



Sanjay Ghodawat University, Kolhapur

2018-19

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EXM/P/09/01

Year and Program: 2018-19

School of Technology

Department of Civil Engineering

S.Y. B.Tech

Course Code: CET206

Course Title: Concrete Technology

Semester – III

Day and Date- Thursday
8th Dec 2018

End Semester Examination
(ESE)

Time: 2.30p. m. To 5.30 p. m.
Max. Marks: 100

Instructions:

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Q.5 is compulsory.

| Q.1 | Solve the following | Marks | Bloom's Level | CO |
|-----|---|-------|----------------|-----|
| a) | Write down Bogue's compound with its formula and abbreviation. Enlist different laboratory test on cement and explain soundness test in detail with neat labeled diagram. | 07 | L ₂ | CO1 |
| | OR | | | |
| a) | Define aggregate. Explain in detail, what are the classifications of aggregate? | 07 | L ₃ | CO1 |
| b) | What are the objectives of compaction of concrete? Explain the different methods of compaction of concrete. | 08 | L ₃ | CO2 |
| | OR | | | |
| b) | What is ad-mixture? Enlist different types of ad-mixtures. And explain any two admixtures in detail. | 08 | L ₃ | CO2 |
| Q.2 | Solve the following | | | |
| a) | What is creep of the concrete? List and explain the factors affecting creep and effect of creep on concrete structure. | 07 | L ₃ | CO3 |
| | OR | | | |
| a) | What are the factors affecting strength of harden concrete? Explain how water/cement ratio and degree of compaction affects strength of concrete. | 07 | L ₃ | CO3 |
| b) | Write a note on Hot Weather Concreting. | 08 | L ₂ | CO5 |
| | OR | | | |
| b) | Write a note on Cold Weather Concreting. | 08 | L ₂ | CO5 |

Q.3 Solve any Two

- | | | | |
|---|----|----------------|-----|
| a) Write a short note on alkali-aggregate reaction, factors affecting alkali-aggregate reaction and controlling methods. | 08 | L ₂ | CO1 |
| b) What are the stages of manufacturing of concrete with flow chart? Explain placing of concrete by tremie method in detail with sketch. | 08 | L ₃ | CO2 |
| c) Explain the relation between modulus of elasticity of concrete and strength of concrete as per IS. And explain types of modulus of elasticity of concrete with neat labeled graph. | 08 | L ₂ | CO3 |
| d) Write a short note on- | 08 | L ₂ | CO5 |
| a. Fiber Reinforced Concrete | | | |
| b. High Density Concrete | | | |

Q.4 Solve any Two

- | | | | |
|--|----|----------------|-----|
| a) What is permeability of concrete? Explain causes of permeability. Explain factors affecting permeability. | 09 | L ₃ | CO4 |
| b) Explain in detail sulphate attack on Concrete and its effect on concrete. And explain methods of controlling sulphate attack. | 09 | L ₃ | CO4 |
| c) Explain Ultrasonic Pulse Velocity method with neat sketch. Enlist factors affecting on this method. | 09 | L ₃ | CO4 |

Q.5

Design a concrete mix for M20 grade of concrete for RCC work as per IS: 10262-2009 for trial I. Use following data:

| | | |
|----|----------------|-----|
| 18 | L ₄ | CO6 |
|----|----------------|-----|

- a. Take Standard Deviation: 4
 - b. Maximum size of aggregate: 20mm
 - c. Water-cement ratio: 0.5
 - d. Type of exposure: Mild
 - e. Targeted slump: 75mm
 - f. Method of placing of concrete: Pumping
 - g. Specific gravity of cement: 3.1
 - h. Zone of F.A.: III
 - i. Specific gravity of FA: 2.6
- CA: 2.65

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

| Sl No. | Nominal Maximum Size of Aggregate mm | Maximum Water Content ¹⁾ kg |
|--------|---|---|
| (1) | (2) | (3) |
| i) | 10 | 208 |
| ii) | 20 | 186 |
| iii) | 40 | 165 |

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate
(Clauses 4.4, A-7 and B-7)

| Sl No. | Nominal Maximum Size of Aggregate mm | Volume of Coarse Aggregate ¹⁾ per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate | | | |
|--------|---|---|----------|---------|--------|
| | | Zone IV | Zone III | Zone II | Zone I |
| (1) | (2) | (3) | (4) | (5) | (6) |
| i) | 10 | 0.50 | 0.48 | 0.46 | 0.44 |
| ii) | 20 | 0.66 | 0.64 | 0.62 | 0.60 |
| iii) | 40 | 0.75 | 0.73 | 0.71 | 0.69 |

Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

| Sl No. | Exposure | Plain Concrete | | | Reinforced Concrete | | |
|--------|-------------|---|---------------------------------|---------------------------|---|---------------------------------|---------------------------|
| | | Minimum Cement Content kg/m ³ | Maximum Free Water-Cement Ratio | Minimum Grade of Concrete | Minimum Cement Content kg/m ³ | Maximum Free Water-Cement Ratio | Minimum Grade of Concrete |
| 1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| i) | Mild | 220 | 0.60 | - | 300 | 0.55 | M 20 |
| iii) | Moderate | 240 | 0.60 | M 15 | 300 | 0.50 | M 25 |
| iii) | Severe | 250 | 0.50 | M 20 | 320 | 0.45 | M 30 |
| iv) | Very severe | 260 | 0.45 | M 20 | 340 | 0.45 | M 35 |
| v) | Extreme | 280 | 0.40 | M 25 | 360 | 0.40 | M 40 |

Q.6 Solve any Three

- | | | | | |
|----|--|----|----------------|-----|
| a) | What are the levels of environment to which concrete is exposed? And write different Exposure Conditions as per IS 456-2000. | 06 | L ₂ | CO4 |
| b) | Explain effect of water/cement ratio on durability of concrete. | 06 | L ₂ | CO4 |
| c) | Define mix design of concrete. What are the objectives of mix design? | 06 | L ₂ | CO6 |
| d) | Enlist different methods of mix design of concrete. What are the variables in mix design? What are the factors affecting mix design. | 06 | L ₃ | CO6 |
