ce 6 sem design and drawing of steel structure

Time allowed:4 hours   Maximum Marks:80

Instructions:1.Use of I.S 800 -2007 & 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 and   32
B2 as laterally supported. Use following data for the design.
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 120 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 0.75 KN/m^2
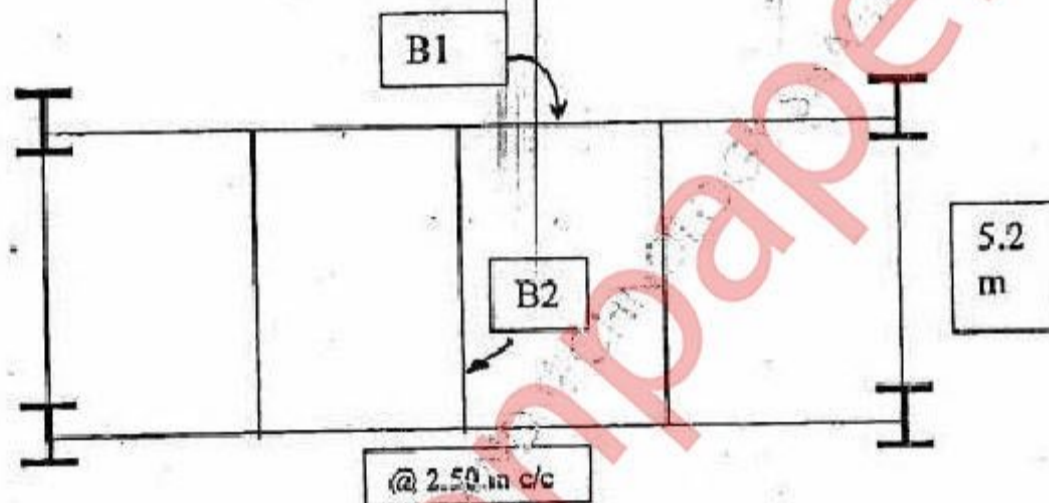
OR

Q.1   The Pratt type trusses of a factory building are spaced at 4.5 m c/c & purlins are
spaced at 1.4 m c/c.The pitch of the truss is ¼ & the span of the truss is10 m.
The wind load on the truss normal to the roof is 1200 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).   26

(a)Design principal rafter of the truss and the main tie for the critical load
combination as per I.S:800-2007   6

(b)Write step by step procedure to design wind load as per I.S 875 (part –III)

Q.2   Design a built up column composed of two channel sections placed back to back,   16
carrying an axial factored load of 1600 KN. Effective length of column is 5.2m.
Design battened system. Draw neat sketches to show details .Use 4.6 grade
20mm dia.bolts for the connections.

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Q.3   Design gusseted base for ISHB 350(medium) with 400mmx16mm cover plate one   16
on each flange. The column carries an axial factored load of 1600 KN. Assume
M15 grade for concrete block and SBC of soil is 150kN/m². Use 4.6 grade 20mm
dia. bolts for the connections.
Draw three views to show the design details.

Q.4(a)   The beam ISLB 325 @ 431 N/ m has a factored end reaction of 160 KN. It is   8
connected to the flange of a column ISHB 300 @ 630N /m. Design an unstiffened
seat connection. Use 4.6 grade bolts and steel grade Fe 410.

(b)   Determine the moment of resistance of a laterally unsupported beam ISLB 300 of   8
effective span 4 m.

Q.5(a)   Design the central section of 25 m long welded plate girder subjected to a   16
factored load of 50 kN/m inclusive of self weight. Provide suitable curtailment of
flange plates. Also design welded connection between web and flange plates.

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