

KATIHAR ENGINEERING COLLEGE, KATIHAR
CIVIL ENGINEERING, 3rd Year (Semester-VI)

**Subject: Design of concrete
structure-I**

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Assignment 1

Q.1 A T beam of flange width 1300 mm, flange thickness 100 mm, rib width 275 mm has an effective depth of 550 mm. The beam is reinforced with 5 bars of 25 mm diameter. Find the ultimate moment of resistance by the limit state method. Use M15 concrete and Fe 415 steel.

Q.2 A singly reinforced rectangular concrete beam has breadth $b = 250$ mm and effective depth $d = 500$ mm. The area of tension steel $= 950 \text{ mm}^2$. Calculate ultimate moment capacity of beam. Given the cube strength of concrete is 20 MPa. Yield strength of steel is 250 MPa. Use Limit state method (LSM)

Q.3 Determine the area of steel for a beam to support a live load of 12 kN/m on a single span of 8 m using concrete M 15 and steel HYSD bar Fe 415 grade in mild exposure condition.

Q.4 Design the reinforcement for a reinforced concrete beam 300 mm wide 400 mm deep of grade M 20, to resist an ultimate moment of 170 kN-m, using mild steel bar of grade Fe 250.

Q.5 Determine the moment of resistance of a single reinforced beam 160 mm wide and 300 mm deep to the centre of reinforcement, if the stresses in steel and concrete are not to exceed 140 N/mm^2 and 5 N/mm^2 respectively. The reinforcement consists of 4 bars of 16 mm diameter. Take $m = 18$. If the above beam is used over an effective span of 5 m, find the maximum load the beam can carry, inclusive of its own.
