

4E4112

Roll No.

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B. Tech. IV-Sem. (Main & Back) Exam; April-May 2017

Civil Engineering  
4CE2A Concrete Technology

Time : 3 Hours

Maximum Marks : 80  
Min. Passing Marks : 26

Instructions to Candidates :-

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. IS 10262 2. NIL

rtuonline.com UNIT - I

- 1 (a) What is the size in 'mm', below which the if particle size is, it is termed 'fine aggregate' and more than this size is called 'Coarse aggregate'. 2
- (b) Describe the method of determination of 'specific gravity' of fine aggregate. 8
- (c) Which of the following statements are true :
- (i) In specifying Grade of Concrete, the digits after 'M' refers to compressive strength of concrete at 7 days age.
- (ii) Proportioning of ingredients of concrete with cement only as the cementitious material in the case of a major concrete work involving M25 Grade requires cement approx 400 kg/m<sup>3</sup>.

- (iii) 'Slump test' can be performed at work site.  
(iv) An increase in water/cement ratio results in decrease in compressive strength of concrete.

6

OR

- 1 (a) Select 'True' statements :
- (i) Hydration of cement produces heat in the mass of 'cement and water'.  
(ii) Structure, of hydrated cement remains changing between the age of one day and seven days.  
(iii) C-S-H gel in a hydrated cement paste gets dissolved in water.  
(iv) Flowability measuring tests are 'V funnel' and 'Slump flow'.  
rtuonline.com 6
- (b) Describe the phenomenon of 'bleeding' in concrete and discuss factors affecting it. 4
- (c) Describe 'bulking' of aggregates and method to determine it. 6

UNIT - II

- 2 (a) Select 'correct' statements out of the following :
- (i) Permeability of concrete depends on 'pressure head'.  
(ii) Creep of concrete does not depend upon its 'age'.  
(iii) Shrinkage of concrete depends upon 'relative humidity'.  
(iv) Rebound hammer reading mainly depends on 'hardness' of concrete surface. 6
- (b) Discuss factors affecting compressive strength of concrete. 8
- (c) Discuss the range of values of ultrasonic pulse velocity in concrete and quality of concrete associated with them. 2

OR

- 2 (a) Given below are the failure loads of concrete core samples along with their size and age. The samples were collected from a concrete road.

S.No.	Core size in mm (diameter, height)	Age (in days)	Compressive Failure Load in kN
1	142, 260	120	600
2	142, 245	35	670
3	142, 235	30	478
4	142, 270	140	590
5	142, 225	100	580
6	142, 210	65	495

If the concrete grade of the concrete road is M40, comment on the core sample test results, associated compressive strength and its interpretation.

- (b) Discuss aggregate cement interface and its characteristics. How it may get affected in a concrete containing flyash ? 10
- 6

### UNIT - III

- 2 (a) Name three types of concrete mixers, write about their suitability for different concretes. 6
- (b) Name three types of compaction equipments for concrete and discuss their applications. 3
- (c) Write fine aggregate/coarse aggregate ratio which you shall select for the cases listed below :
- (i) w/c 0.50, slump 100 mm, maximum size of aggregate 20 mm
- (ii) w/c 0.50 slump 50 mm, maximum size of aggregate 10 mm 4

OR

- 3 (a) Discuss various methods of curing concrete and their suitability. 8
- (b) Discuss durability of concrete, factors affecting it particularly effect of water/cement ratio on it. 8

## UNIT - IV

- 4 (a) Discuss role of 'retarders' in concrete and applications areas of concrete requiring use of 'retarders'. 4
- (b) Discuss physical and chemical properties of silica fume. 4
- (c) Discuss various types of superplasticizers, their respective properties and application areas. 6
- (d) What is the use of 'air-entraining' agents in concrete. 2

### OR

- 4 (a) Write typical dosages of accelerators, in concrete. 2
- (b) Design a concrete mix of M25 Grade by IS method with following data : specific gravities of cement, fine aggregate and coarse aggregates as 3.12, 2.90 and 2.60 respectively. Water absorption values for fine and coarse aggregates as 0.80 and 0.50 percentage respectively. Free moisture as nil in both types of aggregates. Slump to be 100 mm. Degree of quality control-good. Exposure condition moderate. Determine and list quantities of ingredients in  $\text{kg/m}^3$  of concrete. 14

## UNIT - V

- 5 (a) Discuss formwork with appropriate figures for : 8
- (1) Columns
- (2) Slabs.
- (b) Describe salient points and applications of under water concreting. 8

### OR

- 5 (a) List three typical performance criteria for a concrete required to be transported approx 2 hours before placement through pump in construction of a public building likely to get water splashes, once in use. 6
- (b) Draw figure of formwork/shuttering for beams, walls and arches. 10