Registration No. :

Total number of printed pages – 2

Fifth Semester Regular Examination – 2014
DESIGN CONCRETE STRUCTURES
BRANCH : CIVIL
QUESTION CODE : H 129

Full Marks – 70

Time : 3 Hours

Answer Question No. **1** which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions :   2 ×10

   (a) Distinguish among under reinforced, balanced and over reinforced section with separate figures.

   (b) What are the special features of a T beam compared to a rectangular beam ?

   (c) What do you mean by a L beam ? Explain its bending behavior.

   (d) Explain the difference between column under uniaxial bending and column under biaxial bending.

   (e) Calculate x_{umax}/d value for Fe415 steel and M25 concrete.

   (f) What do you mean by punching shear ? Explain.

   (g) How the depth of a isolated footing decided ?

   (h) What do you mean by a restrained slab ?

   (i) Why clear cover is provided for various RCC members ? State the minimum clear cover values provided for columns and slabs.

   (j) What do you mean by diagonal tension ? In what situation, this type of case arises ?

2. A double reinforced beam of size 200mmx300 mm(bd) is provided with tensile reinforcement of 3 bars of 12 mm dia and compressive reinforcement of 3 bars of 10 mm dia. The distance from extreme end upto centre of steel is 40 mm both at top and bottom. Calculate the ultimate moment of resistance of the beam. Use M20 concrete and Fe 500 steel.   10

P.T.O.

3. A RCC beam of 200 mm wide and of 400 mm effective depth is having a clear span of 6 m. It carries a udl of 20 kN/m throughout the span. Using M20 concrete and Fe 500 steel, design the beam for shear using the combination of vertical stirrups and bent up bars. Support width is 300 mm. Show reinforcement detailing. 4 bars of 10 mm dia are provided in tension side as flexural reinforcement. 10

4. A doubly reinforced rectangular beam of bD size 250 mm x 450 mm is reinforced with 4 bars of 16 mm dia on the tension side and 2 bars of 12 mm dia at the compression face. The effective cover is 40 mm. The span of the beam is 56 m and the grade of concrete and steel are M25 and Fe415, respectively. Check, whether deflection criteria is satisfied as per IS codal provision. 10

5. Design a circular column to carry a service load of 1200 kN. Show the c/s and longitudinal section with reinforcement detailing. Use M20 concrete and Fe415 steel. 10

6. Design a simply supported slab of lx = 6 m and ly = 4 m, supported on all four sides. The service load is 3 kN/sq m and floor finish is 1 kN/sq m. The width of support is 250 mm. Use M20 concrete and Fe500 steel. Show the reinforcement detailing. 10

7. Design an isolated footing for a rectangular column , 250 mm x 400 mm carrying a working load of 1250 kN. Consider the safe bearing capacity of soil as 220 kN/sqm at a depth of 1 m below the ground level. Use M25 concrete and Fe415 steel. Show the reinforcement detailing. Assume the depth of foundation as 750 mm. 10

8. Explain the following terms : 2.5×4
   (a) Limit state of collapse and limit state of serviceability
   (b) Stress Strain curve for Fe 415 steel
   (c) Stress block in limit state method of design
   (d) One way shear and two way shear.