

B. Tech 6th Semester Examination
Design of Steel Structures-II (OS)
CE-6001

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt one question each from Sections A, B, C and D. Section E is compulsory. All questions carry equal marks. Use of IS: 800 - 2007, IS: 801-1975 and IS 875 (part 2 and part 3) are allowed.

SECTION - A

1. A continuous beam has the spans and working design loads as shown in Fig. 1. Design a beam with cover plates where necessary. (20)

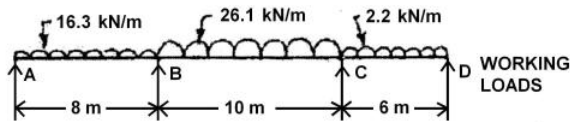


Fig. 1

2. A building consists of **uniform** portal frames with fixed bases having 16 m span and 10 m height. The frames are spaced 5m apart. The roof consists of beams and concrete slab such that the load on the frame is shown in Fig. 2. The wind load on the side may be taken as 5.5 kN/m. Design a portal frame

[P.T.O.]

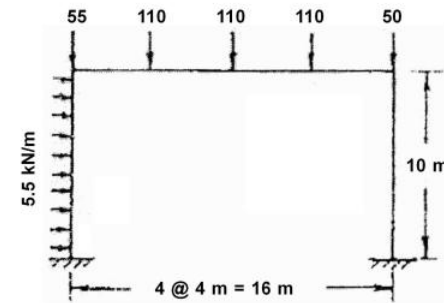


Fig. 2

for the building. Assume the frame to be laterally unsupported and use a uniform load factor of 1.7. (20)

SECTION - B

3. Design a roof truss, rafter bracing, purlin, tie runner, side runner, and eave girder for an industrial building located at Guwahati with a span of 20 m and a length of 50 m. The roofing is galvanized iron sheeting. Basic wind speed is 50 m/s and the terrain is an open industrial area. Building is class B building with a clear height of 8 m at the eaves. (20)
4. Design a rectangular pressed steel tank 7.50 m × 6.25 m × 2.50 metres deep supported at 9.0 m above ground level. The design seismic coefficient may be taken as 0.06. (20)

SECTION - C

5. What are the various forces acting on a steel stack ? Write down the design considerations for steel stacks. (20)
6. Describe with neat sketch different types of typical fabricated poles used for transmission towers? Also describe briefly the different types of typical tower configurations and the types of the main bracing systems used in towers. Describe the analysis procedure of transmission tower. (20)

SECTION - D

7. A beam section consists of two channel welded back to back to form a stiffened I-section as shown. It carries a uniformly distributed load of 250 kgf/m over a span of 4 m. The limiting deflection is $1/325$ of span. Determine if this section will meet the deflection limitations and check the adequacy of the given section in bending for the span and loading mentioned above, and also determine the maximum allowable spacing of lateral braces. Check the lip for minimum strength required for stiffener. (20)

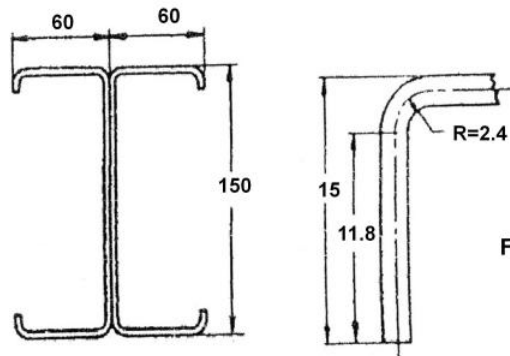
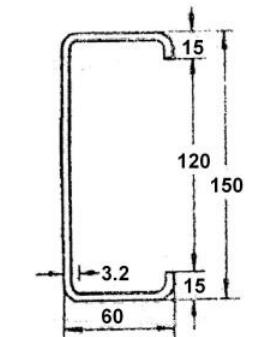


Fig. 3

DETAILS OF LIP

All dimensions in millimetres.

8. Find the allowable load P on the section shown in Fig. 4. Height of column = 4.5 m. Material of sheathing is standard density wood with K_w (modulus of elastic support) = 60 kg/cm. Wall sheathing of sufficient rigidity it attached to each of the flanges of the channel section, which prevents the channel section from buckling in the direction of minor axis. (20)



All dimensions in millimetres.

Fig. 4

[P.T.O.]

SECTION - E

9. Attempt any five.
- What are the various loads to be considered for the design of steel stacks?
 - Write the design criteria for pressed steel tanks.
 - Write a note on the plastic collapse analysis of steel beam.
 - What are the basis and advantages of plastic analysis?
 - Write a note on the general arrangement and stability for the Industrial Buildings.
 - What are stiffened and unstiffened Compression elements? (5x4=20)