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FIFTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2014

CE/PTCE 09 502—STRUCTURAL DESIGN—I

Time : Three Hours

Maximum : 70 Marks

Part A

*Answer **all** questions.*
Each question carries 2 marks.

1. Define "limit state" and mention its types.

2. Explain the term characteristic value.

3. Define "Modular ratio".

4. Define the terms "treat and rise".

5. Differentiate short and long columns.

(5 × 2 = 10 marks)

Part B

*Answer any **four** questions.*
Each question carries 5 marks.

1. Name different types (works) used in RCC construction and explain their grades.

2. Draw types of staircase generally designed.

3. Differentiate one-way and two-way slabs.

4. Write short notes on development length.

5. Explain with neat sketches, various types of support condition for slabs.

6. Draw types of lateral ties used in columns generally.

(4 × 5 = 20 marks)

Part C

*Answer **all** questions.*
Each question carries 10 marks.

1. Write a brief notes on loads, types and their combinations as per code recommendations.

Or

2. (a) Compare WSM and LSM of design.

   (b) Explain the basic properties of RCC structures.

Turn over

3. (a) Draw stress-strain curves for steel and concrete and explain its salient features.

   (b) List out the assumptions in the design of members for flexure for limit state of collapse.

Or

4. Calculate the moment of resistance of a singly reinforced simply supported RC beam 250 mm. wide and 400 mm deep effective is reinforced with 3 members of 20 mm. Fe415 steel and M15 concrete is used.

5. A T-beam which is cast monolithically with 150 mm. thick slab, has a flange width of 1800 mm., rib width of 300 mm. and rid depth of 350 mm. The section is reinforced with 4 nos. of 20 mm. bars in single row at a clear cover of 25 mm. Determine the position of N.A. and moment of resistance of the section.

Or

6. A two span continuous rectangular beam ABC resting on three columns spaced at 6 m. centres, carries a imposed load of 20 kN/m. Design the beam using M15 concrete and Fe 415.

7. A lintel is to be designed for an opening 1.2 m. wide. The height of the opening is 2.0 m. and the roof is 3.5 m. above the floor. Taking the weight of masonry as 19 kN/m^3 and the thickness of wall as 230 mm., design the lintel using M15 and Fe415 materials. Sketch the longitudinal section and cross-section.

Or

8. A RC column 3.3 m. effective length and 400 mm. dia. is reinforced with 8 bars 20 mm. dia. Fe 250 steel. Find the safe load the column can carry if it is wound by spiral reinforcement with 8 mm. mild-steel bar around the compression reinforcement at a pitch of 50 mm. Clear cover for main bar is 40 mm. Use M15 concrete.

(4 × 10 = 40 marks)