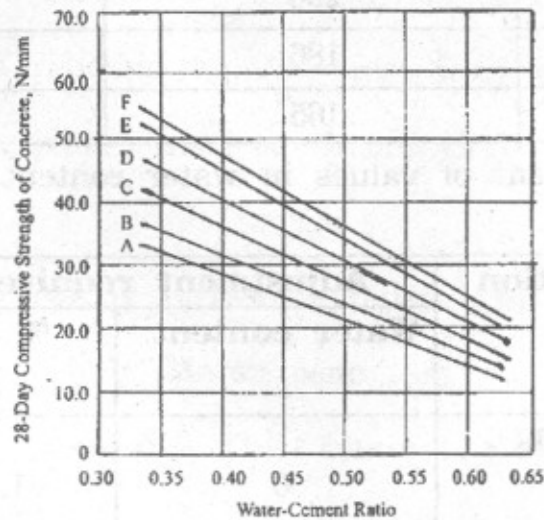
2. (a) Write a short note on heat of hydration. [6]
(b) Explain in brief alkali aggregate reaction. [6]
(c) Write a short note on "Pozzolanic Admixtures." [6]

3. (a) Define workability of concrete. How is the workability measured in laboratory ? Explain any *one* method. [6]
(b) What do you understand by batching ? Explain in brief. [4]
(c) Write a short note on bleeding of concrete. [6]

Or

4. (a) State factors affecting strength of concrete. Describe any *one* in detail. [6]
(b) Write a short note on "Creep of concrete." [5]
(c) Explain briefly relation between tensile and compressive strength of concrete. [5]
5. Design a concrete mix for grade M35 and severe exposure condition using IS Code Method for the following requirement : [16]

- (i) Maximum size of aggregate — 20 mm
- (ii) Degree of workability—Medium (0.9 C.F.)
- (iii) Degree of quality control—Good
- (iv) Cement-OPC 53 grade (Specific gravity = 3.15)
- (v) Aggregates—
 - (a) Coarse aggregate—Crushed stone (specific gravity = 2.7)
 - (b) Fine aggregate—Natural and conforming to zone III (specific gravity = 2.7)
- (vi) Assume standard deviation = 4.0
- (vii) Refer to Fig. No. 1 and tables 1, 2 and 3.



28-Day strength of cement, tested According to IS : 4031—1968

A = 31.9–36.8 N/mm²

D = 46.6–51.5 N/mm²

B = 36.8–41.7 N/mm²

E = 51.5–56.4 N/mm²

C = 41.7–46.6 N/mm²

F = 56.4–61.3 N/mm²

Relation between free Water-Cement Ratio and Concrete Strength for different cement strengths.

Fig. 1.

Table 1 : Minimum Cement content and Maximum W/C ratio for different exposures.

Exposure	Minimum Cement Content kg/cu.m.	Maximum W/C ratio
Mild	300	0.55
Moderate	300	0.5
Severe	320	0.45

Table 2 : Approximate sand and water content per cubic meter of concrete W/C = 0.6, workability = 0.8 C.F.

Maximum Size of Aggregate (mm)	Water content (kg)	Sand as % of total aggregate by absolute volume
10	200	40
20	186	35
40	165	30

Table 3 : Adjustment of values in water content and sand % for other conditions.

Change in condition	Adjustment required in	
	Water content	% Sand in total aggregate
For sand confirming to Zone-I Zone-III and Zone-IV	0	+1.5 for Zone-I -1.5 for Zone-III -3.0 for Zone-IV
Increase or decrease in value of compacting factor by 0.1	±3.0%	0
Each 0.05 increase or decrease in W/C ratio	0	±1.0%

Or

6. (a) What are the factors that affect the choice of mix proportions of concrete ? [5]
- (b) Define the following terms :
- (i) Mean strength
- (ii) Variance
- (iii) Standard deviation
- (iv) Coefficient of variation. [4]
- (c) Explain DOE method of mix design. [7]

Section II

7. (a) Write a short note on analysis of fresh concrete. [6]
- (b) Explain rebound hammer test with its limitations. [4]
- (c) Write a short note on formwork. [6]

Or

8. (a) Explain briefly ultrasonic pulse velocity test. [6]
- (b) Explain briefly Marsh cone test. [4]
- (c) Briefly explain the basic principles of design of formwork. [6]
9. (a) Write a short note on concrete pumps. [6]
- (b) Write a short note on Light weight concrete. [6]
- (c) Write a short note on "Ferro Cement." [6]

Or

10. (a) Explain V-funnel test to be used in assessment of workability of Self Compacting Concrete. [6]
- (b) Write a short note on underwater concreting. [6]
- (c) Explain in detail factors affecting properties of fiber reinforced concrete. [6]
11. (a) What is durability of concrete ? What is its significance ? [8]
- (b) What are the factors contributing cracks in concrete ? [8]

Or

12. (a) Write short notes on :
- (i) Sulphate attack
- (ii) Corrosion of reinforcement. [8]
- (b) Write short notes on :
- (i) Shotcrete
- (ii) Selection of repair procedure. [8]