

B.E.(with Credits)-Regular-Semester 2012-Civil Engineering Sem V  
**CE503 - Design of RCC Structure I**

P. Pages : 2

Time : Four Hours



**GUG/W/16/3679**

Max. Marks : 80

- Notes :
1. All questions are compulsory.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. I.S. 456-2000 (Revised), I.S. 875 may be consulted.
  5. Use of nonprogrammable calculator is allowed.

1. Design a cantilever beam AB = 3m to carry udl of 40 KN/m on AB & 10 KN point load at free end B using WSM. Supp. width is 300 mm.  $F_{ck} = 20$  MPa,  $F_y = 415$  MPa. Sketch rein details. **13**

**OR**

2. Design a one central beam having 5.0 m clear span provided to supp. a slab for a room 5.0 x 6 m carrying LL of  $2.5 \text{ KN/m}^2$  and floor finish load of  $1 \text{ KN/m}^2$ . Wall thickness is 300 mm.  $F_{ck} = 20$  MPa,  $F_y = 415$  MPa. Sketch rein details. **13**
3. Find udl carrying capacity on LHS half span of SS beam having eff. Span = 5.0 m,  $b = 300$  mm,  $D = 600$  mm,  $d = 550$  mm,  $d' = 50$  mm,  $A_{sc} = 2$  bars 20 mm  $\phi$ ,  $A_{st} = 5$  bars 20 mm  $\phi$   $F_{ck} = 20$  MPa,  $F_y = 415$  MPa. Use load factor 1.5. **13**

**OR**

4. Design uniaxially loaded short column having both ends hinged about major axis and top-hinged & bottom-fixed about minor axis to carry axial load of 1200 KN and bending moment of 100 KNm about major axis and 80 KNm about minor axis. Use rectangular c/s with 1.5 aspect ratio. Unsupported lengths w.r.t. major and minor axes are 5.0 m and 6.5 m respectively.  $F_{ck} = 25$  MPa,  $F_y = 415$  MPa,  $\gamma = 1.5$ . Sketch rein details. **13**
5. Find LMR of following T-beam **14**  
 $B_w = 230$  mm,  $D = 500$  mm,  $D_f = 100$  mm,  $B_f = 1200$  mm,  $d' = 50$ ,  $A_{st} = 4$  bars 20mm  $\phi$ ,  $F_{ck} = 20$  MPa,  $F_y = 415$  MPa.

**OR**

6. Find maximum short term deflection for simply supp. prismatic beam carrying 60 KN/m udl on RHS half eff. span of 2.5 m & 10 KN point load at midspan  $b = 300$  mm,  $d = 650$  mm,  $d' = 50$  mm,  $A_{st} = 3$  bars of 16 mm  $\phi$ ,  $A_{sc} = 2$  bars of 16 mm  $\phi$   $F_{ck} = 20$  MPa,  $F_y = 415$  MPa. **14**
7. Design a rigid base rectangular water tank with cover slab to store 2 lac liters water, resting on ground.  $F_{ck} = 25$  MPa,  $F_y = 500$  MPa, SBC of soil is  $280 \text{ KN/m}^2$ . Use aspect ratio 1.4. Assume free board 300 mm. Use IS code method. Sketch rein details. **20**

**OR**

8. A rectangular beam section 300x800 mm is subjected to LL 30 KN/m on whole effective span of 8 m. The beam is prestressed with prestressing force of 2800 KN at an eccentricity of 250 mm at midspan if loss of prestress is 18%, find the resultant stresses at midspan **20**  
i) At transfer.  
ii) At service.

9. Design circular sloped isolated footing for column 500 mm diameter carrying axial load of 600KN. SBC of soil is 100 KN/m<sup>2</sup>,  $\phi = 30^\circ$  Fck = 20 MPa, Fy = 415 MPa,  $\gamma = 1.5$ . Sketch rein details. **20**

**OR**

10. Design a 4 span continuous slab having 4.0 m eff. span to carry LL 2.5 KN/m<sup>2</sup> and floor finish load 1.00 KN/m<sup>2</sup> Fck = 25 MPa, Fy = 500 MPa,  $\gamma = 1.5$ . Sketch rein details. **20**

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