Ref: Ex/Con/T/322/2018

B. Construction Engineering 3rd Year 2nd Semester Examination 2018

DESIGN OF STRUCTURE - II Part I

Time : Three hours Full Marks : 100

Use of IS 456 code is allowed. Design should be explained with neat sketches.

Answer the questions of maximum 50 Marks as follows

1. Derive the expression of percentage of steel (P) for the balanced section adopting working stress method of design using **M25 grade of concrete and Fe500** grade of steel. Calculate the Moment of Resistance for 0.5P and 1.5 P and compare with balance section. [CO1] 10

Or

2. Derive the moment of resistance for the balanced section adopting working stress method of design using **M25 grade of concrete and Fe500** and Calculate the Moment of Resistance for a rectangular beam of size 250 mm X 400 mm with 2-25 mm diameter Tor steel as tensile main reinforcement with adequate shear reinforcement. 10 [CO1]

3. Design a **corner roof slab** of a commercial building having clear size of 3500 mm x 4000 mm supported on 250 mm wide beams. Use M25 grade of concrete & Fe500 steel. Show reinforcement details in plan at important sections. 15 [CO2]

Or

4. Design a **simply supported beam** having a span of 4.0 m subjected to a point load of 100 KN at mid span. The grade of concrete is M25 and Fe500 grade of steel is used. Design the beam with reinforcement for bending and shear at mid span adopting working stress method. Draw neat sketches of cross section at mid span only. 15 [CO2]

5. (a) Design a rectangular column having fixed width of 250 mm at one side subjected to an axial load of 650 KN. The effective length of column is 3m, Use M25 grade of concrete and Fe500 grade of steel. 10

(b) Find the safety of the same column if it is subjected to 70% of the designed load with an uni-axially eccentricity of 125 mm about the major axis instead of the design axial load. [CO3] 15

Or

6. (a) Discuss shear in **flat slab** with calculation of shear stress and its permissible value. 5 [CO6]

(b) Design the **isolated footing** for the square column of size 300 mm subjected to an axial load of 350 KN. The grade of concrete is M25 and Fe500 grade of reinforcing steel is used. Draw neat sketches showing the reinforcement details. 20 [CO4]

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B. Construction Engineering 3rd year 2nd semester Examination – 2018

Subject: Design of Structure -II

Total Time: Three hours
Full Marks: 100

PART-II(Full Marks-50)
Use Separate answer sheet for each part.
IS456:2000 is allowed in the exam hall.

CO1 [05]	Answer any one from (a) and (b) in this block [1] (a) Write a short notes on Limit state method of design. [5] (b) Distinguished between Limit State method and working stress method. [5]
CO2 [15]	[2] Design the RCC Slab of 4X5 meter with two adjacent edge discontinuous Use the following data LL= 3.0 KN/m^2 M25 grade concrete & FE-500 HYSD Bar Size of beam is 250X400 MM Size of column 400X400 mm Use Limit state method for design. [15]
CO3 [15]	*[3]Answer any one* from **(a), (b)** *in this block:* (a) Design a beam of both end continuous & Clear length 8m with the following data LL imposed on beam = 30 KN/m^2 M25 grade concrete & FE-500 HYSD Bar Size of column 400X400 mm, Depth of beam should be restricted 500 mm. Use Limit state method for design. Shown also reinforcement details. [15] (b) Design a beam of both end continuous & 5m clear length with LL on the beam is 15 KN/m^2 & beam is supporting on a Column of 400X400 mm & M25 Grade concrete with FE-500HYSD Bar. Shown also reinforcement details. [15]
CO4 [10]	[4] A column of 4 meter length with cross section 400X400. The axial load of the column is 2500KN. Assume M25 Grade concrete and Fe-500 HYSD Bar used, if safe bearing capacity of Soil is 12 T/M^2 then design a suitable footing. Show also the details of reinforcement of footing. [10]
CO5 [5]	[5] Write the names of different type of retaining wall [5]

CO1: Understand the design philosophy of different methods of Concrete Structures (K2).
CO2: Analyse & Design of Reinforced Slab, Beams and Columns (K4)
CO3: Demonstrate, application & Design of Beam-Column Problems (K3)
CO4: Analyse & Design of Footings (K4)
CO5: Calculate forces and Design of Retaining structures (K2)
CO6: Describe Flat Slab Design Consideration, Concentrated Load on slab & Elementary Bridge Design (K1)