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CE-6002 (CBGS)

B.E. VI Semester

Examination, May 2018

Choice Based Grading System (CBGS)

Structural Design - I (RCC)

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) Assume data suitably, if any missing.

1. a) Enumerate the three methods generally used for analysis and design of a RC beams.
   b) Explain the term M_u(lim) and give the expression for this value for Fe250 and Fe415 steels.

2. Design a beam for b = 300 mm, D = 600 mm. Factored moment = 320 kNm. Assuming $f_{ck} = 20N/mm^2$, and $f_y = 415N/mm^2$.

3. A T beam has to develop an ultimate moment of resistance of 450kNm. Its web width is 200mm, flange width 750mm, slab thickness 100mm and total depth 550mm. Determine the necessary steel for the section using M20 concrete and Fe415 steel. Assume cover to centre of steel to be 50mm.

4. Design a simply supported R.C.C slab for a roof of a hall 4m×10m (inside dimensions) with 230mm walls all around. Assume a live load of $4kN/m^2$. Assuming $f_{ck} = 25N/mm^2$ and $f_y = 415N/mm^2$.

5. Design a roof for a circular room 5m inside diameter. The thickness of the wall is 250mm and the slab projects all round by 1.25m. Assume an imposed load of $1.5k/m^2$. Assume assuming $f_{ck} = 20N/mm^2$ and $f_y = 415N/mm^2$.

6. A column 300×400mm has an unsupported length of 3m and effective length of 3.6m. It is subjected to Pu = 1100kN and Mu = 230kNm about the major axis, determine the longitudinal steel using $f_{ck} = 25N/mm^2$ and $f_y = 415N/mm^2$. Assume d' = 60mm.

7. Design a dog legged stair for a building in which the vertical distance between floors is 3.30m. The stair hall measures 3.0m×4.5m. The live load on the stair may be taken as $3000N/m^2$. Assuming $f_{ck} = 20N/mm^2$, and $f_y = 415N/mm^2$.

8. Design a rectangular isolated column footing of uniform thickness for a RC column of size 400mm×600mm and carrying an axial load of 2500kN inclusive of its own weight. Assume SBC of soil as $110kN/m^2$ and $f_{ck} = 25N/mm^2$ and $f_y = 415N/mm^2$.

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