

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

**Subject: Design of Concrete
Structure-I**

Instructor: Rashid Mustafa

Assignment 2

Q.1 Design a short concrete column to carry an axial load of 1600 kN. Use M20 grade of concrete and Fe415 steel. Unsupported length of column is 3m.

Q.2 Design a reinforced concrete column of rectangular cross section, with one side restricted to 260 mm, to support a factored load of 2250 kN. The materials used are M20 grade concrete and HYSD steel of grade Fe415. Use limit state design method. Apply eccentricity checks, if the effective lengths of the column are 3.0 m.

Q.3 Under what circumstances doubly reinforced beam used? What are the advantages of doubly reinforced beams over singly reinforced beams?

Q.4 What are the three assumptions made for design of reinforced concrete section for limiting state of collapse in flexure that lead to the limiting value of depth of neutral axis? Calculate the limiting values of depth of neutral axis in terms of effective depth of section for two grades of steel having yield strength $f_y = 250$ and 415 N/mm^2 . Take $E = 2 \times 10^5 \text{ N/mm}^2$.

Q.5 An RC column 300 mm x 300 mm is reinforced with four bars of 30 mm diameter placed with an effective cover of 50 mm. Find how far from the centre, the line of thrust may pass along the YY axis without causing tension in concrete. Take $m = 18$
