Basavarajeswari Group of Institutions
BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT
(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

USN											Course Code	2	1	C	V	6	2

Sixth Semester B.E. Degree Examinations, September/October 2024
DESIGN OF STEEL STRUCTURAL ELEMENTS

Duration: 3 hrs   **Max. Marks: 100**

*Note: 1. Answer any **FIVE** full questions choosing ONE full Question from each Module.*
2. Use of IS 800:2007, steel tables & SP-6 are permitted.
3. Missing data, if any, may be suitably assumed

<u>Q. No</u>		<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PI)</u>

Module-1

1.	a.	What are the advantages and disadvantages of steel structures?	10	(2:1:1.2.1)
	b.	Distinguish between working stress design and limit state design of steel structures.	10	(2:1:1.2.1)

(OR)

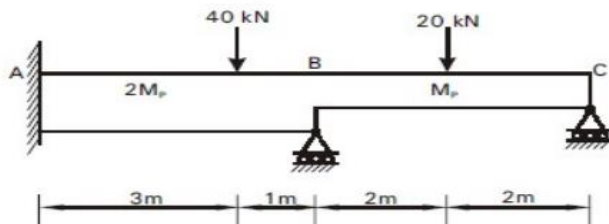|				
2.	a.	Calculate the plastic moment for propped cantilever carrying udl over the entire span.	10	(3:1:2.1.3)
	b.	Calculate the plastic moment for a continuous beam shown in Fig Q2. Take load factor 1.5	10	(3:1:2.1.3)

Fig. Q2

Module-2

3.	a.	What are the advantages and disadvantages of bolted connections?	10	(2:2:1.2.1)
	b.	Design the bolted connection for a lap joint of plate thickness 20 mm and 12 mm to carry a factored load of 70 kN. Use M16 and 4.6 grade bolts and grade 410 plates.	10	(3:2:2.1.3)

(OR)

4.	a.	Explain the defects in welding.	10	(1:2:1.2.1)
	b.	Two plates 60 ×10 mm and 100 ×10 mm connected with lap joint to mobilse the tensile strength of the plate using fillet welding in work shop. Design a longitudinal fillet weld.	10	(3:2:3.1.4)

Module-3

5.	a.	Explain the failure modes of an axially loaded column.	10	(1:3:1.2.1)
	b.	A Single angle discontinues member ISA 110 ×110 ×10 mm with single bolted connection in 2.5 m long. Calculate the safe load carrying capacity of section. Assume both ends are fixed.	10	(3:3:2.1.3)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI– Performance Indicator)

6.		Design a laced column 9 m long to carry a factored axial load of 1200 kN. The column is fixed at the both ends. Provide single lacing system with bolted connection. The column consists of two channels placed back-to-back.	**20**	**(3:3:3.1.4)**

Module-4

7.	**a.**	Explain the factors effecting strength of tension members.	**10**	**(1:4:1.2.1)**
	b.	A Single unequal angle ISA $90 \times 60 \times 8$ mm is connected to 10 mm gusset plate with six number of 20 mm bolts to transfer tension. Determine the design tensile strength of the angle if gusset plate is connected to 60 mm leg.	**10**	**(2:4:2.1.3)**

(OR)

8.	**a.**	Design a slab base for a column made of ISHB250@536.6 N/m to carry an axial working load of 520 kN. The grade of concrete is M20 and grade of steel Fe 410. Also design welded connection to base plate.	**20**	**(3:4:3.1.4)**

Module-5

9.	**a.**	Explain the difference laterally supported beam and laterally unsupported beam.	**10**	**(1:5:1.2.1)**
	b.	Determine the design Bending strength of ISMB300 @ 433.6 N/m. The unsupported length of beam is 3 m. Assume beam is laterally supported. Check the safety of beam.	**10**	**(3:5:2.1.3)**

(OR)

10.		Design a steel beam section for supporting hall for the following data: Clear span: 6.5 m End bearing: 200 mm C/C Spacing of beams :3 m Imposed Load on the beams :12 kN/m^2 Dead load (Inclusive of self-weight): 3 kN/m^2	**20**	**(3:5:3.1.4)**

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Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI– Performance Indicator)