

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-VI Semester (CE)

COURSE CODE(CREDITS): 18B11CE611 (3)

MAX. MARKS: 35

COURSE NAME: CONCRETE TECHNOLOGY

COURSE INSTRUCTORS: Dr. Tanmay Gupta

MAX. TIME: 2 Hours

---

*Note: All questions are compulsory. Marks are indicated against each question in square brackets. Use of IS 10262-2019 is allowed.*

---

Q.1 Discuss about the maturity concept of concrete, if the strength of sample of fully matured concrete is found to be 50Mpa. Find the strength of identical concrete at the age of 7 days when cured at an average temperature during day-time at 30<sup>0</sup>C and night-time at 5<sup>0</sup>C (Plowman's coefficient A = 32, B = 54). [3][CO2]

Q.2 State merits and application of sulphur infiltrated concrete. [2][CO5]

Q.3 Explain permeability and the factors affecting the same. [3][CO4]

Q.4 Discuss in detail the constituents, properties and uses of self-compacting concrete. [4][CO5]

Q.5 Elaborate upon the different types of fibers used in concrete. What are its advantages? [3][CO5]

Q.6 Design a concrete mix of M20 concrete mix as per IS 10262:2019, with the following stipulations:

- i. Type of cement: OPC 43
- ii. Maximum nominal size of aggregate: 20mm
- iii. Minimum cement content: 320 kg/m<sup>2</sup>
- iv. Maximum water cement ratio: 0.55
- v. Workability: 75 mm slump
- vi. Exposure condition: Mild
- vii. Degree of supervision: Good
- viii. Type of aggregate: Crushed angular aggregate
- ix. Maximum cement content: 450 kg/ m<sup>2</sup>
- x. Chemical admixture: Not recommended
- xi. Specific gravity of cement: 3.15
- xii. Specific gravity of coarse aggregate: 2.68
- xiii. Specific gravity of fine aggregate: 2.65

- xiv. Water absorption coarse aggregate: 0.6%
- xv. Water absorption fine aggregate: 1.0%
- xvi. Free surface moisture : Nil for both aggregates
- xvii. Fine aggregate confirming to Zone I of IS 383
- xviii. Coarse aggregate confirming to table 2 of IS 383 [10][CO4]

Q.7 Calculate the gel/space ratio and the theoretical strength of a sample of concrete made with 600 gm. of cement with 0.45 water/cement ratio, on full hydration and at 80 per cent hydration. [2][CO2]

Q.8 Write a brief note on following:

- i. Gel water and bound water
- ii. High Alumina Cement
- iii. Procedure for finding out normal consistency of cement [6][CO1]

Q.9 Explain aggregate crushing value test and aggregate impact value test in detail. [2][CO3]

---