6. A one way slab has been designed for a simply supported span of 4 m with an overall depth of 170 mm and clear cover of 20 mm using M20 grade of concte and Fe 500 grade of steel. The dead load and live loads are 5 and 3 kN/m^2, respectively. The main reinforcement provided is 10 mm Φ @ 135 mm c/c. Verify the section for limit state of serviceability. **20**

7. Design a semi-circular beam supported on three equally spaced columns. The centres of the columns are on a circular curve of 9 m diameter. The beam carries a uniformly distributed design live load of 20 kN/m. M 20 grade of concrete and Fe415grade of steel should be used. δd

8. If a retaining wall which supports 4 m high soil bank above ground level and also carries surcharge 45 kN/m^2 has been finally designed as per the details shown in figure. Further

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B. Tech. EXAMINATION, Dec. 2018

(Fifth Semester)

(Old Scheme) (Re-appear Only)

(CE)

CE305

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 *Five* questions only which carry equal marks. Use of Indian Standards such as IS : 456 and SP : 16 is allowed. Any data if missing can be suitably assumed Use of sscientific calcualtor is allowed.

1. Explain the following terms :

   (a) Characteristics strength and target mean strength

   (b) Creep and shrinkage

   (c) Static and dynamic modulus of elasticity of concrete

   (d) Split tensile strength and modulus of rupture

   (e) Partial safety factors.   **20**

2. A T beam has the following details : Grade of concrete M20. Use working stress method to determine the moment of resistance. Effective cover to the reinforcement is 25 mm.   **20**

125 mm   1500

500 mm

6-30 mm Φ
Fe 500

300 mm
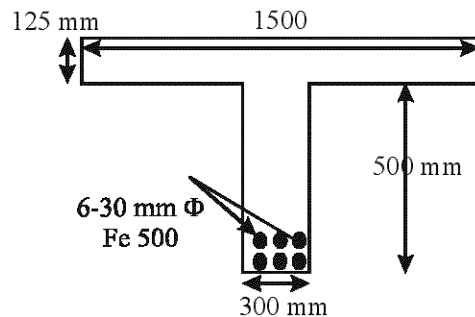
3. A reinforced concrete rectangular beam (300 × 450 mm) is reinforced with 4-20 mm φ Fe 415 grade of steel. The beam is subjected to bending moment 50 kNm and shear force 25 kN at a section. If the beam if cast with M 20 garde of concrete and is subjected to 40 kNm torsion in addition, determine the additional reinforcement required.   **20**

4. Design a circular column 8 m effective height and 400 mm diameter to carry axial load 750 kN using spiral reinforcement, if the permissible compressive stresses in concrete and steeel are 7 MPa and 190 MPa, respectively.   **20**
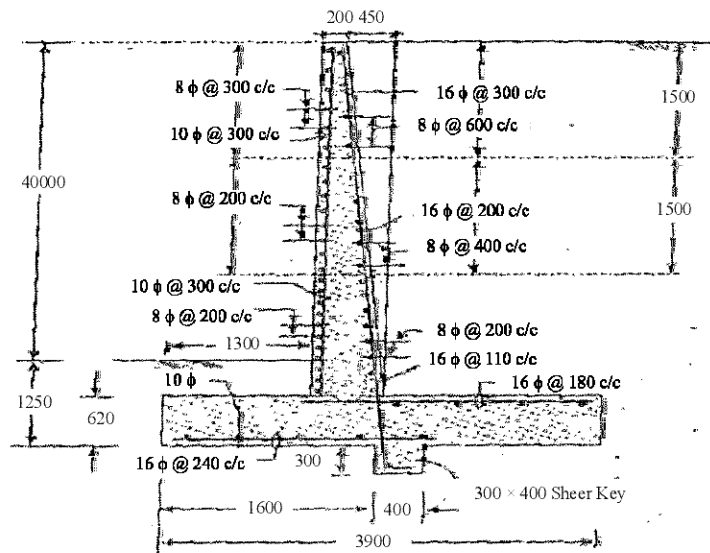
5. Determine the ultimate moment of resistance of a 100 mm thick reinforced concrete slab which consists of 10 mm diameter Fe 415 grade of steel 150 mm centre to centre at 80 mm effective depth. The slab was cast of M 20 grade of concrete.   **20**

details of soil are safety bearing capacity 170 kN/m^2, angle of repose 30°, unit weight of soil 18 kN/m^3 and coefficient of friction with concrete 0.45. Check the stability of the retaining wall. **20**