



USN

--	--	--	--	--	--	--	--	--	--

10CV72

Seventh Semester B.E. Degree Examination, July/August 2021

Design of Steel Structures

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions.
2. Use IS:800-2007 and Steel table is permitted.

- 1 a. Explain with neat sketches, the different failures of bolted connections. (06 Marks)
- b. Distinguish between working stress design and limit state design of steel structures. (08 Marks)
- c. Name the common types of steel structures. (06 Marks)
- 2 a. Write the advantages and disadvantages of steel members. (05 Marks)
- b. Design a bolted connection between the flange of a column ISHB450@907 N/m and a bracket plate 15 mm thickness. The bracket plate is supporting a load of 150 kN at an eccentricity of 350 mm. Adopt HSFG bolts of property class 8.8. Take $f_{yb} = 640 \text{ N/mm}^2$, $f_{ub} = 800 \text{ N/mm}^2$ and $f_u = 410 \text{ N/mm}^2$; dia of bolts = 20 mm. (15 Marks)
- 3 a. Write the defects in welded connections with figure. (05 Marks)
- b. Calculate the load that can be transmitted through the eccentric welded connection shown in Fig.Q3(b). Take weld size = 6 mm. (15 Marks)

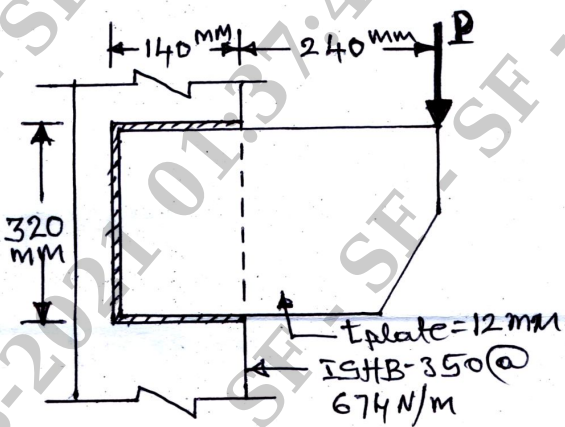


Fig.Q3(b)

(15 Marks)

- 4 a. Determine the shape factor for the inverted T-section of web 8 mm thick \times 80 mm deep and flange 100 mm wide \times 10 mm thick. (05 Marks)
- b. Determine the value of fully plastic moment for the two span continuous beam shown in Fig.Q4(b). Adopt a load factor 1.5. Draw admissible BMD. (15 Marks)

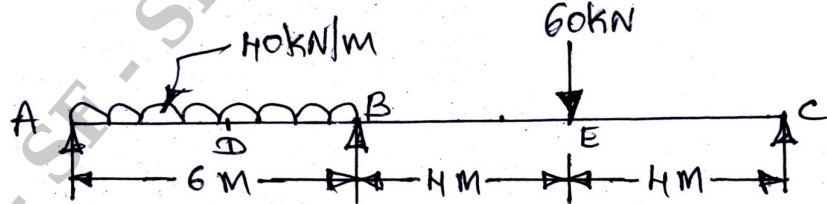


Fig.Q4(b)

(15 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.



10CV72

- 5 Design a double angle tension member connected on each side of a 10 mm thick gusset plate to carry a factored axial load of 320 kN. Use 20 mm black bolts. (20 Marks)
- 6 Design a compression member made up of two channel sections placed back to back to carry a factored load of 750 kN over a length of 10 m. The ends of the compression member restrained against displacement only. Design single lacing system with 16 mm dia bolts for all connections. (20 Marks)
- 7 Design a gusseted base for a column ISHB 400@822 N/m along with cover plates 400×12 mm both sides. The column carries an axial load of 1750 kN (factored load). Use M20 concrete and SBC of soil as 225 kN/m^2 . Also design the concrete base using M18 property class 8.8 HSFG bolts. (20 Marks)
- 8 Design a simply supported beam, using suitably ISMB section for an effective span of 6.0 m, subjected to a factored uniformly distributed load of 25 kN/m. Assume that it is laterally supported throughout. Apply all necessary checks. (20 Marks)

* * * * *