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Total Pages : 03

BT-7/D-18

37044

DESIGN OF CONCRETE STRUCTURES-II

CE-401-E

Time : Four Hours]

[Maximum Marks : 100

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks. Any missing data may be assumed suitably. Use of IS:456 and IS:1343:1980 is allowed. Use M 20 concrete and Fe 415 steel if not specified in question.

Unit I

1. (a) What are the various losses in prestressing ? 10  
(b) Explain the Magnel's method of design of END Block. 10
2. A continuous beam has three spans each of 6 m. The characteristic dead load is 8 kN/m and the characteristic live load is 12 kN/m. Design the critical sections of the beam and sketch the reinforcement details. Use M 20 grade concrete and Fe 415 HYSD bars. 20

(2-64/13)L-37044

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Unit II

3. Design an interior panel 5 m × 6 m of flat slab in a hotel carrying a live load of 3 kN/m<sup>2</sup>. The weight of the finishes on the slab may be taken as 2 kN/m<sup>2</sup>. It is supported on columns of size 400 mm × 400 mm. Drops may provided. Use M 20 concrete and Fe 415 steel. Provide two-way reinforcement. 20
4. Design a rectangular combined footing for two columns 400 mm × 400 mm and 550 mm × 550 mm carrying axial loads 1000 kN and 1200 kN, respectively. The columns are located 4 m apart. The safe bearing capacity of soil is 200 kN/m<sup>2</sup>. 20

Unit III

5. Design a bunker with hopper bottom to store wheat for a capacity of 300 kN. Weight of the wheat is 8000 N/m<sup>3</sup>. The stored wheat is to be surcharged at angle of repose of 30°. Use M 20 concrete and Fe 415 steel. 20
6. Design a circular water tank of capacity 200 KL. The depth of the tank is limited to 3m from inside. Keep the joint between the wall and base slab as flexible. The base slab rests on the ground. 20

L-37044

2

### Unit IV

7. (a) What are the basic assumptions of yield line theory ?

5

- (b) A rectangular slab of size  $3.5\text{m} \times 4.5\text{m}$  is simply supported all around and is reinforced with 8 mm dia. bars @ 150 mm c/c in short span and 8 mm dia. bars @ 200 mm c/c in long direction. Use yield line theory to determine the safer service Live load the slab can carry. Use M 20 concrete and Fe 415 steel. Take overall depth of slab as 125 mm. The dead load of floor finishes may be assumed as  $1.5 \text{ kN/m}^2$ .

15

8. Compute moments, shear forces and axial forces in the members of a two storeyed rigid building frame using portal method :

20

