

Total No. of Questions : 5

Total No. of Printed Pages : 4

1390059

UITians

EIS-195

B.E. (Vth Sem.) (CGPA) Civil Engg. Exam.-2016

STRUCTURAL DESIGN & DRAWING-I

Paper - CE-503

Time Allowed : Three Hours

Maximum Marks : 60

Note : All questions are compulsory.

All questions carry equal marks.

Q.I (a) Explain the following—

4

- (i) Partial factor of safety
- (ii) Characteristics strength
- (iii) Under reinforced section
- (iv) Over reinforced section

or

Differentiate between working stress and unit state method.

(2)

- (b) Find the moment of resistance of a singly reinforced RC beam of 200mm width and 450 mm effective depth reinforced with 4 bars of 16mm diameter of Fe 415 steel. Consider M_{20} concrete. 8

or

A singly reinforced RC beam is to resist a super imposed bending moment of 200 KN/m. Beam has an effective depth of 500 mm. Take width of beam equal to half the depth considering Fe 415 grade steel and M_{20} concrete design the beam.

- (a) Explain minimum shear reinforcement and bond stress. 4

or

Explain the advantages of doubly reinforced beam over singly reinforced beam.

- (b) A doubly reinforced RC section of size 200 mm width and 450 mm effective depth is reinforced with 5 bars of 28mm dia at the tension and 2 bars of 25 mm dia at the compression zone. Effective cover to the compression steel is 50mm. Calculate the ultimate moment capacity of the section. Take M_{20} concrete and Fe 415 steel. 8

or

(3)

A RC beam is continuous over three spans of 6m (Clear) each. Width of support is 300 mm. If the dead and live load on the beam is 2.5 KN/m and 4 KN/m resp. Design the beam using Fe 415 and M 25 grade. Apply check for deflection and shear.

- Q.III (a) Differentiate between one way and two way slab. 4

or

Explain flat slab and yield line.

- (b) Design a RC slab for a room of size 4m x 5m (inside). The live load on the slab may be taken as 4KN/m² and finishing load is 1.25 KN/m². Assume the slab to be simply supported at all the four edges with corner free to lift. Use M₂₀ concrete and Fe 415 steel. 8

or

Design a RC slab for a room of size 30 m x 7 m with walls of thickness 250 mm. The slab carries 70mm thick lime concrete at its top, the unit wt. of which may be taken as 20 KN/m³. The live load on the slab may be taken as 3 KN/m². Use M₂₀ and Fe-415.

- Q.IV (a) Define any two of the following — 4
 (i) Slenderness ratio
 (ii) Radius of gyration

- (iii) Effective length of column
 (iv) Long and short column
- (b) Design a circular column 4.5 m long with helical reinforcement to transfer a service load of 1400 KN. Use M_{20} concrete and Fe 415 steel. .8

or

Design an isolated square footing for the column subjected to an axial load of 1600 KN. If the safe bearing capacity of soil is 120 KN/m². Use M_{20} and Fe415 steel.

- Q.V (a) Classify the RC staircases.

4

or

Write down the general design criteria for staircases.

- (b) Design a dog-legged stair case to be provided in a residential building. Clear space available is 3 m x 4.8 m. Floor to floor height is 3.6 m. Length of landing on either side along the direction of flight is 1.2 m. 8

or

Design flight of a single flight waist slab stair case for residential building of 3.0 m storey height. Consider the width of flight as 1.0 m and the span of flight as 4.5 m.