This question paper contains 2 printed pages.

3327 Your Roll No. .....

B. Tech. (C) / IV **J**

Paper— ADVANCED STRUCTURAL DESIGN

(ECE–404)

Time : 3 hours *Maximum Marks* : 70

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt four questions. Draw neat sketches.

Use of IS: 456, 875, 3370 and SP16 is permitted. Any missing data may be suitably assumed.

1. Determine the yield line pattern and collapse load of a two way slab of clamped edges along four sides. Assume $M_{px}=M_{nx}=50$ kNm/m and $M_{py}=M_{ny}=70$ kNm/m while $L_x=8$ m and $L_y=6$ m. 17½

2. Design a 6 m×6 m size interior panel of a flat slab floor with drop panels over column capitals. Imposed load on floor and dead weight of flooring may be taken as 5 kN/m^2 and 1·2 kN/m^2 respectively. Adopt M-20 grade of concrete and Fe 415 steel. 17½

3. Design a circular water tank for 400 kilolitre capacity resting on ground. Assume a freeboard of 30 cm and monolithic cast joint (rigid) between tank wall and

P. T. O.

floor. Draw reinforcement detail for the tank wall and floor. Use M-25 grade of concrete and Fe 415 steel.

17 1/2

4. A circular slab is 5 m in effective diameter and is partially fixed at the edges. If is loaded with a live load of 5 kN/m^2. Using rectangular mesh as main reinforcement at the centre and suitable type of steel at the edges, design and detail the reinforcement for the slab. Use M-25 concrete and Fe 415 steel. 17 1/2

5. Design the rear counterfort of a counterfort retaining wall of total height 7·5 m, used to retain granular material of 6·2 m height. Also design and detail curtailment of reinforcement in the counterfort. Top of embankment is horizantal. Weight of earth is 18 kN/m^3 and angle of repose is 30°. Thickness of heel slab is 400 mm and C/c spacing between counterforts may be taken as 3·25 m. Use M-20 grade concrete and mild steel. Sketch the reinforcement details also. 17 1/2

6. An intze tank is of inside diameter 12 m. Height of cylindrical portion is 8 m and depth of conical dome is 2 m. Diameter of supporting tower is 8 m. Design and detail conical done of the tank. Load coming from the top dome, top ring beam, tank wall and bottom ring beam is 93·55 kN/m. Use M-20 grade concrete and Fe 415 steel as material of construction. 17 1/2