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CE 181405

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BINA CHOWDHURY CENTRAL LIBRARY

(GIMT & GIPS)  
Azara, Hatkhowapara  
Guwahati - 781017

2023

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BINA CHOWDHURY CENTRAL LIBRARY

**B.Tech. 4<sup>th</sup> Semester End-Term Examination**

**CONSTRUCTION MATERIALS AND CONCRETE TECHNOLOGY**

**(New Regulation)**

**(w.e.f. 2017-18) & New Syllabus (w.e.f 2018-19)**

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks  
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Answer the following :

(10 × 1 = 10)

(i) The degree of plasticity of fresh concrete is called

- (a) Compaction (b) Consistency  
(c) Workability (d) Setting

(ii) Manufacturing difference of OPC and PPC is

- (a) PPC adds Fly ash and OPC adds Silica Fume  
(b) PPC adds Gypsum and OPC adds Fly ash  
(c) PPC adds Silica Fume and OPC adds Fly ash  
(d) PPC adds Fly ash and OPC adds no Fly ash

(iii) Due to presence of reactive silica, the hydration reaction

- (a) Increases C-S-H gel and Ca (OH)<sub>2</sub>  
(b) Decreases C-S-H gel and Ca (OH)<sub>2</sub>  
(c) Increases C-S-H gel and decreases Ca (OH)<sub>2</sub>  
(d) Decreases C-S-H gel and increases Ca (OH)<sub>2</sub>

[Turn over



- (iv) Which of the following ratio is also known as water-cement ratio?
- (a) Weight of water to the weight of aggregates
  - (b) Density of water to the Density of cement
  - (c) Volume of water to the volume of cement
  - (d) Weight of water to the weight of cement
- (v) For compressive strength test of cement, 600 gm of cement of 32% consistency is taken for preparation of three cubes. The amount of water taken is
- (a) 66 ml
  - (b) 264 ml
  - (c) 176 ml
  - (d) 192 ml
- (vi) Which of the following agent is not affecting the durability of concrete?
- (a) Alkali reactive silica
  - (b) CO and CO<sub>2</sub>
  - (c) Water molecule
  - (d) GGBFS
- (vii) Creep is \_\_\_\_\_ to the strength of concrete.
- (a) Directly proportional
  - (b) Inversely proportional
  - (c) Equal
  - (d) Similar
- (viii) Water proofing admixtures are
- (a) Water fair material
  - (b) Water repellent materials
  - (c) Water absorption material
  - (d) Water adsorption material
- (ix) The transmission loss given in the sound levels measured on either side of the wall is 60 dB and 40 dB is
- (a) 20 dB
  - (b) 60 dB
  - (c) 100 dB
  - (d) 240 dB
- (x) In flakiness index test, the thickness gauze used for 25-20 mm aggregate size range is
- (a) 40.5
  - (b) 22.5
  - (c) 13.5
  - (d) 37.5

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2. (a) Discuss the hydration reaction of the Bogue's Compounds. (5)
- (b) Discuss Los Angeles test of aggregates. (5)
- (c) Describe the methods of preservation of timber. (5)
3. (a) The test results of sieve analysis for 16 mm single sized aggregate of a 3 kg test sample are given below. (5)

Sl.No	IS Sieve No	Wt. Retained (kg)
1	20 mm	0
2	16 mm	0.41
3	10 mm	2.32
4	4.75 mm	0.25

Determine whether the sample is conforming to IS 383-2016.

- (b) How water reducing superplasticizer react with cement and increases workability? (5)
- (c) Discuss the types of modulus of elasticity of concrete. (5)
4. (a) Describe third point loading test of concrete. (7)
- (b) How durability and permeability of concrete are related? Discuss the factors affecting the permeability of concrete and how these increases/decreases the durability of concrete. (1 + 7)
5. (a) Explain with example what is destructive and non-destructive testing of concrete? Under what circumstances non-destructive testing of concrete have to be adopted? (3 + 4)
- (b) Property of fresh concrete is workability and that of hardened concrete are compressive strength and durability. Critically analyse how these three properties are interlinked. (8)
6. The following data are given for a concrete mix design : (15)
- (a) Characteristic compressive strength required at the field after 28 days of curing =  $35\text{N/mm}^2$ .
- (b) Type of aggregate = Maximum nominal size 20mm angular
- (c) Standard deviation to be used = 5.00
- (d) Probability factor (k) = 1.65
- (e) Value of X = 6.5
- (f) Approximate air content = 1%



- (g) Workability required = 200mm of slump
- (h) Exposure condition = Moderate
- (i) Specific gravities of cement, coarse aggregate, fine aggregate and superplasticizer are 3.02, 2.63, 2.58 and 1.18 respectively.
- (j) Grading zone for fine aggregate = Zone II
- (k) Maximum water content per cubic meter of concrete for 20mm aggregate is 186 kg.
- (l) Volume of CA per unit volume of total aggregate, for FA zone II and nominal maximum size of 20mm aggregate is 0.62.
- (m) Minimum cement content from durability consideration = 300 kg
- (n) Maximum cement content = 450 kg
- (o) Method of concrete placement = Pumping

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Determine the actual quantities required for the mix at saturated surface dry (SSD) condition per cubic meter of concrete for W/C ration of 0.45

7. Write short notes (any *three*) :

(3 × 5 = 15)

- (a) Advantages of AAC blocks
- (b) Sulphur impregnated concrete
- (c) Alkali Aggregate reactivity test
- (d) Shrinkage of concrete.
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