

Roll No.

23423

**M. Tech 2nd Sem. (Civil Engg.)
(Specialisation in Structural Design)
Examination – May, 2018**

DESIGN OF STRUCTURES - II

Paper : MTSD-203

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : All question carry equal marks. Attempt any *five* questions.

1. (1) How do you calculate the lever arm for a deep beam ? $5 \times 4 = 20$
 - (2) Contrast between ordinary-moment shear walls and ductile-moment shear walls.
 - (3) What are the functions of design codes ?
 - (4) What are the factors influences the bond response of bars at the beam column joint ?
 - (5) Briefly explain about corbel with a neat sketch.

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2. (a) Estimate the crack width and deflection of reinforced concrete beams 10
- (b) Discuss and distinguish ordinary-moment shear walls and ductile moment shear walls. 10
3. Analyze and construct a simply supported deep beam with width = 250mm, overall depth (D) = 3500mm, width of supports = 500mm, clear span = 5m. Live load on the beam = 150kN/m at service state. Adopt M25 grade concrete and Fe415 steel. 20
4. Estimate the reinforcement and design the exterior panel of a flat slab in a hotel carrying a superimposed live load of 3kN/m². Weight of floor finishes on the slab may be taken as 2kN/m². The panel is supported on 300 mm diameter circular column. Drops may be provided. The size of panel is 5m x 7m. Adopt M20 concrete and Fe415 steel. 20
5. Design a rectangular underground water tank on the ground having size 10m x 4 m x 5 m. Use M30 concrete and Fe 415 steel. Density of soil = 16kN/m³, angle of repose = 30°. 20
6. (a) Explain briefly IS guidelines about design of dog legged stairs. 10
- (b) What are the various thumb rules for proportioning of a staircase? 10
7. A simply supported reinforced concrete beam of rectangular section 250mm wide by 450mm overall depth is used over an effective span of 4m. The beam is reinforced with 3 nos. 20mm dia Fe415 at an effective depth of 400mm. Two hanger bars of 10mm dia are provided. The self weight together with dead load on the beam is 4kN/m and service live load is 10 kN/m. Using M20 grade concrete and Fe415 grade steel. Compute (a) Short term deflection (b) Long term deflection (c) Maximum crack width at tension face directly under bar. 20
8. A plain concrete wall of 4 m high, 6 m long and 200 mm thick is restrained against rotation at its base and unrestrained at the ends. Examine the load the wall can carry. Assume $f_{ck} = 25 \text{ N/mm}^2$, $f_y = 500 \text{ N/mm}^2$. Design the wall if it has to carry a factored load of 600kN/m 20