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Question Paper Code : 40304

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Fourth Semester

Civil Engineering

CE 8404 — CONCRETE TECHNOLOGY

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is “Bouge’s compounds”?
2. Mention the test adopted to test the quality of water.
3. Differentiate between accelerators and retarders.
4. Mention the properties that could be improved by the addition of admixtures to concrete.
5. What are the factors affecting the choice of mix proportions?
6. Give the use of concrete mix design and its importance.
7. Write on bleeding and segregation of concrete.
8. Write the significance of durability in concrete.
9. Define Light weight concrete.
10. Define Ferro cement.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Define hydration of cement and also draw the graph for heat of hydration of cement. (5)
- (ii) What are the two methods of manufacture of cement? Write the difference between them. (8)

Or

- (b) Explain in detail about the test conducted to determine :
(i) Impact test (5)
(ii) Soundness test (5)
(iii) Shape test. (3)
12. (a) Define admixture. What are the types of mineral admixtures? (13)
Or
(b) Write a note on :
(i) Fly Ash (5)
(ii) Silica fume (3)
(iii) Ground Granulated Blast Furnace Slag. (5)
13. (a) Describe in detail about the procedure for BIS method of mix design. (13)
Or
(b) (i) What are the factors to be considered for mix design? (6)
(ii) What are the requirements of concrete mix design? (5)
(iii) What are the types of mixes? (2)
14. (a) Define Workability. What are the factors affecting concrete workability? (13)
Or
(b) (i) Define durability of concrete. (2)
(ii) What do you mean by Significance of durability? (4)
(iii) What are the Role of water-cement ratio? (7)
15. (a) What are the types of concrete? Explain any three types of concrete. (13)
Or
(b) (i) Define shotcrete and its types. (6)
(ii) Write any three tests conducted for self-compacting concrete. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Design a concrete mix by BIS method with the following data :
(i) Grade designation : M35
(ii) Type of cement : OPC 53 Grade
(iii) Maximum nominal size of aggregate : 20mm
(iv) Minimum cement content : 340 kg/m³
(v) Maximum water-cement ratio : 0.45

- (vi) Workability : 100–120mm slump
- (vii) Exposure condition : Moderate (For Reinforced Concrete)
- (viii) Method of concrete placing : Pumping
- (ix) Degree of supervision : Good
- (x) Type of aggregate : Crushed Angular Aggregates
- (xi) Maximum cement content : 390 kg/m³
- (xii) Chemical admixture type: Super Plasticizer ECMAS HP 890

Specific gravity of :

- (1) Coarse aggregate 20mm : 2.67,
- (2) Fine aggregate: 2.65
- (3) GGBS : 2.84

Assume any other data if necessary. Also calculate the quantity of cement, fine aggregate, coarse aggregate, water, GGBS and chemical admixture required per cubic meter of concrete. (15)

Or

- (b) Write critical notes on the preparation, use and suitability of following three special concretes.
 - (i) Polymer concrete (5)
 - (ii) High Performance concrete (5)
 - (iii) Geopolymer concrete (5)
