

Reg. No. :

Question Paper Code : 50339

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fourth Semester

Civil Engineering

CE 8404 — CONCRETE TECHNOLOGY

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

(Use relevant Tables and Charts of IS : 10262-2019)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define fineness modulus? Give the practical range of fineness modulus for fine aggregate.
2. Describe the role played by gypsum in the hydration reaction of cement.
3. Why chloride based accelerators are not used in pre-stressed concrete and reinforced concrete structures?
4. How does a surface active agent increase workability?
5. What is meant by a design mix of concrete?
6. What tests are necessary to check the adoptability of a particular mix proportion for field use?
7. What is meant by bleeding in concrete?
8. Why do the age factor not taken advantage in IS: 456-2000?
9. List out the advantages of SCC.
10. How geo polymer concrete is more advantage than cement concrete in construction industry?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail the type of cement recommended and its properties in
- (i) Mass concreting works
 - (ii) Under-water construction
 - (iii) Marshy land
 - (iv) Cold weather concreting. (4+3+3+3)
- Or
- (b) (i) Classify the common aggregates used in concrete with examples. (7)
- (ii) Write the importance of the quality of water used for concreting. (6)
12. (a) Explain in detail the various mineral admixtures used in concrete. (13)
- Or
- (b) Explain in detail the different types of chemical admixtures added in concrete. (13)
13. (a) Design a concrete mix for M20 grade of concrete using IS method with the following details: (13)
- (i) Type of cement: OPC 43 Grade
 - (ii) Maximum size of aggregate: 20mm
 - (iii) Degree of Exposure: Mild
 - (iv) Workability: 100mm slump
 - (v) Minimum cement content: 300kg/m³
 - (vi) Maximum free water-cement ratio : 0.55
 - (vii) Method of placing concrete : Normal
 - (viii) Shape of Coarse aggregate: Crushed angular aggregates
 - (ix) Degree of quality control: Good
 - (x) Specific Gravity of cement: 3.10
 - (xi) Specific Gravity of FA & CA: 2.65, 2.7 respectively
 - (xii) Free surface moisture: Nil for CA & FA.
 - (xiii) Grading of fine aggregate is falling in zone II.

Or

- (b) Design a concrete mix for M30 grade of concrete using Class F type fly ash by IS method with the following details: (13)
- (i) Type of cement: OPC 43 Grade
 - (ii) Maximum size of aggregate: 20mm
 - (iii) Degree of Exposure: Severe
 - (iv) Workability: 125mm slump
 - (v) Minimum cement content: 320kg/m³
 - (vi) Maximum free water-cement ratio : 0.45
 - (vii) Method of placing concrete : Pumping
 - (viii) Shape of Coarse aggregate: Crushed angular aggregates
 - (ix) Degree of quality control: Good
 - (x) Specific Gravity of cement: 3.10
 - (xi) Specific Gravity of fly ash : 2.20
 - (xii) Specific Gravity of FA & CA: 2.65, 2.7 respectively
 - (xiii) Free surface moisture: Nil for CA & FA.
 - (xiv) Super plasticizer will be used.
 - (xv) Grading of fine aggregate is falling in zone II.

14. (a) Explain in detail the factors affecting the workability of concrete. (13)

Or

- (b) Explain in detail the factors influencing the strength of concrete. (13)

15. (a) Write a short note on :

- (i) Foam concrete (6)
- (ii) Fiber reinforced concrete. (7)

Or

- (b) Write a short note on :

- (i) Ferro cement (6)
- (ii) Geo polymer concrete. (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain how will you account for the moisture present in sand and coarse aggregate while mix proportioning of concrete. (8)
- (ii) How do you check the homogeneity of concrete during workability tests? (7)

Or

- (b) (i) How do you check the workability of concrete in pavement construction? (7)
- (ii) Explain in detail the effect of water cement ratio on durability of concrete. (8)