

Dec 13 (KUP)

Roll No. .... Total Pages : 04

BT-7/D-13 8743

DESIGN OF CONCRETE STRUCTURE-II

CE-401-E

Time : Four Hours] [Maximum Marks : 100

Note : Attempt Five questions in all, selecting one question from each Unit. All questions carry equal marks. Use IS 456 : 2000 and IS 1343 1980 is allowed. Assume any data suitably, if missing and state clearly.

Unit I

1. A semicircular beam with radius of 3.5 m and is supported continuously on five supports. The beam carries a dead load of 15 kN/m and live load of 25 kN/m. Determine B.M., T.M. and S.F. at the salient points. Plot B.M., T.M. and S.F. diagram for one span. Use M25 concrete and Fe415 steel.

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P.T.O.

6. (a) Using Janssen's theory, derive an expression for horizontal pressure at any depth 'h' below the top in a silo. Also derive an expression for total vertical load of the grain transferred to the walls.  
(b) Discuss the procedure for designing the hoppers of rectangular bin.

Unit IV

7. ARC frame consists of beams having spans 6 m c/c. A typical floor inner beam carries a negative bending moment of 450 kNm and shear force of 325 kN at the face of the beam column joint due to gravity and earthquake loads. Design the beam section for ductility.
8. A rectangular slab 6 m long x 3 m wide is simply supported on 3 sides and free on 4th longer side. Calculate the collapse load if the moment capacities are same in both the directions.

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2. Compute the draw the location of pressure line for a rectangular beam 250 mm wide and 300 mm deep that is pre-stressed with a force of 500 kN at a constant eccentricity of 75 mm. The beam carries a concentrated load of 50 kN at the middle span. The beam has a span of 4 m. Neglect dead weight of the beam.

### Unit II

3. Design a two flight staircase with steps on waist slab for floor to floor height of 3.5 m, width of flight equal to 1.25 m and superimposed load of 3 kN/m<sup>2</sup> for the following support condition :  
Simply supported of the ends of landing slab which span in the direction of flight.

Consider weight of surface finish of 0.5 kN/m<sup>2</sup> and concrete of grade M 25 and steel of Fe 415 grade.

4. Design a raft foundation for the layout as shown in figure 1. Net bearing capacity of the soil is 65 kN/m<sup>2</sup> and column size is 300 mm × 300 mm.

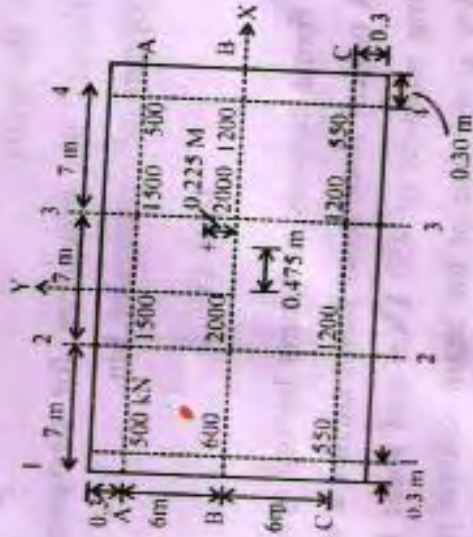


Figure 1  
Unit III

5. Design a circular tank 13.75 m diameter and 3 m height of wall. Free board is 0.30 m. The tank rests on a firm ground. The walls are fixed at the base and free at top. Use M25 grade of concrete and Fe415 rebars.