

Roll No. .... 24378

24378

**B. Tech. (Civil) 6th Semester  
Examination – May, 2015**

**DESIGN OF CONCRETE STRUCTURES - II**

Paper : CE-302-F

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 :**
- (i) Question No. 1 is compulsory.
  - (ii) Each question carries equal mark (20 marks).
  - (iii) Students have to attempt 5 questions in total at least *one* question from each Section.
  - (iv) Use of IS 456 - 2000 & IS; 1343 is allowed.
  - (v) Assume suitable data if missing.

1. Write short note on the following :  $8 \times 2.5 = 20$

- (i) Shear force and bending moment at any point for symmetrically supported semi circular beam.
- (ii) Drop of flat slab.

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- (iii) Pile and pile cap.
- (iv) Battery of Bunkers.
- (v) Pre tensioning system
- (vi) Substitute frame.
- (vii) Characteristics features for yield lines.
- (viii) Guyon's method.

### SECTION – A

2. Design RC rectangular four span continuous beam with each span = 5m, carrying a slab 125mm thick over it (slab cast monolithically). The live load over the slab may be taken as  $2500 \text{ N/m}^2$  and finishes as  $1500 \text{ N/m}^2$ . The width of slab which transfers the load to beam may be taken as 4m. Use M 20 concrete and Fe 415 steel. 20

OR

A semi circular beam is simply supported on three equally spaced columns. Show that the maximum bending moment and the twisting moment are equal to  $0.429 wR^2$  and  $0.1045 wR^2$  respectively.

3. Design the interior panel of a flat slab  $6 \times 8 \text{ m}$  in size, for a super imposed load of  $9.75 \text{ KN/m}^2$ . Provide two way reinforcements. Use M20 concrete. 20

OR

Design the stair for a public building, supported on wall on one side and stringer beam on the other side. The horizontal span of stair is 1.4m. The risers are 130mm and tread are 250mm. Use M15 mix.

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### SECTION - B

4. Design Trapezoidal footing for two columns A and B, Carrying loads of 800 and 900 kN resp. Column A is 300mm  $\times$  300mm in size and column B is 400  $\times$  400mm in size. The centre to centre spacing of the column is 4m. The safe bearing capacity of soil is 200 kN/m<sup>2</sup>. Use M 20 mix.  $\sigma_{st}$  140N/mm<sup>2</sup>. 20
5. Design an underground rectangular tank 5m  $\times$  7m  $\times$  3m deep. The subsoil consists of dune sand having unit weight of 18000 N/m<sup>3</sup> and angle of friction of 38°. The subsoil water level is at a great depth. Use M20 concrete and Fe 415 steel. 20

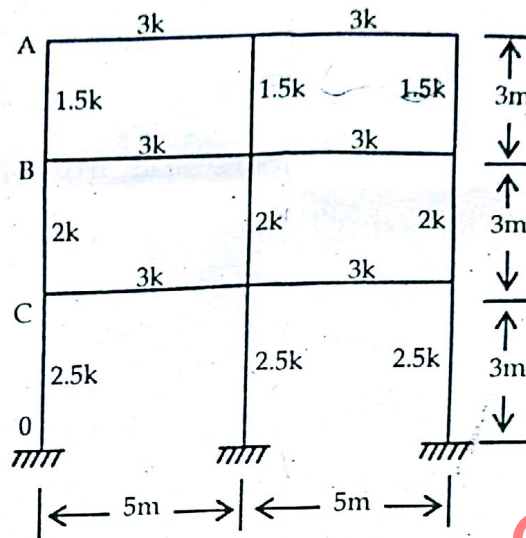
### SECTION - C

6. (a) A pretensioned prestress concrete beam of 9m span has a cross section of 300mm  $\times$  500mm, is prestressed with 195 kN force at transfer. The cable has cross sectional area of 1800 mm<sup>2</sup> of steel, and has a parabolic profile with a maximum eccentricity of 1800mm at the mid span. Determine the loss of prestress, given that  $E_s = 2.1 \times 10^5$  N/mm<sup>2</sup> and  $E_c = 3 \times 10^4$  N/mm<sup>2</sup>. 15
- (b) Explain Mangal's method. 5

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7. If wind load of 15 kN and 30 kN are acting at Joint A, B and C respectively, analyze the frame by Cantilever method. Assume that all column has equal area of cross section. 20



### SECTION - D

8. (a) A rectangular slab  $5 \times 6$  m in size, simply supported at the edges. The slab is expected to carry a service load of  $7 \text{ kN/m}^2$  and a floor finishing load of  $3 \text{ kN/m}^2$ . Use M 20 concrete and Fe 415 steel. Design the slab if
- it is isotropically r/f
  - if is orthoisotropically r/f with  $\mu = 0.85$ . 15
- (b) Analyze the isotropically reinforced square slab by virtual work method. 5
9. (a) A square slab of side length 7m is simply supported at the ends and carries a service load of  $8 \text{ kN/m}^2$ . Design the slab Use m 20 concrete and Fe 250. 15
- (b) Draw and explain yield line pattern for one way slabs. 5