T.E. / Civil / Sem-VI / CBCGS / R-19 / 'C' Scheme / Sub:- DDSS / S.H. 2024
Date:- 03/12/2024

(4 Hours) (Total Marks: 80)

Q.P. Code:-10070185

N.B. 1. Question **No. 01 is compulsory,**
attempt any **three** out of the remaining four questions.
2. Draw neat and proportionate **sketches** whenever necessary.
3. Use of **IS 800 and steel tables** is permitted.
4. Assume **suitable data** if necessary, and justify the same.
5. Use steel of **grade Fe410** and bolts of **grade 4.6.**

Q1 Answer the following

A Design a laterally supported beam SB1 and MB1 using appropriate ISMB sections and beam to beam connection between them, Assuming the top flange of the beam is embedded in the slab. The Flooring plan is as Shown , Design flooring system for the following data, Thickness of Slab = 150mm, the thickness of wall = 200mm, Height of wall = 1.2m over all beams, Unit weight of brick wall and concrete is 20KN/m^3 and 25KN/m^3 **32**

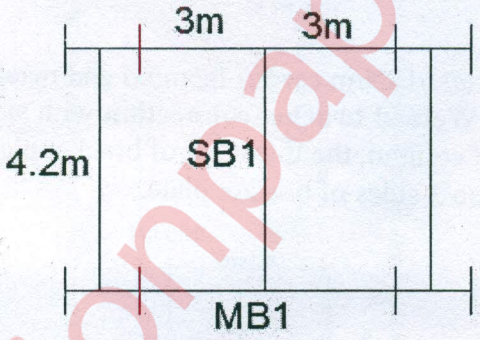

Fig. 1(A)

B Find Panel point load for a given roof truss for DL, LL and WL and design member AB, AL and BL. Considering truss to be constructed in the industrial area of Mumbai. The angle at joint A is 20^0. Assume K1 = 1.0, K2 = 0.98, K3 = 1.0, and (C_{pe}- C_{pi}) = -0.5, Spacing between trusses 6m ; The Span of truss = 16m **32**
Wt. of GI Sheet - 200 N/m^2
Self-weight of Purlin – 220 N/m

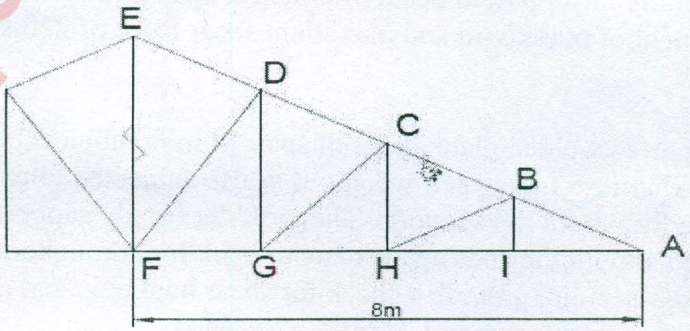

Fig. 1(B)

Q2

A Design a laced column 5 m long to carry factored axial load of 1200 kN. The column is restrained in position but not in direction at both the ends. Use 2 channel section placed as back to back. Draw neat sketch showing details of connection. Use 18 mm diameter bolts . **10**

B Design a slab base for a column ISHB 400 subjected to an factored axial compressive load of 850 kN where the load is transferred to the base plate by direct bearing of column flanges. The base rests on concrete pedestal of grade M20 **06**

Q3

A A Column ISHB 300@576.83 N/m strengthened with two cover plates of size 350 x 20mm to carry factored axial load of 2000kN, calculate Size, Thickness required for the **Gusset base** assuming M20 concrete grade and 24mm bolt diameter, draw diagrams showing all details. **10**

B A column ISHB 350 @ 710 N/m; used as a column with an effective height of 5.2m to support the load from the beam, Determine the design capacity of the column in kN. **06**

Q4

A A column of ISHB 300 @ 618N/m carries factored end reaction of 180kN due to a Beam. **Design Welded bracket connection** with an eccentricity of 150 mm from web of column, the thickness of bracket plate is 12mm, and Provide welding on 3 sides of bracket plate. **08**

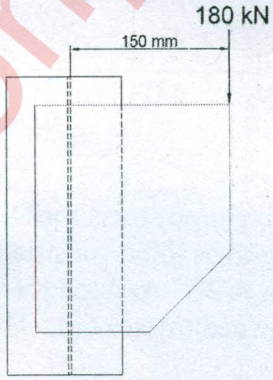

Fig. 4(A)

B Design a laterally unsupported beam of effective span 5 m and subjected to maximum bending moment of 600 kN-m and maximum shear force of 210 kN use steel of grade Fe 410. **08**

Q5 A simply supported welded plate girder of span 14 m is subjected to DL of 22 kN/m and LL of 20 kN/m excluding self weight, it is also subjected to two point load of 550 kN at 4 m from both the supports. The girder is simply supported at the ends and fully restrained at both the ends against lateral buckling throughout the span . Design the cross-section, provide a check for shear buckling, and design bending strength, Assume Load factor as 1.5 and fy=250 Mpa. **16**