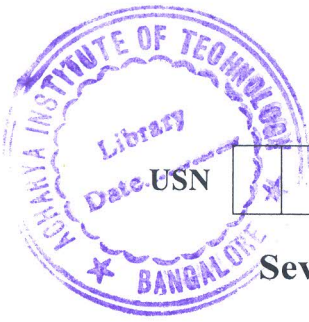


CBCS SCHEME



Date-USN

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

15CT72

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020

Design of Steel Structures

Time: 3 hrs.

Max. Marks: 80

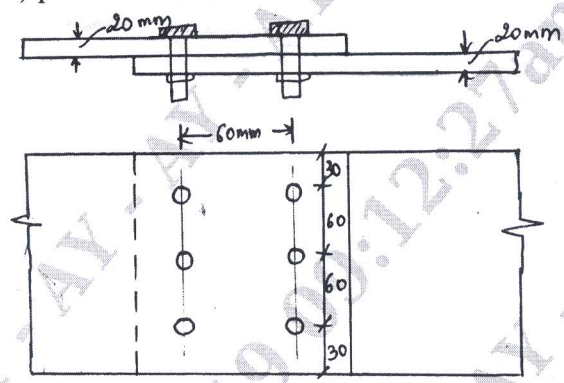
- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. IS800-2007 and SP6 are permitted.
 3. Steel Tables are permitted.
 4. Assume any missing data suitably.
 5. Draw suitable sketches, wherever necessary

Module-1

- 1 a. What are the advantages and disadvantages of using steel structures? (05 Marks)
- b. What are the different loads and load combinations to be considered in the design of steel structures? (05 Marks)
- c. Explain the design basis for limit state design. (06 Marks)

OR

- 2 a. Explain the failure modes of bolted joint. (06 Marks)
- b. Find the efficiency of the lap joint shown in Fig Q2(b). Given: M20 bolts of grade 4.6 and Fe410 (E250) plates are used.



All dimensions in mm

Fig Q2(b)

(10 Marks)

Module-2

- 3 a. Briefly explain different types of welded joints. (04 Marks)
- b. Determine the maximum load that can be resisted by the bracket shown in Fig Q3(b). Use shop welds.

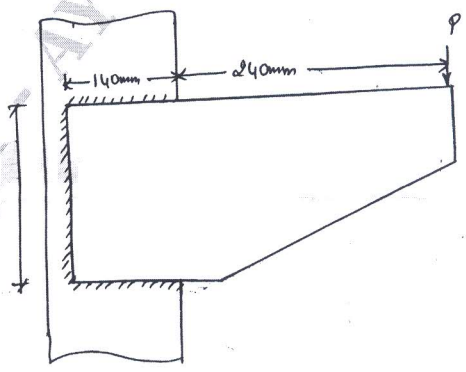


Fig Q3(b)

(12 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.

OR

- 4 a. What are the advantages and disadvantages of welded connections? (04 Marks)
 b. Design the welded connection to connect two plates of width 200mm and thickness 10mm for 100% efficiency. (12 Marks)

Module-3

- 5 a. Explain the term plastic hinge, load factor and shape factor. (06 Marks)
 b. Determine the collapse load for a simply supported beam loaded with UDL throughout by static and Kinematic method. (05 Marks)
 c. Determine the collapse load for a fixed beam loaded with UDL throughout by static and Kinematic method. (05 Marks)

OR

- 6 Design a single angle section for a tension member of a roof truss to carry a factored load of 225kN. The length of the member is 3m. (16 Marks)

Module-4

- 7 a. Explain the behavior of compression member. (04 Marks)
 b. In a truss a strut 3m long consists of 2ISA100100, 6mm. Find the factored strength of the member if the angles are connected in both sides of 12mm gusset by
 i) one bolt ii) two bolts iii) welding. (12 Marks)

OR

- 8 a. Explain the various modes of failure of a compression member. (06 Marks)
 b. Design a single angle strut connected to the gusset plate to carry 180kN factored load. The length of the strut between centre to centre intersections is 3m. (10 Marks)

Module-5

- 9 Design a slab base and concrete base for a column ISHB 400 subjected at an axial load of 1000kN. Use M20 concrete and SBC of soil = 200 kN/m². (16 Marks)

OR

- 10 A simply supported beam of span 6m carries a UDL of 50kN/m. Design the beam and check against deflection and lateral buckling of web. The beam is laterally restrained. (16 Marks)

* * * * *