CE503 - Design of RCC Structures-I

P. Pages : 1   **GUG/W/18/1602**

Time : Four Hours   ‖‖‖‖‖‖‖‖‖ *1261*   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.I. Hand Book for structural steel section, I.S. Code 800/1962 or 1964, I.S. 456 (Revised), I.S. 875 may be consulted.

1.   Design a cantilever beam AB = 3 m to carry udl of 30 KN/m on half span near fixed end & 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**

<p align="center">OR</p>

2.   Design a one central beam having 5.0 m clear span provided to supp. a slab for a room 5.0 m x 7 m carrying LL of 3.5 KN/m^2 and floor finish load 1 KN/m^2. Wall thickness is 300 mm F_{ck} = 20 MPa, F_y = 500 MPa Sketch rein details.   **13**

3.   Find udl carrying capacity on LHS half span of SS beam having eff. Span = 6.0 m, b = 250 mm, D = 600 mm, d = 550 mm, d' = 50 mm, A_{sc} = 2 bars 20 mm ϕ, A_{st} = 5 bars 20 mm ϕ F_{ck} = 20 MPa, F_y = 415 MPa Use load factor 1.5.   **13**

<p align="center">OR</p>

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 1500 KN and bending moment of 150 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, Y = 1.5 Sketch rein details.   **13**

5.   Find LMR of following T-beam B_w = 230 mm, D = 500 mm, D_f = 90 mm, B_f = 1100 mm, d' = 50, A_{st} = 4 bars 20 mm ϕ, F_{ck} = 20 MPa, F_y = 415 MPa   **14**

<p align="center">OR</p>

6.   Find maximum short term deflection for simply supp. prismatic beam carrying 50 KN/m udl on RHS half eff. Span of 2.5 m & 10 KN point load at midspan b = 250 mm, d = 650 mm, d' = 50 mm, A_{st} = 3 bars of 16 mm ϕ, A_{sc} = 2 bars of 16 mm ϕ 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 KN/m^2 Use aspect ratio 1.4. Assume free board 300 mm. Use IS code method. Sketch rein details.   **20**

<p align="center">OR</p>

8.   A rectangular beam section 300 x 800 mm is subjected to LL 40 KN/m on whole effective span of 8m. 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 800 KN SBC of soil is 120 KN/m^2, ϕ = 30º F_{ck} = 20 MPa, F_y = 415 MPa, Y = 1.5 Sketch rein details.   **20**

<p align="center">OR</p>

10.   Design a 4 span continuous beam having 4.0 m eff. Span to carry LL 25 KN/m and DL 20 KN/m F_{ck} = 25 MPa, F_y = 500 MPa, Y = 1.5 Sketch rein details.   **20**

<p align="center">*********</p>