

B.Tech. (Civil) 4th Semester F-Scheme

Examination, May-2019

DESIGN OF CONCRETE STRUCTURES-I

Paper-CE-206-F

Time allowed : 3 hours [Maximum marks : 100]

Note : - Attempt any five questions. All questions carry equal marks.

- Question No. 1 is compulsory. Students have to attempt 5 questions in total at least one question from each section.

- IS:456 are allowed. Assume suitable data.

1. Write short note for the following : 5×4=20
 - (a) What is size effect of concrete ?
 - (b) How to fulfill the four objective of the design of reinforced concrete structure ?
 - (c) Define characteristics load.
 - (d) Define "effective width" of flanged beam.
 - (e) How do we determine the amount of span in the shorter span direction ?

Section-A

2. (a) Define workability of concrete. 10
- (b) Differentiate between design mix and nominal mix concrete. 10

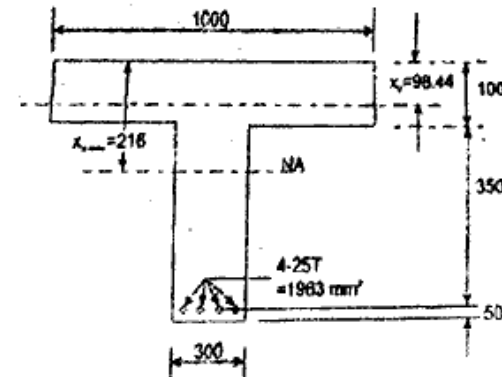
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3. Give four reasons to justify the design of structure by limit state method. Also explain working stress method. 20
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Section-B

4. A rectangular R.C. beam in M25 concrete is 300mm wide and 650mm deep (overall) and is subjected to a maximum bending moment of 30kNm. Design the beam and calculate the minimum reinforcement required. 20
5. For the given T-beam of Fig. given data: $b_f=1000$ mm, $d_f=100$ mm, $b_w=300$ mm, cover=50 mm, $d=450$ mm and $A_{st}=1963$ mm² (4-25 T). Use M20 and Fe 415. The beam cross section is subjected to a maximum bending moment of 30kNm and a maximum shear force of 50KN. In addition the beam cross section is subjected to a Torsional moment of 45KNm. Calculate the reinforcement for torsion. 20



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Section-C

6. (a) Explain short term deflection and long term deflection and the respective influencing factors of them. 15
- (b) Explain reinforcement splicing. 5
7. Determine the area of steel, bar diameters and spacing in the two direction of a simply supported slab of effective span $4\text{m} \times 9\text{m}$ subjected to live load of 5kN/m^2 and the load of floor finish is 2kN/m^2 . Use M25 and Fe 415 steel. Draw the diagram showing reinforcement details. Assume suitable data. 20

Section-D

8. (a) Design a circular tied column to load of 250kN and $M_u=120\text{ kNm}$ using M25 and Fe415 and assuming the dimensions ; $D=400\text{mm}$. 14
- (b) How would you determine the minimum depth of foundation ? 6
9. Design a retaining wall to retain water on one side or soil on the other side of 4 m height. The soil characteristics are given below : 20
- Unit weight of soil : 22kN/m^3
- Angle of repose of soil 38°
- The bearing capacity of soil = 120kN/m^2
- Use M25 and Fe 415 steel.