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123 A

Roll No.

24378

**B. Tech. 6th Semester (Civil)
Examination – May, 2016**

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

24378-9550-(P-7)(Q-9)(16)

P. T. O.

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

- (i) Shear force and bending moment at any point for symmetrically supported circular beam.
- (ii) Components of flat slab.
- (iii) Strap and raft footing.
- (iv) Bunkers and silos.
- (v) Post tensioning system.
- (vi) Substitute frame.
- (vii) Characteristics features for yield lines.
- (viii) Mangel's method.

SECTION - A

2. Design RC rectangular four span continuous beam with each span = 6m, carrying a slab 130mm thick over it (slab not cast monolithically). The live load over the slab may be taken as 3500 N/m^2 and finishes

24378. -(P-7)(Q-9)(16) (2)

as 2000 N/m^2 . The width of slab which transfers the load to beam may be taken as 3.5 m. 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. 20

3. Design the interior panel of a flat slab $6 \times 7 \text{ m}$ in size, for a super imposed load of 7.75 KN/m^2 . Provide two way reinforcements. Use M 25 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 1.4 m. The risers are 120 mm and tread are 300 mm. Use M 15 mix. 20

24378-9550-(P-7)(Q-9)(16) (3)

P. T. O.

SECTION - B

4. Design rectangular footing for two columns A and B, Carrying loads of 800 and 900 kN resp. Column A is 300mmX 300mm in size and column B is 400X 400mm in size. The centre to centre spacing of the column is 4 m. The safe bearing capacity of soli is 200 kN/m². Use M 20 mix. σ_{st} 140 N/mm². 20

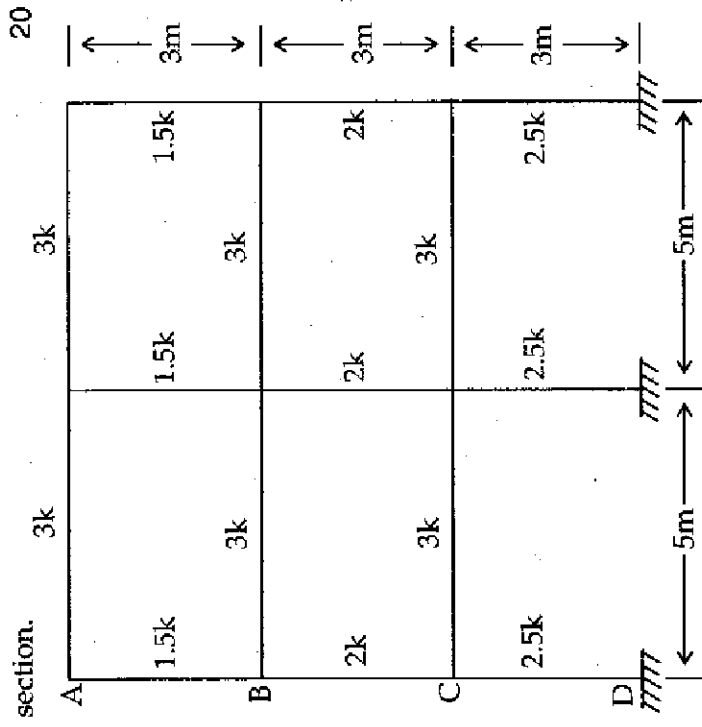
5. Design an underground rectangular tank 4m x 6m x 2m deep. The subsoil consists of dune sand having unit weight of 16000 N/m³ and angle of friction of 34°. The subsoil water level is at a great depth. Use M 20 concrete and Fe 415 steel. 20

SECTION - C

6. (a) A pretensioned prestress concrete beam of 7m span has cross section of 300 mm X 500 mm, is prestressed with 155 kN force at transfer. The

cable has cross sectional area of 1500 mm² of steel and has a parabolic profile with a maximum eccentricity of 1500 mm at the mid span. Determine the loss of prestress, given that $E_s = 2.1 \times 10^5$ N/mm² and $E_c = 3 \times 10^4$ N/mm². 15

- (b) Explain Guyon's method. 5
7. If wind load of 15kN and 30 kN are acting at joint A, B and C respectively, analyze the frame by portal method. Assume that all column has equal are of cross



SECTION - D

(b) Draw and explain yield line pattern for two way slabs. 5

8. (a) A rectangular slab 3×5 m in size, simply supported at the edges. The slab is expected to carry a service load of 4 kN/m^2 and a floor finishing load of 1 kN/m^2 . Use M 20 concrete and

Fe 415 steel. Design the slab if

(I) it is isotropically r/f

(II) if is orthoisotropically r/f with $\mu = 0.65$. 15

(b) Analyze the isotropically reinforced square slab by Equilibrium method. 5

9. (a) A square slab of side length 4 m is simply supported at the ends and carries a service load of 5 kN/m^2 . Design the slab Use m 20 concrete and Fe 250. 15

24378-9550-(P-7)(Q-9)(16) (6)

24378-9550-(P-7)(Q-9)(16) (7)