B.Arch. Part-IV 8th Semester Examination, 2007

# Structural Engg.-IV
## (CE-801A)

Time : 3 hours                                                                                   Full Marks : 100

*Use separate answerscript for each half.*
*Answer SIX questions, taking THREE from each half.*
*The questions are of equal value.*
*Two marks are reserved for neatness in each half.*

## FIRST HALF

1.  Write short notes on the following :
    a)  Basic wind speed
    b)  Terrain category
    c)  Internal pressure coefficients
    d)  Design wind pressure.

2.  A single storeyed building frame has three spans of width $3^m$, $4^m$ & $5^m$ respectively. Height of each floor is $3^m$. Basic wind speed = 50 m/sec, $k_1 = 1$, $k_2 = 1.1$ & $k_3 = 1.0$. Force coefficient = 1.12. Calculate the wind forces on all the columns.

3.  a)  Describe any post-tensioning system of Prestressing of concrete members with neat sketches.

    b)  A post tensioned Beam of cross-section $150 \times 350$ mm is prestressed by parabolic cable with an eccentricity of 50 mm above the centroid at the support and an eccentricity of 75 mm below the centroid the at the mid span. Area of cable is $500$ mm$^2$ and initial prestress is $1000$ N/mm$^2$. Determine the force of prestress at the other end of the beam if its span is 10 m. Assume $\mu = 0.55$ & $K = 0.0015$/m.

4.  A concrete T-beam has 800 mm wide x 200 mm deep flange and 300 mm wide x 600 mm deep web. The prestressing force is 6000 kN, applied at 400 mm from bottom. Calculate the stress developed at top and bottom. What would be change in fibre stress, when the beam is placed at the support.
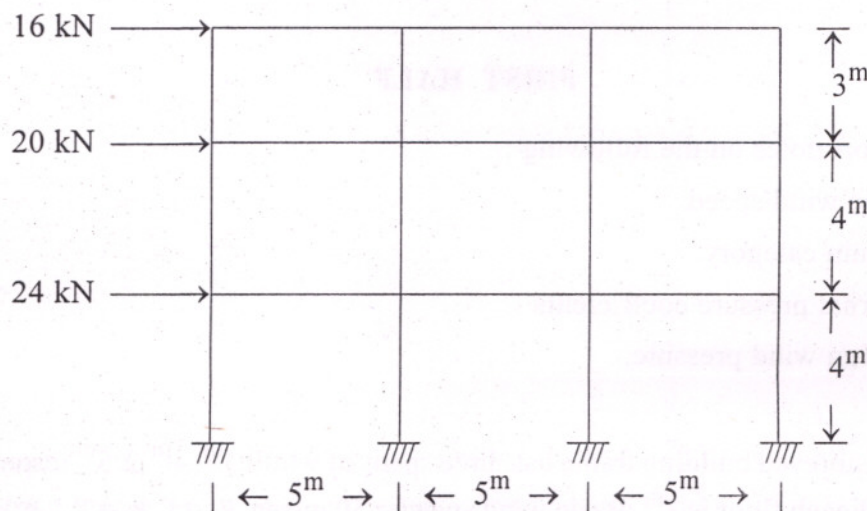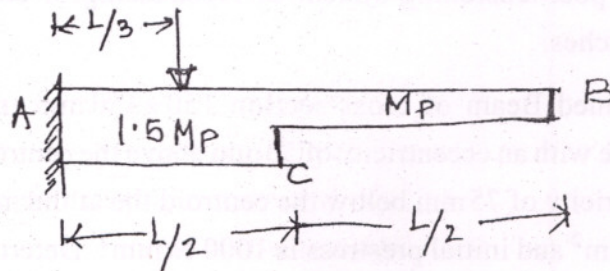
## SECOND HALF

5.  Write short notes on the following :

    a)  Mechanism

    b)  Plastic hinge

    c)  Curved beam & straight beam

    d)  Assumption of Portal frame method.

6.  Calculate bending moments for all the member of the frame as shown in Figure, use portal method.



7.  A fixed ended beam is subjected to a Load W at $\frac{1}{3}$rd span as shown in figure. Estimate Collapse Load.



8.  A cantilever beam is a quadrant of a circle in plan. Radius of circle is 4 m. The beam is subjected to a uniformly distributed load of 5 kN/m. Calculate the bending moment, torsion and shear force at the fixed end.

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