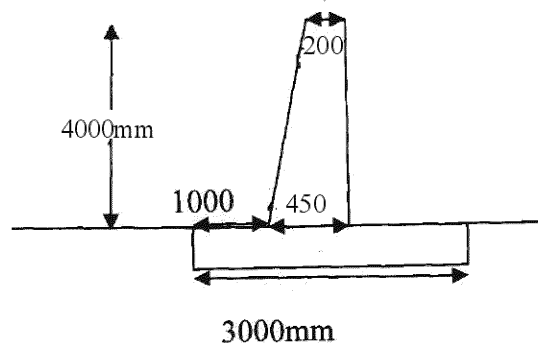


6. How minimum eccentricity in carrying axial load over columns has been taken into account by Indian Standards ? Design a column using working stress method to carry 2000 kN load using M25 grade of concrete and Fe415 grade of steel. The size of the column has been fixed to 450 mm \times 600 mm. **20**
7. Design a circular spiral column using limit state method of 400 mm diameter to resist 1500 kN ultimate axial load. The column has 3.5 m unsupported length. Use M25 grade of concrete and Fe500 grade of steel. **20**
8. A retaining wall shown in figure is to resist 4 m earth weighing 19 kN/m³ with angle of internal friction 28°. If the allowable bearing capacity of the soil is 160 kN/m² below 1m natural ground, design the base slab of the retaining wall. **20**



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No. of Printed Pages : 04

Roll No.

W-472

B. Tech. (W) EXAMINATION, Dec. 2017

(Fourth Semester)

(Re-appear Only)

(CE)

CE(W)-204

REINFORCED CONCRETE DESIGN-I

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions. All questions carry equal marks. Use of Indian Standards is allowed. Any data if missing can be suitably assumed. Use of scientific calculator is allowed.

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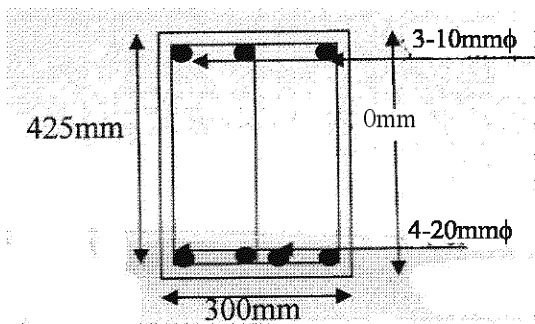
P.T.O.

1. Discuss the following terms :

- (i) Characteristic strength
- (ii) Target strength
- (iii) Creep
- (iv) Shrinkage
- (v) Static modulus of elasticity
- (vi) Dynamic modulus of elasticity
- (vii) Modulus of rupture
- (viii) Strain hardening of steel.

2.5×8=20

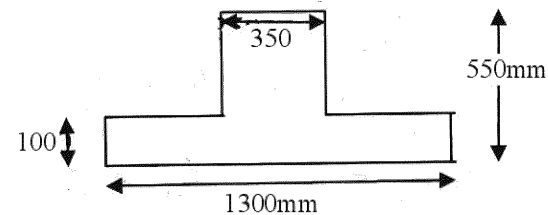
2. A reinforced concrete beam 300×450 mm with details as shown in figure is subjected to 150 kNm load. The beam has been cast with M20 grade of concrete and Fe500 grade of steel. Investigate the stability of the beam considering extreme stresses in concrete and steel. **20**



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3. The beam shown in question 2 has shear reinforcement 4-legged 4 mm diameter @ 100 mm centre to centre. Determine the uniformly distributed load the beam can carry considering shear and using working stress method. **20**
4. A cantilever beam is to be designed for the details shown in figure to carry 25 kN/m load (under service state) over a span of 4m using M20 grade of concrete and Fe415 grade of steel. Design the beam under flexure using limit state method. **20**



5. Design a reinforced concrete beam as per sectional details in Q 4 to resist ultimate bending moment 75 kNm, twisted moment 25 kNm and shear force 50 kN using M20 grade of concrete and Fe500 grade of steel. **20**

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P.T.O.