ONE TIME EXIT SCHEME

USN | | | | | | | | | | | 09ENG5.5

Fifth Semester B.Arch. Degree Examination, April 2018
Structures - V

Time: 3 hrs.   Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. Use of IS : 456 – 2000 and SP :16 is permitted.
3. Use Limit state Method, unless specified.

PART – A

1 a. Explain balanced, under reinforced and over reinforced sections, with neat sketches.
(06 Marks)

  b. The cross section of a singly reinforced concrete beam is 225mm wide and 350mm deep to the centre of the tensile reinforcement which consists of 4 bars of 20mm diameter. If the stresses in concrete and steel are not to exceed $7N/mm^2$ and $230N/mm^2$. Determine the moment of resistance of the section. What maximum udl this beam can carry safely on a span of 8m? Take m = 13.33. Use working stress method.
(14 Marks)

2 A doubly reinforced beam section is 300mm × 500mm and is provided with 2 bars of 12mm diameter as comp steel and 4 bars of 25mm dia as tensile steel. These reinforcements are provided at an effective cover of 40mm. Determine the ultimate moment of resistance of the beam section. Use M_{20} concrete and Fe415 steel.
(20 Marks)

3 A T – beam of flange width 1000mm, flange thickness 100mm, effective depth 550mm and rib width 275mm has to be designed as a balanced section. Determine the area of steel required and the limiting moment of resistance. Use M_{20} concrete & Fe415 steel.
(20 Marks)

4 A reinforced concrete beam is to be designed over an effective span of 5m to support a design service load of 8kN/m. Adopt M_{20} grade concrete and Fe415 bars. Design the beam to satisfy the limit states.
(20 Marks)

PART – B

5 Design a two way slab for an office floor of size 3.5m × 4.5m with discontinuous and simply supported edges on all the sides with corners prevented from lifting and supporting a service live load of $4kN/m^2$. Adopt M_{20} grade concrete and Fe415 HYSD bars.
(20 Marks)

6 a. A rectangular reinforced concrete column of C/s dimension 300 × 600mm is to be designed to support an ultimate axial load of 2000kN. Design suitable reinforcements in the column using M_{20} and Fe415.
(10 Marks)

  b. Design the reinforcements in a rectangular column of size 300 × 500mm to support a design ultimate load of 500kN together with a factored moment of 200kN.m. Adopt the value of $fck = 20N/mm^2$ and $Fy = 415 N/mm^2$.
(10 Marks)

7   Design one of the flights of a dog – legged stairs spanning between landing beams using following data :
Type of stair case – Dog – legged with waist slab, treads and risers.
No. of steps in the flight = 10.
Tread = 300mm , Riser = 150mm. Width of landing beam = 300mm.
M_{20} and Fe415.   **(20 Marks)**

8   Write short notes on :
    a.   Advantages of RCC.
    b.   Stress – strain block diagram for singly reinforced beam.
    c.   Water cement ratio.
    d.   Workability of concrete.   **(20 Marks)**