T.E Civil - VI - C-scheme 08.5.23 40+40+40+4+36 (170)

Time: 4 hours **Total Marks: 80**

N.B
1. **Question No.1** is compulsory , attempt **any three** out of remaining questions.
2. Draw neat and proportionate sketches wherever applicable.
3. Use of IS 800:2007 and steel table is permitted.
4. Assume suitable data if necessary and justify the same.

Q 1 a) A truss is provided over an industrial building in the vicinity of Mumbai as shown in **Figure -1 (a)** Calculate Panel Point load for DL,LL and WL to design member AB,BC,AP and PO for the following data : 32

Inclination of roof with horizontal = 15°

Span of Truss-16 m , Spacing of truss : 4 m

Self weight of purlin -200 N/m

Weight of AC sheets-170 N/m^2 ,

K_1=1.0,K_2=0.98 ,K_3=1.0 and $(C_{pe}-C_{pi})$= - 0.8

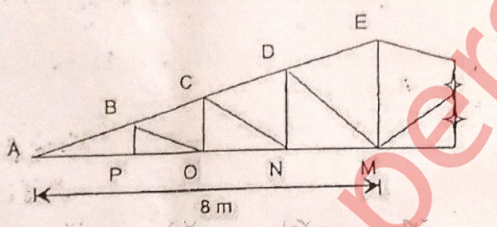

Figure -1 (a)

OR

Q 1 b) The flooring system of an industrial shed is planned as shown in **Figure -1 (b)** Design beam SB1 ,MB1 and beam to beam connection between them with top flange of beam at same level . Use following data : 32

Thickness of slab -150 mm ,Thickness of wall -200 mm ,

Height of wall is 1.3 m over outer beams, Unit weight of concrete and brick wall is 25 kN/m^3 and 20 kN/m^3

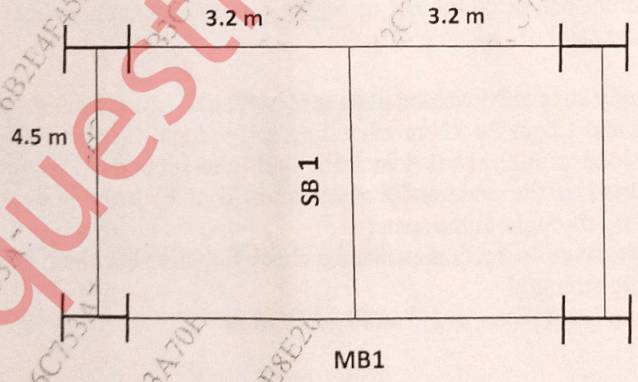

Figure -1 (b)

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Q 2 a) Design a laced column 6.2 m long to carry factored axial load of 1000 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 16 mm diameter bolts . **10**

Q 2 b) Design a slab base for a column ISHB 300 @ 618 N/m subjected to an factored axial compressive load of 900 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**

Q 3 a) A column ISHB 350 @ 710N/m; carries a factored axial load of 1600kN. Calculate ONLY the size and thickness of the gusseted base, assuming M20 concrete grade. **10**

Q 3 b) Determine the design axial load on the column section ISMB 400, given that the height of the column is 3.5 m and that it is pin-ended. Assume fy = 250 N/mm^2 , fu = 410 N/mm^2; E = 2×10^5 N/mm^2 **06**

Q 4 a) Design a fillet weld to connect a 10 mm thick bracket to the flange of a column **[Refer Figure 4(a)]** **08**

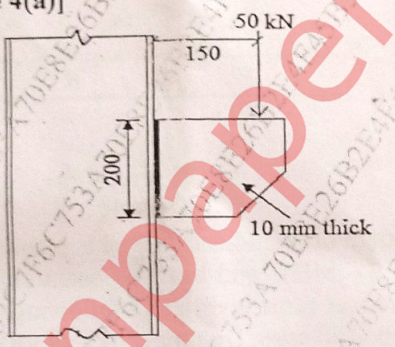

Figure 4(a)

Q 4 b) Design a laterally unsupported beam of effective span 4 m and subjected to maximum bending moment of 550 kN-m and maximum shear force of 200 kN .Use steel of grade Fe 410.. **08**

Q 5) A simply supported welded plate girder of span 12 m is subjected to DL of 20 kN/m and LL of 20 kN/m excluding self weight, it is also subjected to two point load of 600 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 . **16**
Design the cross-section, provide a check for shear buckling, and design bending strength,
Assume Load factor as 1.5 and f_y=250 Mpa.
