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Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 33125 Roll No.

B. Tech Examination 2021-22

(Even Semester)

DESIGN OF CONCRETE STRUCTURES-II

Time : Three Hours] *[Maximum Marks : 60*

Note :– (i) Attempt all questions.

(ii) Use of IS 456-, IS 1343, and design charts of SP 16 is permitted

(iii) Assume any missing data suitably.

SECTION–A

1. Attempt all parts of the following: $1 \times 8 = 8$

(a) Differentiate between one way slab and two-way slab.

(b) List out the various types of loss of prestress in pre tensioned members.

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(c) Explain the terms characteristic strength and characteristic load.

(d) Distinguish between web shear cracks and flexural shear cracks.

(e) Explain the term busting tension with reference to post tensioned prestressed members.

(f) What are the applications of prestressed concrete ?

(g) What is the necessity of using high strength concrete and high tensile steel in prestressed concrete?

(h) Distinguish between balanced, over-reinforced and under-reinforced sections in limit state design, which of these should be recommended in design.

SECTION – B

2. Attempt any two parts of the following: $2 \times 6 = 12$

(a) Explain the principle of prestressing.

(b) What is a combined footing? What are the different types of combined footings? Explain the situations in which each type of combined footings is used.

(c) Design an isolated footing for a circular column of diameter 400 mm carrying a service load of 1240 kN. SBC of soil = 200 kN/m2. Use M20 concrete and Fe 415 grade steel.

(d) Draw the cross section of water tank showing reinforcement details.

SECTION – C

3. Attempt any two parts of the following: $5 \times 2 = 10$

(a) Under what circumstances the counterfort retaining wall is preferred? Briefly give the design procedure of a counterfort retaining wall. Also sketch the reinforcement detail.

(b) A circular slab is 5m inside diameter and is fixed at the edges. It is loaded with a live load of 3 kN/m2. Design the reinforcement for the slab and sketch the details. Assume M20 concrete and Fe 415 steel.

(c) Explain the design procedure for spherical dome.

4. Attempt any two parts of the following: $5 \times 2 = 10$

(a) Explain the different types of retaining wall. Discuss the design procedure in detail of a counterfort retaining wall. Also sketch the reinforcement detail.

(b) A cantilever retaining wall is designed to retain earth for a height of 4m. Assume good soil for foundation is at a depth of 1m below the ground level. The safe bearing capacity of soil is 180 kN/ m2 and unit weight of soil is 16.5 kN/m3. Coefficient of friction between soil and concrete is 0.5 and angle of shearing resistance of 30o. Proportion the retaining wall and check for stability. Also design and detail the stem slab and toe slab of the retaining wall.

(c) Design and detail an isolated footing for a square column 400 mm × 400mm carrying a load of 2100kN. The SBC of the soil is 280 kN/m2. Use M20 concrete and Fe 415 grade steel.

5. Attempt any

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(c)

6. A

5. Attempt any two parts of the following: $5 \times 2 = 10$

(a) Design and detail a circular tank with fixed base for a capacity of 6 lakh liters. The depth of water is to be 5m including freeboard of 250mm. The tank is supported on ground. Design using M20 concrete and 415 grade steels.

(b) Briefly explain the use design of ring beam in dome structure.

(c) A circular slab is 6 m diameter and is simply supported at the edges. It is loaded with a live load of 4 kN/m2. Design the reinforcement for the slab and sketch the details. Assume M 20 concrete and Fe 415 steel.

6. Attempt any two parts of the following: $5 \times 2 = 10$

(a) Differentiate between pre-tensioning and post-tensioning.

(b) Determine the extreme fiber stresses developed at the mid span section of a simply supported prestressed concrete beam of rectangular section 250 mm $\times$ 600 mm prestressed using high tensile steel of cross-sectional area 1000