

CIVIL (SEM-VI) / R-19 / SH-22 / 07-12-22

Time : 4 Hours

Marks : 80

N.B 1. Question No.1 is compulsory , attempt any three out of remaining questions.

& P CODE : 10015706

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) The flooring system of an industrial shed is planned as shown in fig.1 32

Design beam SB1 ,MB1 and beam to beam connection between them with top flange at same level . Use following data :

Thickness of slab -15 cm ,Thickness of wall -200 mm ,Height of wall is 1.3 m over beams ,Unit weight of concrete and brick wall is  $25 \text{ kN/m}^3$  and  $20 \text{ kN/m}^3$

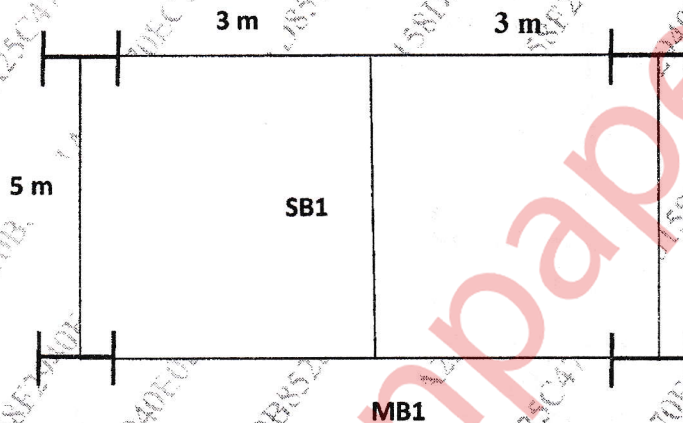


Fig.1

OR

Q 1 b) Find the panel point load for the given roof truss for DL,LL and WL and design member AB,AL and BL .The structure is situated in Mumbai 32

industrial area with rise of  $\frac{1}{4}$ . (Refer Fig.2)Use following data :

- Span of Truss-24 m
- Spacing of truss : 3 m
- Self-weight of purlin -220 N/m
- Weight of GI sheets -150 N/m<sup>2</sup>
- $K_1=1.0, K_2=0.98, K_3=1.0$  and  $(C_{pe}-C_{pi})= -0.3$

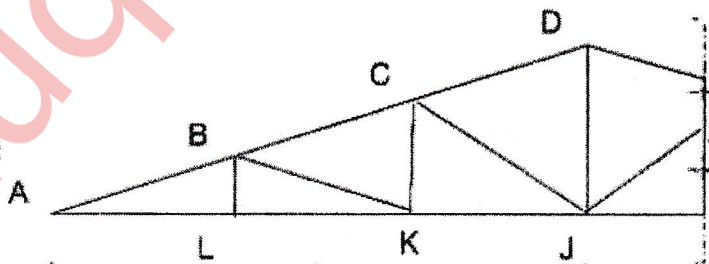


Fig.2

- Q 2 a) Design a column of effective length of 5.90 m and subjected to factored axial compressive load of 2000 kN. Provide channel section back to back connected by welded battens. Use Fe 410 grade steel. Sketch the connection details. **10**
- Q 2 b) A bracket plate is welded to the flange of a column ISHB 200 as shown in Fig 3. Calculate the size of the weld required to support a factored load of 100 kN. All dimensions in mm. **06**

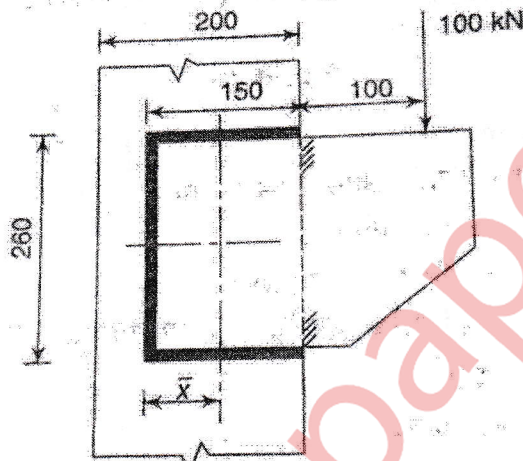


Fig.3

- Q 3 a) Design a column (provide I section) to support a factored load of 1050 kN. The column has an effective length of 7.0 m with respect to z axis and 5.0 m with respect to y axis. Use steel of Grade Fe 410. **08**
- Q 3 b) Design the base plate for an ISHB 350 column to carry a factored load of 1200 kN. Assume Fe 410 grade steel and M25 concrete. Use welded connections. **08**
- Q 4 a) Calculate the Moment of resistance of a laterally unsupported beam ISLB 350 of Length 3.5 m **08**
- Q 4 b) Explain web buckling and web Crippling **04**
- Q 4 c) Explain block shear failure **04**
- Q 5 Design a welded plate girder for an effective span of 30 m and carrying a uniformly distributed load of 30 kN/m and two concentrated loads of 150 kN each acting at 10 m from both ends. The girder is simply supported at ends and fully restrained at both ends against lateral buckling through out the span. Assume load factor as 1.5 and  $f_y = 250 \text{ Mpa}$  **16**