

Printed Pages – 6

Roll No. : .....

**320654(20)**

**B. E. (Sixth Semester) Examination, April-May 2021**

**(New Scheme)**

**(Civil Engg. Branch)**

**CONCRETE TECHNOLOGY**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Part (a) of each question is compulsory.  
Attempt any two parts from (b), (c) and (d)  
of each question.***

**Unit-I**

1. (a) Define specific surface. 2
- (b) Explain the process of hydration of cement with suitable diagram of hydrated product. 7

**320654(20)**

**PTO**

[ 2 ]

- (c) What is the need of grading? Explain your answer with suitable example in tabular form for coarse and fine aggregate both. 7
- (d) Write notes on : 7
- (i) Surface index
  - (ii) Alkali aggregate reaction

### Unit-II

2. (a) Define Workability. 2
- (b) Describe the function of water reducing admixture used in concrete. 7
- (c) What are the factors affecting workability? Explain each point in detail. 7
- (d) Write notes on : 7
- (i) Slump test
  - (ii) Mineral additives and their effect

### Unit-III

3. (a) What are the properties of hardened concrete? 2
- (b) What are the factors affecting compressive strength of concrete? 7

320654(20)

[ 3 ]

- (c) The strength of fully matured concrete was found to be  $45 \text{ N/mm}^2$ . Find the strength of an identical concrete at the age of seven days when cured at an average temperature during day time at  $20^\circ \text{C}$  and night time at  $10^\circ \text{C}$ . 7
- (Take constants  $A = 32, B = 54$ )
- (d) Write short notes on : 7
- (i) Modulus of elasticity of concrete
  - (ii) Creep behaviour in concrete.

### Unit-IV

4. (a) State the principle of concrete mix design. 2
- (b) Write notes on : 7
- (i) Sampling and acceptance criteria of concrete
  - (ii) Difference between destructive and non-destructive testing of concrete
- (c) Differentiate between the ACI, DOE and IS 10262 : 1982 methods for mix design of concrete. 7
- (d) Design a concrete mix to be used in structural elements by IS method for following requirements.

320654(20)

PTO

[ 4 ]

- (i) Characteristics compressive strength = 30 N/mm<sup>2</sup>
- (ii) Maximum size of aggregate = 20 mm
- (iii) Shape of coarse aggregate = angular
- (iv) Degree of workability desired, compacting factor = 0.85
- (v) Degree of quality control = good
- (vi) Type of exposure = moderate

Test data for concrete making material :

Specific gravity of cement = 3.15

Specific gravity of coarse aggregate = 2.72

Specific gravity of fine aggregate = 2.66

Water absorption (air dry to saturated surface dry) in coarse aggregate, percent = 0.5

Surface moisture coarse aggregate = nil

Fine aggregate = 2%

- (vii) Compressive strength of cement at 28 days = 51 N/mm<sup>2</sup>

7

[ 5 ]

Sieve analysis :

IS designation	Cumulative % passing		Sand
	Fraction I	Fraction II	
	10 mm	20 mm	
40 mm	100	100	
25 mm	100	100	
20 mm	100	88	
12.5 mm	100	24	
10 mm	90	12	100
4.75 mm	4	1	92
2.36 mm	3	—	86
1.18 mm	—	—	78
600 micron	—	—	64
300 micron	—	—	16
150 micron	—	—	2
Passing 150 micron	—	—	—

Note : Sand conforming to zone III of IS : 383-1970

## Unit-V

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|--|---|
| 5. (a) What do you mean by no-fines concrete?                      | 2 |
| (b) Explain the need and procedure of vacuum dewatered concreting. | 7 |
| (c) Explain the manufacturing process of light weight concrete.    | 7 |
| (d) Write notes on :   | 7 |
| (i) Shotcreting  |   |
| (ii) Fiber reinforced concrete                                     |   |