BHARTIYA INSTITTUTE OF ENGINEERING & TECHNOLOGY SIKAR

Department of Civil Engineering

Design of Concrete Structures-I

Q.1 Design a balanced singly reinforced concrete beam section for a service moment of 60 kN-m. The width of beam is limited to 175 mm. Use M-20 concrete and Fe-415 steel bars. Use Limit State Method.

Q.2 Design a reinforced concrete beam subjected to a bending moment of 20 kN-m. Use M-20 concrete and Fe-415 reinforcement. Keep the width of the beam half the effective depth. Use working stress method.

Q.3 Determine the moment of resistance of beam having the following data:
b = 350 mm, d = 900 mm,
d' = 50 mm, A_{st} = 5 bars of 20Ø dia (Fe-415),
A_{sc} = 2 bars of 20 mm dia (Fe-415),
Grade of concrete = M-20

Q.4 Find the moment of resistance of a T-beam if
D_f = 90 mm, b_f = 700 mm,
d = 600 mm, b_w = 240 mm,
A_{st} = 5-20Ø,
Use M-20 concrete and Fe = 415 Steel.

Q.5 A simply supported beam, 300 mm wide and 600 mm effective depth carries a udl of 74 kN/m, including its own weight over an effective span of 6 m. The reinforcement consists of 5 bars of 20 mm dia, out of these 2 bars can be safely bent up at 1 m distance from the support. Design the shear reinforcement for the beam. The concrete is of M-20 grade and steel for stirrups is of Fe-415 grade. Take width of supports as 400 mm.

Q.6 A RC beam 350 mm wide and 500 mm effective depth is subjected to ultimate design shear force of 200 kN at the critical section near supports. The tensile reinforcement at the section near supports is 1.0%. Design the shear stirrups near the supports. Also design the minimum shear reinforcement at mid span. Assume concrete of grade M-20 and Fe-415 steel. What changes will made in spacing if the stirrups used in beam is of Fe-415 grade steel.

Q.7 Design a short axially loaded square column 500 mm x 500 mm for a service load of 2000 kN. Use M-20 concrete and Fe-415 steel bars.

Q.8 Design a circular column to carry an axial load of 1000 kN. Use M-20 concrete and Fe-415 steel bars.

Q.9 Explain how you determine the deflection due to shrinkage and creep.

Q.10 Explain following terms:

i) Control of defelction
ii) Development length
iii) Bond Stress
iv) Curtailment of reinforcement