

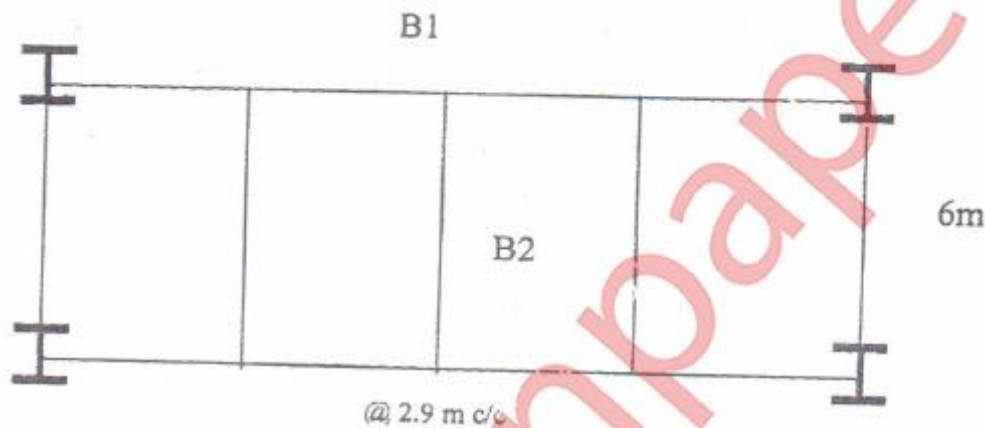
(4 Hours)

[Total Marks : 80

- Note: 1. Use of I.S 800 -2007 I.S 875 & Steel Table is allowed.
 2. Assume suitable data wherever necessary.
 3. Figures to the right indicate full marks.
 4. **Q.No.1** is compulsory & attempt any **three** from remaining questions.

Q.1 Figure shows the typical framing plan of a steel building. Design beam B1 and B2 as laterally supported. Use following data for the design. 32

- i). All beams support a brick wall of 150mm thk. & 3 m high having unit wt. 20 KN/m^3 .
 ii). Thk. of RCC slab is 130 mm & top flange of the beam is embedded in concrete. Unit wt. of concrete is 25 KN/m^3
 iii). Live load on slab is 3 KN/m^2 and wt. of floor finish is 1 KN/m^2



OR

- Q.1 The Pratt type trusses of a factory building are spaced at 4 m c/c & purlins are spaced at 1.2 m c/c. The pitch of the truss is $\frac{1}{4}$ & the span of the truss is 10 m. The wind load on the truss normal to the roof is 1100 N/m^2 (suction), the dead load due roofing sheets purlins may be taken as 400 N/m^2 and the live load may be taken as per I.S 875 (part-II).
- (a) Design principal rafter of the truss and the main tie for the critical load combination as per I.S:800-2007 22
 (b) Also design the purlin for the above truss. 7
 (c) Write step by step procedure to design wind load as per I.S 875 (part -III) 3
- Q.2 Design a built up column composed of two channel sections placed toe to toe. The column carries an axial factored load of 1475 KN. Effective length of column is 10.1m. Design single lacing system with tie plates at each end. Draw neat sketches to show details. Use 4.6 grade 20mm dia. bolts for the connections. 16

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- Q.3 Design gusseted base for ISHB 350 (medium) with 450mm x 16mm cover plate one on each flange. The column carries an axial factored load of 2400 kN. Assume M20 grade for concrete block and SBC of soil is 200 kN/m². Use 4.6 grade 20mm dia. bolts may be used for connections. Draw three views to show the design details. 16
- Q.4(a) The beam ISLB 325 @ 431 N/m has a factored end reaction of 200 kN. It is connected to the flange of a column ISHB 300 @ 630 N/m. Design an unstiffened seat connection. Use 4.6 grade bolts and steel grade Fe 410. 8
- (b) Determine the moment of resistance of a laterally unsupported beam ISMB 400 of effective span 4 m. 8
- Q.5(a) A welded plate girder 20 m in span and laterally supported throughout is simply supported at the ends. It has to support a udl of 100 kN/m (factored) including self weight. Design the central section of the plate girder without intermediate vertical stiffeners. Also design curtailment of flange plates, end bearing stiffeners and connections between flange and web using fillet welds. 16