VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

QUESTION BANK

VI SEMESTER

CE6603 – DESIGN OF STEEL STRUCTURES

Regulation – 2013

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SUBJECT CODE: CE6603 **YEAR: III**

SUBJECT NAME: DESIGN OF STEEL STRUCTURES **SEM : VI**

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(As per Anna University 2013 Regulation)

UNIT I - INTRODUCTION

Properties of steel – Structural steel sections – Limit State Design Concepts – Loads on Structures – Connections using rivets, welding, bolting – Design of bolted and welded joints – Eccentric connections - Efficiency of joints

Q.NO	PART-A	BT level	Competence
1.	List the various types of connections used for connecting the structural members?	BT-1	Remember
2.	Construct the formula to calculate the efficiency of Bolt and weld Joint.	BT-5	Evaluate
3.	Formulate the equation for calculating the effective throat thickness of weld?	BT-5	Evaluate
4.	List the types of failures occur in riveted joint?	BT-1	Remember
5.	Outline the concept of riveting?	BT-2	Understand
6.	Define the terms – Pitch of a rivet & nominal diameter of rivet.	BT-1	Remember
7.	Differentiate nominal diameter and gross diameter of bolt.	BT-2	Understand
8.	List the various types of welded joints	BT-1	Remember
9.	Summarize the advantages of HSFG bolts?	BT-3	Apply
10.	Define the terms gauge, pitch, edge and end distance of bolt joint	BT-1	Remember
11.	Classify the types of bolts used for structural purposes?	BT-3	Apply
12.	Recommend the limit states of serviceability applicable to steel structures?	BT-6	Create
13.	Discuss the factors to be considered in mechanical properties of structural steel?	BT-2	Understand
14.	Summarize about splitting of plates.	BT-3	Apply
15.	Arrange the double riveted lap joint with neat sketch	BT-4	Analyse

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16.	Compare and contrast the high tension bolt from common black bolt?	BT-4	Analyse
17.	Define the design strength due to block shear	BT-1	Remember
18.	Recommend the minimum pitch and maximum pitch as IS 800-2007	BT-6	Create
19.	Compare the advantages of welded connection over bolted connection.	BT-2	Understand
20.	Establish the terms slip factor and prying action.	BT-4	Analyse

Q.NO	PART-B	BT Level	Competence
1.	Two plates 10 mm and 20 mm thick are connected by double cover butt joint made of 8mm cover plate. Record the strength of the joint. If 6 numbers of M20 bolts of grade 4.6 and Fe 415 are used on either sides of the joint in two rows with pitch of 60mm and edge distance of 40mm in both direction.	BT-1	Remember
2.	Describe about the following a) Design philosophies for structural steel (7) b) Show the various limit states to be considered in design of steel structures (6)	BT-1	Remember
3.	Discuss about the following a) Sectional classification and properties of structural steel (7) b) Factor of safety for loads and materials (6)	BT-2	Understand
4.	Estimate the dimensions of a doubly bolted lap joint for plates 16mm thick to carry its full load. Take permissible axial tension in plate 150N/mm^2	BT-2	Understand
5.	Estimate the safe load and efficiency of a double cover butt joint. The main plates are 12mm thick connected by 18mm diameter bolts at a pitch of 100mm. Design the cover plate also. What is the percentage reduction in the efficiency of the joint if the plates are lap jointed?	BT-2	Understand
6.	A single bolted double cover butt joint is used to connect two plates 8mmthick. Assuming 20mm bolts at 50mm pitch examine and record the efficiency of the joint. The thickness of cover plate is 4mm	BT-1	Remember
7.	A tie member 75 mm X 8mm is to transmit a load of 90 kN. What is the length of the fillet weld and calculate the necessary overlap.	BT-1	Remember
8.	An ISLC 300 @ 331N/m is used to transmit a force of 500KN. The channel section is connected to a gusset plate of 8mm thick. Identify the suitable fillet weld if the overlap is limited to 350mm.	BT-3	Apply

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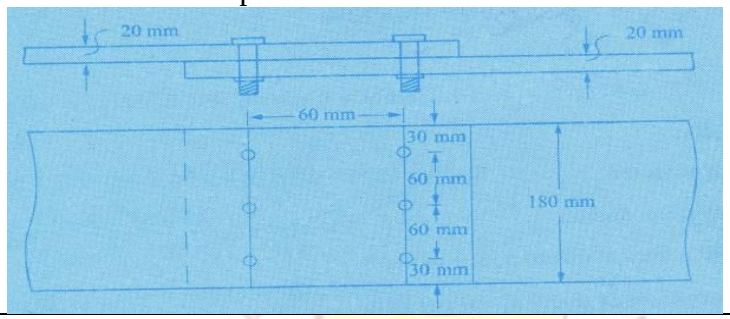
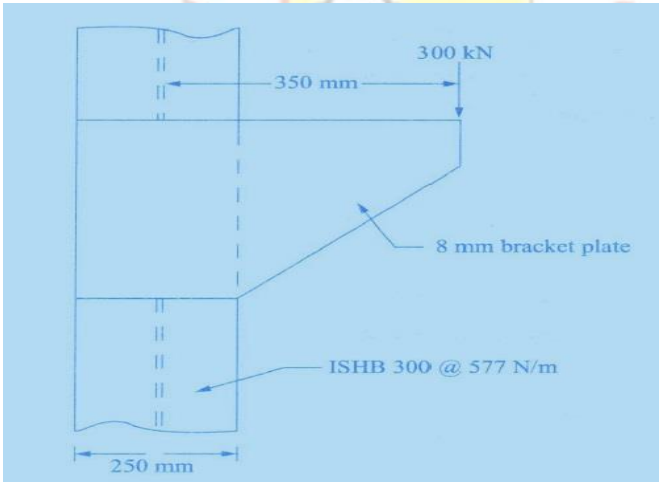
9.	A tension member made of 2 ISA 100 x 75 x 12 mm is connected to a 12mm thick gusset plate with long legs and carries a factored pull of 420KN , Design suitable shop weld connection.	BT-4	Analyse
10.	Design a double bolted lap joint for a plate of 20mm thickness to carry its full load. a. If the bolts are bearing type b. If the bolts are friction grip type bolts	BT-5	Evaluate
11.	A bridge truss carries an axial pull of 400 KN. It is to be a gusset plate22mm thick by a double cover butt joint with 22 mm diameterpower driven rivets. Design an economical joint. Examine the efficiency of the joint.	BT-4	Analyse
12.	Calculate the efficiency of the lap joint shown in fig. use M20 bolts of grade 4.6 and Fe 410 plates. 	BT-3	Apply
13.	A bracket is bolted to the flange of a column as shown. Use 8 mm thick bracket plate and M20 bolts of grade 4.6, Illustrate and design the connection. 	BT-3	Apply
14.	Design a lap joint between the two plates each of width 120mm, if the thickness of one plate is 16 mm and the other is 12 mm. The joint has to transfer a design load of 160kN. The plates are of Fe 410 grade. Use bearing type plates.	BT-6	Create

Q.NO	PART-C	BT Level	Competence

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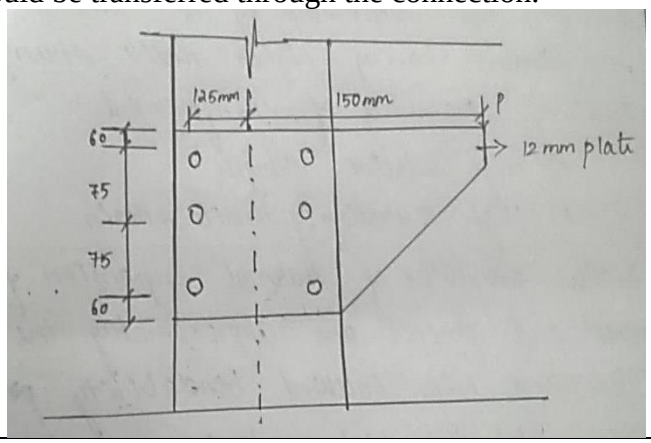
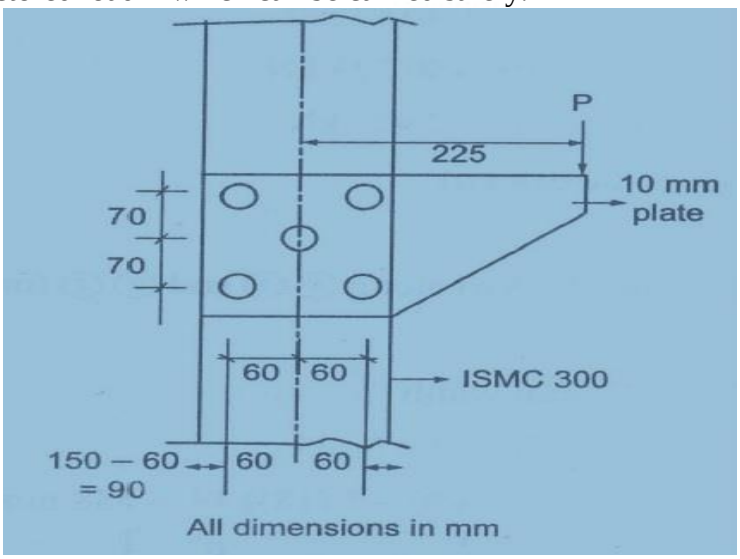
1.	A bracket connection shown in figure is with 24mm diameter bolts of grade 4.6 and plate grade Fe 410 steel. Determine the Safe load P that could be transferred through the connection. 	BT-4	Analyse
2.	A bracket bolted to a vertical column is loaded as shown in figure. If M20 bolts of grade 4.6 are used, determine the maximum value of factored load P which can be carried safely. 	BT-4	Analyse
3.	A tie member of a roof truss consists of 2 ISA 90 mm X 60 mm X 10 mm. The angles are connected on either side of 12 mm gusset plate and the member is subjected to a pull of 400kN. Design the welded connection.	BT-6	Create
4.	A tie member of a roof truss consists of 2 ISA 90 mm X 60 mm X 8 mm. The angles are connected on either side of 12 mm gusset plate and the member is subjected to a pull of 375kN. Design the welded connection.	BT-6	Create

UNIT II - TENSION MEMBERS

Types of sections – Net area – Net effective sections for angles and Tee in tension – Design of

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connections in tension members – Use of lug angles – Design of tension splice – Concept of shear lag			
Q.NO	**PART-A**	**BT level**	**Competence**
1.	Define tension member?	BT-1	Remember
2.	Write the expression for calculating net area for angle and T-section in tension.	BT-5	Evaluate
3.	Define slenderness ratio.	BT-5	Evaluate
4.	When gusset plates areused?	BT-1	Remember
5.	Formulate to calculate net area in (a) chain bolting (b) zigzag bolting.	BT-2	Understand
6.	Name the types of steel sections used as tension members.	BT-1	Remember
7.	Classify the modes of failure in Tension member.	BT-2	Understand
8.	Write down the expression for design of angle tension member.	BT-1	Remember
9.	Distinguish Net sectional and Gross area?	BT-3	Apply
10.	Discuss Tension Splice.	BT-1	Remember
11.	Discuss Shear Lag in Tension member?	BT-3	Apply
12.	Illustrate built-up members?	BT-6	Create
13.	What is the formula for design strength due to yielding of critical section?	BT-2	Understand
14.	Extend the equation for calculating the effective net area for a double angle joined back to back.	BT-3	Apply
15.	Examine lug angle and its use?	BT-4	Analyse
16.	Investigate the design strength due to block shear.	BT-4	Analyse
17.	Plan two specifications for designing of lug angle	BT-1	Remember
18.	What if a single angle with one leg is connected to a gusset plate which is subjected to an eccentric load?	BT-6	Create
19.	Select any two typical cross sections of tension member using angle sections with neat sketch.	BT-2	Understand
20.	Measure the maximum pitch when the angles are placed back to back?	BT-4	Analyse

Q.NO	**PART-B**	**BT Level**	**Competence**
1.	Design the tensile strength of a roof truss diagonal 100x75x8 mm connected to the gusset plate by 5mm welds .	BT-2	Understand
2.	Use 10mm thick gusset plate and 20 mm diameter black bolts to design a tension member to carry factored axial tension of 450KN.	BT-1	Remember

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3.	Determine the tensile strength of a roof truss member 2 ISA 90x60x6 mm connected to the gusset plate of 8 mm thickness by 4mm weld. The effective length of weld is 200mm.	BT-3	Apply
4.	Design a tension member to carry a factored force of 340KN. Use 20mm diameter black bolts and a gusset plate of 8mm thick.	BT-1	Remember
5.	Design a single angle equal section 100x100x10 mm, connected to a gusset plate at the ends with 20mm diameter bolts with the connection length of 250mm to transfer tension.	BT-1	Remember
6.	Write the procedure for the design of tension members	BT-4	Analyse
7.	Explain in detail about the modes of failure in Tension member.	BT-1	Remember
8.	Find the suitable dimensions so as to design a tension member using 2 unequal angles of size 120mm x 90mm x 8mm with a 10mm thick gusset plate. The short leg is outstanding. The pull on the member of 250kN	BT-4	Analyse
9.	Explain the concept of shear lag in detail	BT-2	Understand
10.	Discuss in detail about Tension member splice	BT-5	Evaluate
11.	Find the suitable design for a single angle section for a tension member of a roof truss to carry a factored tensile force of 225KN. The member is subjected to the possible reversal of stress due to the action of wind. The length of the member is 3m.use 20mm shop bolts of grade4.6 for the connection.	BT-2	Understand
12.	Design as bridge truss diagonal subjected to a factored tensile load of 300 kN. The length of the diagonal is 3.0m. the tension member is connected to a gusset plate of 16mm thick with one line of 20mm diameter bolts of grade 8.8	BT-6	Create
13.	Determine the tensile capacity of the sections a) Angles are placed on the opposite side of gusset plates b) Angles are placed on the same side of gusset plates	BT-3	Apply
14.	Illustrate lug angle with neat sketch and give its uses also	BT-4	Analyse

Q.NO	**PART-C**	**BT Level**	**Competence**
1.	A single unequal angle ISA90x60x6 mm is connected to a 12mm gusset plate at the ends with 4 nos of 16mm bolts to transfer tension as shown. Determine the design tensile strength of the angle a) If the gusset is connected to 90mm leg b) If the gusset is connected to 60mm leg	BT-5	Evaluate

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	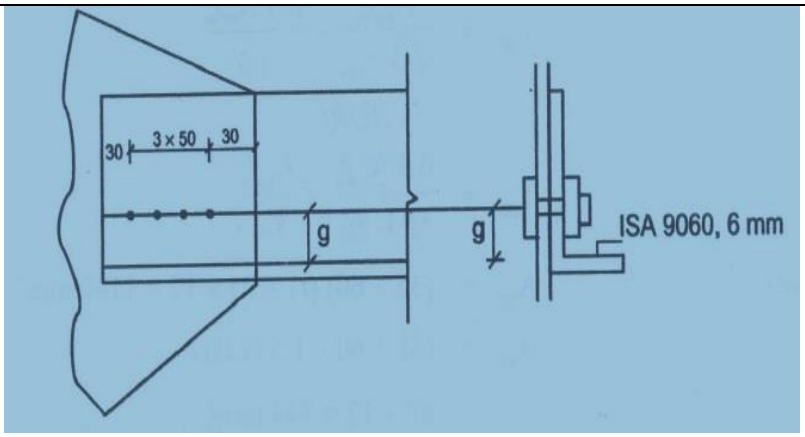		
2.	Identify the suitable design for a tension splice for a tension member sections 160mm x 10mm and 250mm x 12 mm. The member is subjected to a pull of 200 KN.	BT-5	Evaluate
3.	Design a splice to connect a 300mmx20mm plate with 300mmx10mm plate to carry design load of 500 kn. Use 20 mm black bolts	BT-3	Apply
4.	A tension member of a roof truss carries a factored axial tension of 430kN. Design the section and the connection a) Without using lug angles b) Using lug angles	BT-3	Apply

UNIT III - COMPRESSION MEMBERS

Types of compression members – Theory of columns – Basis of current codal provision for compression member design – Slenderness ratio – Design of single section and compound section compression members – Design of laced and battened type columns – Design of column bases – Gusseted base

Q.NO	PART-A	BT level	Competence
1.	Define compression member and slenderness ratio	BT-1	Remember
2.	List the various types of compression members?	BT-1	Remember
3.	Distinguish column and strut	BT-2	Understand
4.	Define effective length of a column.	BT-1	Remember
5.	State the uses of providing column base?	BT-1	Remember
6.	What are the different way by which a compression member buckles. Construct the diagram of buckling modes of column.	BT-6	Create
7.	Evaluate the effective length of column based on end conditions	BT-5	Evaluate
8.	What do you mean by web buckling?	BT-1	Remember
9.	Discuss the purpose of providing battens in compound steel columns?	BT-2	Understand

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10.	Explain gusset base and strut	BT-2	Understand
11.	Classify the modes of failure in compression member.	BT-3	Apply
12.	Define buckling load and state the assumptions made in Euler's analysis	BT-1	Remember
13.	Illustrate the lateral systems that are used in compound columns.	BT-4	Analyse
14.	Explain effective sectional area in column design	BT-4	Analyse
15.	Differentiate between slab base and gusseted base for steel columns	BT-2	Understand
16.	Examine the cause for decrease in permissible stresses due toincrease in slenderness ratio	BT-4	Analyse
17.	Why lacings are used in compression members?	BT-3	Apply
18.	Justify the purpose for providing anchors bolt in base plate?	BT-5	Evaluate
19.	Where should the splice plate be located in a column?	BT-6	Create
20.	What do you mean by latticed column	BT-3	Apply

Q.NO	PART-B	BT Level	Competence
1.	A rolled steel beam section HB 350 @ 0.674 kN/m is used as astanchion. If the unsupported length of the stanchion is 4 m, evaluatesafe load carrying capacity of the section.	BT-5	Evaluate
2.	Find the suitable design for a built-up column consisting of twochannels connected by batten to carry an axial load of 800 KN; theeffective length of the column is 6 m.	BT-1	Remember
3.	Explain the step by step procedure for finding the load carrying capacity of a compression member.	BT-2	Understand
4.	A 4.8m long column with one end fixed and other end hinged is made of ISMB 400 with a flange plate of 300 x 20 mm welded to each flange. Determine the load carrying capacity of the column section, if the grade of steel is Fe415 / E250.	BT-3	Apply
5.	i) List out the maximum values of effective slenderness ratio for various members as per IS recommendations. (7) ii) Analyse the different failure modes of column in detail (6)	BT-4	Analyse
6.	Find the suitable design for a rolled steel beam section column to carry an axial load 1100 kN. The column is 4 m long and adequately in position but not in direction at both ends.	BT-1	Remember
7.	Illustrate in detail about column splice and mention its purpose	BT-3	Apply
8.	A column of ISMB 400 is subjected to an axial force of 750kN. Analyse and design suitable base plate. Assume necessary data required.	BT-4	Analyse
9.	Find the suitable design for a laced column for an axial load of 1200kN with an effective span of 7.5m has one end fixed and other	BT-1	Remember

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	end hinged. Use channels for main members and an angle for lacing		
10.	A built up column consists ISHB 400@ 77.40 kg/m with one 300mm x 12mmflange plate on each side. The column carries an axial load of 2600kN. Determine the suitable dimension for a gusseted base, if the column is supported on concrete pedestal with a bearing pressure of $5N/mm^2$.	BT-1	Remember
11.	Describe about laced column and also explain its design and specifications.	BT-2	Understand
12.	Design a column with single lacing system to carry a factored axial load of 1500kN. The effective height of the column is 4.2m. Use two channels placed toe to toe.	BT-2	Understand
13.	Identify the suitable design for a slab base for a column ISHB 300 @577N/m carrying an axial factored load of 1000kN. Use M20 grade concrete and provide welded connection between column and base plate.	BT-4	Analyse
14.	Design a suitable slab base for a column section ISHB 400@ 822 N/m. Supporting an axial load 500kN. The base plate is to rest on a concrete pedestal of M20 grade concrete.	BT-6	Create

Q.NO	PART-C	BT Level	Competence
1.	Design a built up column 6 m long to carry a load of 400 kN. The column is restrained in position but not in direction at both the ends. Provide single angle lacing system with bolted connections.	BT-1	Remember
2.	A built up column consists of ISHB 400 @ 77.4 kg/m with one 300 mm x 12 mm flange plate on each side. The column carries an axial load of 2600 kN. Design a gusseted base if the column is supported on concrete pedestal with a bearing pressure of 5 N/mm^2.	BT-4	Analyse
3.	Calculate the compressive resistance of a compound column consisting ISMB 500 with one cover plate 350 x 20 mm on each flange and having a length of 5 m. Assume that the bottom of column is fixed and top is rotation fixed, translation free.	BT-2	Understand
4.	A steel column ISHB 400 @ 759.3 N/m is subjected to a factored axial load of 2000 kN. Design a slab base plate for the column. Assume that the bearing surfaces of the column and base plate are machined and the concrete footing is of M20 grade.	BT-3	Apply

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UNIT IV - BEAMS

Design of laterally supported and unsupported beams – Built up beams – Beams subjected to uniaxial and biaxial bending – Design of plate girders - Intermediate and bearing stiffeners – Flange and web splices.

Q.NO	PART-A	BT level	Competence
1.	Define shape factor and what is meant by slender section?	BT-1	Remember
2.	Write the various factors affecting the lateral-torsional buckling strength	BT-6	Create
3.	What is laterally unsupported beam? Give an example.	BT-1	Remember
4.	Demonstrate the reasons behind splicing in plate girder	BT-3	Apply
5.	Evaluate the economical depth of a plate girder?	BT-5	Evaluate
6.	Write about the Box girders.	BT-3	Apply
7.	Construct the failure mode of laterally unsupported beams	BT-6	Create
8.	What do you mean by castellated beam?	BT-1	Remember
9.	Explain effective sectional area in column design	BT-4	Analyse
10.	Write the formula for calculating the thickness of beam bearing plate	BT-3	Apply
11.	Discuss about built up beams	BT-2	Understand
12.	Distinguish web buckling and web crippling?	BT-4	Analyse
13.	What are the classifications in Stiffeners?	BT-1	Remember
14.	Examine the purpose of providing stiffener in plate girder and what are the different types of stiffeners provided in plate girder?	BT-4	Analyse
15.	Define laterally restrained beam. Why do compression flanges require lateral support?	BT-1	Remember
16.	What do you mean by curtailment of flanges?	BT-2	Understand
17.	Justify the purpose for providing the bearing stiffener and where it is used?	BT-5	Evaluate
18.	How do you improve the shear resistance in plate girder?	BT-2	Understand
19.	What is web crippling?	BT-1	Remember
20.	Discuss the elements of the plate girder.	BT-2	Understand

Q.NO	PART-B	BT Level	Competence
1.	An ISMB 500 section IA 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.	BT-5	Evaluate
2.	Find the suitable design for a simply supported steel joist with a 4.0m effective span carries a UDL of 40kN/mover its span inclusiveof self-weight. The beam is laterally unsupported.	BT-1	Remember

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3.	Find the suitable design for a simply supported beam of effective span 10m carrying a factored load of 30kN/m. The compression flange of the beam is laterally restrained all along and provided with stiffened end bearing of 100mm wide. The overall depth of thebeam is restricted to 450mm.	BT-1	Remember
4.	Estimate the suitable built up beam section for a span of 8m to carry a uniformly distributed load of 15kN/m and a central concentrated load of 100 kN. The beams is laterally supported through out.Show the curtailment of plates also	BT-2	Understand
5.	Write short notes on: (i) Bending strength of a laterally supportedbeam (ii) Shearing strength of a laterally supported beam	BT-1	Remember
6.	A welded plate girder of span 25m is laterally restrained throughout its length. It has to carry a load of 80 kN/m over the whole span besides its weight. Design the girder without intermediate transverse stiffeners.	BT-6	Create
7.	Explain the step by step procedure for design of vertical, intermediate and horizontal stiffeners in a plate girder.	BT-2	Understand
8.	Analyse the expression for the economical depth of the plate girder.	BT-4	Analyse
9.	A welded plate girder has i) Each top and bottom flange = 435 x 28 mm and ii) Web 1250 x 10 mm. Predict the design of vertical and horizontalstiffeners.	BT-2	Understand
10.	Design a bearing stiffener for a welded plate girder with the following specifications. Web = 1000mm X 6mm thick. Flanges = 2 Nos. of 350X20mmplate on each side. Support reaction = 350kN.Width of the support = 300mm.	BT-4	Analyse
11.	Check the beam section WB 500 @1.45 kN/m against web crippling and web buckling if reaction at the end of beam is 179.6 kN, The length of bearing plate at the support is 120 mm. Design bearing plate. The bearing plate is set in masonry	BT-1	Remember
12.	A plate girder of span 15m is made-up of web plates of 1600mm x 8mm flange angles150mmx 115mm x 10mm and two flange plates 480mm x 10mm itcarries a uniformly distributed load of 100kN/m including its ownweight. Identify the suitable design and sketch the web splices at5m from one end.	BT-4	Analyse
13.	A simply supported beam of span 3.25m consists of rolled steel section ISLB 325 @ 422.8 N/m. Determine the design bending strength of the beam, if the beam is laterally unsupported.	BT-3	Apply
14.	Show the design of web and flanges for a reverted plate girder is simply supported over an effective span of 16m. It carries a UDL of 80kN/m in addition to its self weight. And two points of 400kN each at 4m from their supports.	BT-3	Apply

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Q.NO	PART-C	BT Level	Competence
1.	Determine the design bending strength of ISLB 350 @ 486 N/m considering the beam to be (a) laterally supported (b) laterally unsupported. The design shear force V is less than design shear strength. The unsupported length of beam is 3 m. Steel is of grade Fe410	BT-2	Understand
2.	A simply supported steel joist of 4 m effective span is laterally supported throughout. It carries a total udl of 40 kN (service load inclusive of self weight). Design an appropriate section using steel of grade Fe 410.	BT-3	Apply
3.	Design a laterally restrained simply supported beam to carry a uniformly distributed load of 44 kN/m. The effective span of the beam is 8 m. A bearing length of 75 mm is provided at the supports.	BT-4	Analyse
4.	Design rolled steel I section for a simply supported beam with a clear span of 6 m. It carries a UDL 50 kN/m excluding self weight of the girder. The beam is laterally supported.	BT-3	Apply

UNIT V- ROOF TRUSSES AND INDUSTRIAL STRUCTURES

Roof trusses – Roof and side coverings – Design of purlin and elements of truss; end bearing – Design of gantry girder.

Q.NO	PART – A	BT Level	Competence
1.	Explain the co efficient of external wind pressure.	BT-2	Understand
2.	What are economical considerations for industrial truss?	BT-4	Analyse
3.	Write the uses of sag rod in a roof truss	BT-3	Apply
4.	Explain about the importance of steel decking.	BT-2	Understand
5.	State the necessity of curtailment of flange plates in plate girder.	BT-4	Analyse
6.	What is the purpose of the purlin in a roof truss?	BT-5	Evaluate
7.	What are the loads to be considered for the design of gantry girder?	BT-4	Analyse
8.	List the criteria to be adopted for arriving at the spacing of truss?	BT-5	Evaluate
9.	List the various components of a roof truss.	BT-3	Apply
10.	Classify the type of truss based on span.	BT-3	Apply
11.	Define bracing and Why bracings required in roof trusses?	BT-1	Remember

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12.	Give general guidelines for fixing spacing of roof trusses	BT-1	Remember
13.	Define pitch of trusses	BT-1	Remember
14.	Discuss about Principles of plastic analysis	BT-2	Understand
15.	Define gantry girders	BT-1	Remember
16.	Which section is recommended for gantry girder?why	BT-6	Create
17.	Define Drift Analysis	BT-1	Remember
18.	Explain recommended allowable stresses and deflection for gantry girder?	BT-6	Create
19.	Name the commonly used roof coverings.	BT-2	Understand
20.	Define end bearing in roof trusses?	BT-1	Remember

Q.NO	PART – B	BT Level	Competence
1.	i.Classify the different types of roof truss with neat sketches (7) ii.Give general guidelines for fixing spacing of roof trusses (6)	BT-2	Understand
2.	A roof truss- shed is to be built Jodhpur city area for an industrial use. Determine the basic wind pressure .The use of shed 18 m x 30 m	BT-1	Remember
3.	An industrial roof shed of size 20 mx30 m is proposed to be constructed at Mangalore near a hillock of 160 m and slope is 1 in 2.8. The roof shed is to be built at a height of 120 m from the base of the hill. Determine the design wind pressure on the slope. The height of roof shed shall be 12m	BT-1	Remember
4.	A communications tower of 80 m height is proposed to be built hill top height 520 m with a gradient of 1in 5. The horizontal approach distance is 2.8 m km from the level ground .The tower is proposed at Abu mount .Determine the design wind pressure.	BT-1	Remember
5.	Design a purlin for a roof truss having the following data: Span of the truss = 6.0m ,Spacing of truss = 3m c/c, Inclination of roof = 30^{o}Spacing of Purlin = 2m c/c Wind pressure = 1.5 $kN/m^{2,}$Roof coverage= A.CSheeting weighing 200 N/m^2 , Provide a channel section Purlin.	BT-6	Create

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6.	Find the suitable design for a gantry girder to be used in an industrial building carrying an EOT crane for the following data: Crane capacity = 200 kN. Total self weight of all components = 240 kN. Minimum approach at the carne hook of gantry girder = 1.2m Wheel base = 3.5m C/C distance between gantry rails = 16m C/C distance between columns = 8m Self weight of rail section = 300 N/m Yield stress = 250 N/mm^2 Design the main gantry section. Connection design not required.	BT-1	Remember
7.	Calculate the dead load, live load and wind load on a 'Fink' type truss for the following data and mark the loads on the nodes of the truss.Span = 12m , Pitch = ¼ of span Height at eves level = 10m from the ground Spacing of truss = 5m c/c.	BT-3	Apply
8.	Determine the basic wind intensity for an industrial building situated in Chennai using the data provided Life of the structure 50 years, Terrain category = 2, Size of the building - 20m x 40m, Height of eye board - 10m, Topography: Slope < 3^o, Slope 1 in 4.	BT-3	Apply
9.	Identify the suitable purlin in an industrial building, the trusses of 16m span and 4m rise are spaced at 8m apart. The building is in medium wind zone in an industrial area of plain land.	BT-3	Apply
10.	Discuss briefly the following with neat sketches. i) bracing system in roof truss ii) Connection of purlin to rafter iii) Anchorages of truss with concrete column.	BT-2	Understand
11.	Recommend the design for a channel section purlin for the following data:Spacing of trusses =4.2m Spacing of purlin= 2m Live load on galvanized iron roofing sheets = 0.6 kN/m^2 Wind load = 1.4 kN/m^2	BT-4	Analyse

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	Slope of main rafter = 31^0		
12.	Estimate the factored forces to be considered for the design of each member MEMBER DL LL WL TOP CHORD -28.2 -36.66 124.60 BOTTOM CHORD 26.40 34.32 -116.40 MAIN SLING 10.40 13.52 -48.80	BT-4	Analyse
13.	Write down the step by step procedure of design of gantry girder	BT-3	Apply
14.	i.)List out various elements of roof truss and mark all its significance. (7) ii.) Explain the design principles of gantry girder (6)	BT-2	Understand

Q.NO	PART-C	BT Level	Competence
1.	A Power house building 25m high is to be designed in Darbhanga city. Compute the basic wind pressure.	BT-2	Understand
2.	Explain the procedure for the design of gantry girder	BT-3	Apply
3.	List out various elements of the roof truss and mark all its significance	BT-4	Analyse
4.	Design of gantry girder for an electric overhead crane with the following data: Capacity of crane= 100 KN. Weight of trolley=40 KN, Weight of crane girder=200KN, Span of crane girder=18m.Centre to Centre distance between columns=8m,Minimum clearance between trolley and gantry girder = 1.2 m centre distance of crane wheels=3m	BT-3	Apply

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