

Time : 4 Hours

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)** 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 kN/m^3 and 20 kN/m^3

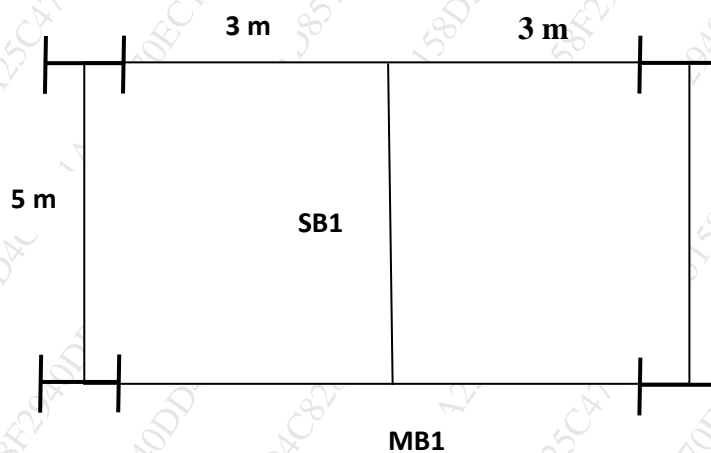


Fig.1

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 industrial area with rise of $\frac{1}{4}$. (Refer Fig.2)Use following data : **32**
 Span of Truss-24 m
 Spacing of truss : 3 m
 Self-weight of purlin -220 N/m
 Weight of GI sheets-150 N/m²
 $K_1=1.0, K_2=0.98, K_3=1.0$ and $(C_{pe}-C_{pi})= -0.3$

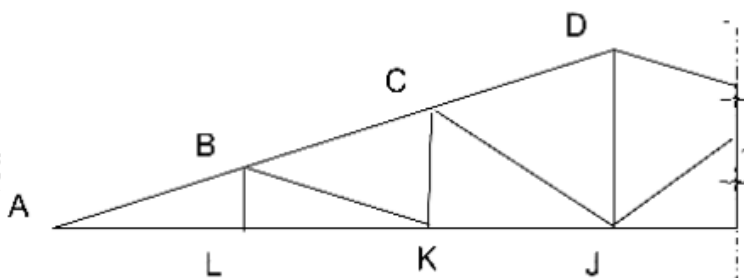


Fig.2

- 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** **06**. Calculate the size of the weld required to support a factored load of 100 kN. All dimensions in mm .

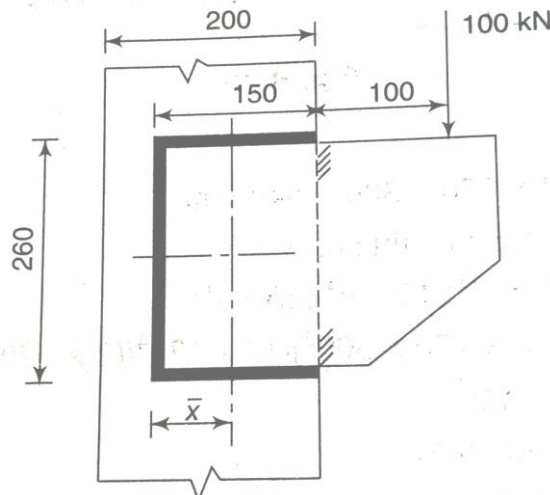


Fig.3

- 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 an 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**