Q. Code:376566

Reg. No. | | | | | | | | | | | | | |

B. E / B. TECH.DEGREE EXAMINATIONS, MAY 2024

Sixth Semester

CE18601 – DESIGN OF STEEL STRUCTURES

(CIVIL ENGINEERING)

(Regulation 2018/2018A)

(Use of IS 800, IS 808, IS875 (Part 3) and Steel Tables may be permitted)

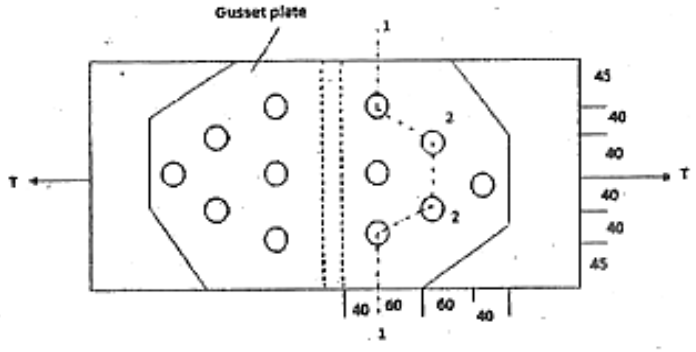
TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Upon successful completion of the course, the student should be able to Provide the apt connection for the problem statement using codal provisions.	**3**
CO 2	Design of tension members using codal provisions.	**3**
CO 3	Design columns and columns bases.	**3**
CO 4	Design bending member with appropriate section using design principles.	**3**
CO 5	Compute the wind loads and others loads on industrial structures based on codal provisions.	**3**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Distinguish between gauge distance and pitch of the bolt.	**1**	**2**
2.	How to calculate the efficiency of a joint?	**1**	**2**
3.	Calculate the net effective area for the bolted connection shown in the figure for section 1-2-2-1. Use 4.6 grade of bolt 24 mm diameter	**2**	**3**



All dimensions are in mm

4.	What is shear lag? How can it be reduced?	**2**	**2**
5.	What is the purpose for providing anchor bolts in the base plate?	**3**	**2**
6.	Define Slenderness ratio.	**3**	**1**
7.	What do you mean by castellated beam?	**4**	**1**
8.	What are the different types of stiffeners provided in a plate girder?	**4**	**2**
9.	What are the key advantages of using PEBs over conventional buildings?	**5**	**2**
10.	Discuss the types of load combinations for the analysis of roof truss.	**5**	**2**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Design a single bolted double cover butt joint to connect plates Fe410 grade having thickness 16 mm. Use M16 bolts of grade 4.6. Find the efficiency of the joint.	**(14)**	**1**	**3**
	(OR)			
(b)	Design a lap joint between the two plates of width 150 mm, if the thickness of one plate is 12 mm and the other is 10 mm. The joint has to transfer a working load of 100 kN. The plates are of Fe 410 grade. Use bearing type bolts.	**(14)**	**1**	**3**

12. (a)	Find the tension carrying capacity of single angle ISA 100 x 100 x 8 mm connected to gusset by means of three bolts of 22mm diameter at a pitch of 80 mm centre to centre in one line. Take fy = 250 N/mm^2 and fu = 410 N/mm^2.	**(14)**	**2**	**3**
	(OR)			
(b)	Design a tension member using two angle sections to carry 180kN when both angles are connected on both sides of the gusset plate.	**(14)**	**2**	**3**
13. (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.	**(14)**	**3**	**3**
	(OR)			
(b)	Design a gusseted base for a column ISHB 350 @710N/m with two plates 450mm x 20mm carrying a factored load of 3600 kN. The column is to be supported on a concrete pedestal to be built with M25 concrete.	**(14)**	**3**	**3**
14. (a)	Design a simply supported beam of effective span 1.5m carrying a factored concentrated load of 360 kN at mid span.	**(14)**	**4**	**3**
	(OR)			
(b)	An ISMB 500 section is used as a beam over a span of 6 m, with simply supported ends. Determine the maximum factored uniformly distributed load that the beam can carry if the ends are restrained against torsion but compression flange is laterally unsupported.	**(14)**	**4**	**3**
1 5. (a)	Design a truss of span 15m spacing 4m to be built near Visakhapatnam with the following details: Class of building=General with life of 50 years Terrain = Category 2 Max.dimension:40m Width of building: 15m Height at eve level: 8m Topography: □less than 3°	**(14)**	**5**	**3**
	(OR)			

		Marks	CO	RBT LEVEL
(b)	Design an angle purlin for a trussed roof from the following data. Span of the roof truss is 12m Spacing of roof truss is 5m Spacing of purlins along the slope of roof truss is 1.2m Slope of roof truss=1/2 Wind load on roof surface normal to roof=1.04kN/m^2 Vertical load from roof sheeting=0.2kN/m^2.	**(14)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Design a lap joint between the two plates of width 150 mm, if the thickness of one plate is 12 mm and the other is 10 mm. The joint has to transfer a working load of 100 kN. The plates are of Fe 410 grade. Use appropriate connections.	**(10)**	**1**	**3**

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