

SAMPLE PRACTICE QUESTIONS

STRUCTURAL DESIGN-II

- Sketch and briefly explain any three failure patterns of bolted connection.
- Design a tension member to carry an axial factored load of 500kN. Use a double angle rolled steel section connected (at site) to each side of a gusset plate of 10mm thick using 20mm diameter bolts of grade 4.6.
- Determine the strength and efficiency of a bolted lap joint shown in figure. The bolts are of 20mm diameter, grade 4.6. The plates are of 12mm thick and grade Fe410. Assume suitable data.
- Differentiate between bearing type connection & friction type connection.
- A tie member consisting of an angle section ISA100x75x8, designed to transfer a factored axial load of 280kN, is to be welded to a gusset plate of 10mm thick, using 6mm fillet weld. Design the weld, if the weld is provided on three sides by overlapping the angle on the gusset plate, at a shop. Also sketch the connection showing the weld lengths.
- Explain the classification of cross sections as per the IS 800: 2007 based on yield and plastic moments & rotational capacities.
- Determine the design compressive load capacity of a column made of a rolled steel section ISMC200@217N/m if length of the column is 3m, with both ends fixed.
- Differentiate between web buckling & web crippling. (5)
- b) An ISLB600@976.1N/m has been used as a simply supported beam over a span of 7.2m. Determine the safe uniform load that the beam can carry in flexure if the compression flange of the beam is restrained against lateral buckling.
- 6 a) Design a built up column with two channels placed back-to-back and separated apart. The column is of 6m effective length and supports a factored load of

- 1500kN. Also design the bolted lacing system.
- Answer any two full questions, each carries 20 marks.
-
- 7 a) Explain various loads and load combinations to be considered in the design of a
- roof truss
- b) Design an I section purlin for an industrial building, located at Chennai, with
- Galvanised iron sheets as the roofing material.
- Span of the truss =13m
- Spacing of trusses = 6m c/c
- Spacing of purlins = 1.2m c/c
- Wind pressure intensity = 2 kN/m²
- Weight of GI sheets =130N/m²
- Grade of steel : Fe 410
-
- a) Classify the timber based on grades, modulus of elasticity, durability, location
- and treatability.
- b) Design a bolted bracket connection (in plane) to support an end reaction of
- 500kN due to the factored loads supported by the beam, as shown in figure
- below. The eccentricity of the end reaction is 200 mm. The steel used is of grade
- Fe410 and bolts are of 20mm diameter, grade 4.6. The thickness of bracket plate
- may be taken as 10 mm. The column section is ISHB200 @366N/m.