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Total No. of Questions: 09

Total No. of Pages: 02

B. Tech (CE) (Sem. 4)
DESIGN OF CONCRETE STRUCTURE-1
Subject Code: BTCE-403
Paper ID: A1173

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. Section A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. Section B contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. Section C contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

SECTION A

1.
 - a) What is difference between under reinforced and over reinforced section?
 - b) What is the maximum percentage of steel for a singly reinforced section.
 - c) What do you understand by diagonal tension? In what way shear stress and diagonal tension are related to each other?
 - d) What is the necessity of splicing the bars?
 - e) Differentiate between one-way slab and two-way slab.
 - f) What is soundness of aggregates?
 - g) Define fineness modulus.
 - h) What is Abram's law?
 - i) Define bond and anchorage.
 - j) What is neutral axis? Explain.

SECTION B

2. Write down various types of cement with their chemical composition. Also discuss their hydration and setting process.
3.
 - (a) Explain the process of finding specific gravity and water absorption of aggregates.
 - (b) Explain how the grading of fine and coarse aggregates is done.
4. Define workability of concrete and explain the various factors affecting the workability of concrete.

5. Determine the moment of resistance of a T beam with flange width 1000mm, web thickness 300mm, slab thickness 100 mm, effective depth 350 mm, and area of tension steel 2945 mm^2 . Assume M20 concrete and Fe 415 steel.
6. A beam has an effective depth of 40 cm. At a particular section, it has 8 mm diameter 2 legged stirrups provided at 20 cm centre to centre. Calculate the shear resistance of the stirrups. Use M20 concrete and Fe 415 steel.

SECTION C

7. Design a doubly reinforced concrete beam, supporting a U.D.L. (superimposed) of 40 kN/m over a clear span of 6 m. The beam carries two concentrated loads of 20 kN each at a distance of 2 m from the face of support. The overall depth and width of the beam are restricted to 90 cm and 40 cm respectively. Use M20 concrete and Fe 415 steel.
8. Discuss in detail the steps involved in the mix design of concrete based on BIS method.
9. Design the RC floor slab for a room of internal dimensions of 4 m x 9.5 m. Assume the slab to be simply supported on 230 mm thick masonry walls. The slab is to support live load of 4 kN/m^2 and surface finish of 1 kN/m^2 . Use M 20 and Fe 415 grade of concrete and steel respectively. Draw reinforcement details.