SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF CIVIL ENGINEERING

M.E-STRUCTURAL ENGINEERING

QUESTION BANK

II SEMESTER

ST3261 ADVANCED STEEL STRUCTURES

Regulation: 2023

Academic Year: 2024 – 2025 (Even Semester)

Prepared by

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Department of Civil Engineering

Vision

To produce competent and quality engineers by imparting knowledge, excellence and global perspectives in Civil Engineering to our students and to make them ethically strong professional engineers to build our nation.

Mission

- To produce outstanding graduates with high technical knowledge to serve the nation.
- To impart value based education
- To provide solution to the challenges in the field of Civil Engineering.

Program Educational Objectives (PEOs)

1. To produce graduates who can understand their ethical, environmental as well as professional responsibilities so that they appreciate the impact of the engineering solutions which have sustainability over society and the nation.
2. To develop the graduates who will exhibit strong technical ability to create & synthesize data using relevant tools and concepts, for providing sustainable solutions to civil engineering problems and projects.

3. To equip the graduates with suitable skills making them industry ready when they leave the portals of the Institute and to become a competent distinguished Professional Civil Engineer.

4. To produce students who can exhibit attitude, professionalism, ability to communicate with team members and adapt to the latest technology by engaging themselves in life-long learning

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QUESTION BANK

SUBJECT : ST3261-ADVANCED STEEL STRUCTURES

SEM / YEAR: II/ I

UNIT-I GENERAL			
Design Philosophies and Design Codes (IS, EC, AISC) – Stability Criteria –Beam- Columns and Frames (Sway and Non-Sway) – Design of members subjected to combined forces – Design of Purlins, Louver rails, Gable column and Gable wind girder.			
PART - A			
Q.no	**Questions**	**BT Level**	**Competence**
1.	What are the types of structural steel?	*BT-1*	Remembering
2.	What is mean by characteristics strength?	*BT-3*	Applying
3.	Under what circumstances does brittle failure of steel take place?	*BT-1*	Remembering
4.	What is the significance of response reduction factor in the estimation of seismic forces?	*BT-1*	Remembering
5.	Why is it necessary to follow codes of practice for designing structures?	*BT-3*	Applying
6.	Define the terms i) Purlin ii) Louver	*BT-1*	Remembering
7.	What is meant by gable girder?	*BT-1*	Remembering
8.	Why is a reduction of live loads done for the columns of multistory structures?	*BT-1*	Remembering
9.	List the important mechanical properties of steel along with the factors that influence them.	*BT-2*	Understanding
10.	What are the parameters that influences the yield stress of steel?	*BT-2*	Understanding
11.	List a few Indian standards codes that are followed while designing structures made of steel.	*BT-1*	Remembering
12.	Distinguish between the working stress methods and limit state method.	*BT-3*	Applying
13.	Summarize the advantages of using Purlins in industrial buildings.	*BT-3*	Applying
14.	What are the three classification of loads as per IS800:2007?	*BT-2*	Understanding
15.	Compare the gable frames with ordinary frames and draw a neat sketch of it.	*BT-1*	Remembering
16.	List the IS code numbers which we have to use to evaluate wind, dead and live, earthquake, and crane loads.	*BT-2*	Understanding
17.	Rewrite the functions of eaves girder	*BT-1*	Remembering
18.	Discuss about a gable wind girder	*BT-2*	Understanding
19.	Rewrite the functions of gable wind girder.	*BT-1*	Remembering
20.	Summarize the limitations of stress concentration factor.	*BT-2*	Understanding
21.	Define characteristics load.	*BT-3*	Applying
22.	What are load combination considered in plastic design?	*BT-1*	Remembering

23.	What are the classification under which imposed loads are grouped as per IS875-Part II?	*BT-1*	Remembering
24.	What are the factors that influence wind pressure coefficient?	*BT-2*	Understanding
PART - B			
1.	Design a 'I' section purlin, for an industrial building situated in the outskirts of Allahabad, to support a galvanized corrugated iron sheet roof for the following data: a) Spacing of the truss c/c :6m, b) Span of truss :12m, c) Spacing of purlins c/c: 1.5m, d) Intensity of wind pressure :2kN/m^2, e) Weight of galvanized sheets: 130N/m^2, Assume the Grade of steel as Fe 410.	*BT-3*	Applying
2.	Design a Roof trusses of 12m span and 2.4m rise are spaced at 4m. The roof covering consist of ACC Sheeting. Compute the ultimate bending moments for which the purlin have to be designed if the structure is suited in Shimla.	*BT-2*	Understanding
3.	Design a roof truss has a span of 12m span and a pitch of 2.4m which is placed at 3.5m c/c. calculate the live load on the roof truss.	*BT-1*	Remembering
4.	A factory is proposed to be built at Nellore on a hillock. The height of the hill is 150m. And the slope is 1 in 3. The building is proposed to be built at a distance of 100m from the base of the hill. Find the design wind pressure. The height of the building is 10m.	*BT-2*	Understanding
5.	A roof having a span of 24m and rise is spaced at 4m apart. Assuming ACC sheeting, estimate the dead load and live load on the purlins, assuming a purlins spacing of 1.40m.	*BT-1*	Remembering
6.	A roof truss is of 16m span and 2.67m rise is spaced at 5m. Assuming GI sheeting, compute the ultimate bending moments for which the purlins have to be designed if the structure is situated in Srinagar.	*BT-2*	Understanding
7.	Design a roof truss for an industrial building with 25 m span and 120 m long. The roofing is galvanized iron sheeting. The basic wind speed is 50 m/s and terrain is open industrial area and building is class A building. The building clear height at the eaves is 9 m.	*BT-2*	Understanding
8.	What are the three form of structural stability considered by the code?	*BT-3*	Applying
9.	An industrial building is proposed to be built in Bangalore city where the basic wind pressure is 33m/s. Particulars of the building are: Length: 120m Width: 24m Roof truss: Fink Eaves height: 8m above GL, Truss span: 24m Rise: 5m, Truss spacing: 5m, Purlin Spacing: 1.3 m Ground: Plain Land Roofing Sheet: AC Sheets Estimate the design of the purlin using channel section.	*BT-1*	Remembering

10.	Compare the properties of cast iron, wrought iron and steel. Why is steel considered superior for structural application compared to the other two materials?	*BT-1*	Remembering
11.	State the physical and mechanical properties of steel as a structural material.	*BT-3*	Applying
12.	Explain in details how are standards and specification different from codes?	*BT-2*	Understanding
13.	Explain the following: (i) Louver rails (ii) Gable column	*BT-2*	Understanding
14.	i) What are the various design philosophies for designing steel structures? ii) State the shortcomings of working stress design philosophy?	*BT-1*	Remembering
15.	Explain the advantages and disadvantages of using steel structures.		
16.	Explain briefly various types of loads to be considered in the design of steel structures.	*BT-3*	Applying
17.	Explain what structural steel is. Describe the important properties of such steel.	*BT-1*	Remembering
18.	Discuss the design a suitable purlin section, for the industrial building. a) Spacing of the truss c/c :5m, b) Span of truss :10m, c) Spacing of purlins c/c: 1.5m, d) Intensity of wind pressure :2kN/ m^2, e) Weight of galvanized sheets (GI Sheets):130N/ m^2, f) Location of the building: Indore, g) Grade of steel: Fe 410.	*BT-2*	Understanding
19.	Explain the special consideration required in the design of steel structures.	*BT-2*	Understanding
20.	Draw the stress-strain curve of mild steel and explain the salient features.	*BT-3*	Applying

UNIT II DESIGN OF CONNECTIONS

Types of connections – Welded and Bolted – Design of simple base, Gusseted base and Moment Resisting Base – Flexible Connections - Seated Connections – Unstiffened and Stiffened Seated Connections – Moment Resistant Connections– Clip angle Connections – Split beam Connections.

PART - A

Q.no	Questions	BT Level	Competence
1.	What are shear connections?	*BT-1*	Remembering
2.	Explain the moment connections	*BT-2*	Understanding
3.	Draw the moment rotation curve for different types of connections	*BT-3*	Applying
4.	Define un-stiffened seat connections	*BT-1*	Remembering
5.	Explain stiffened seat connections	*BT-2*	Understanding

6.	What is bracket connection?	*BT-1*	Remembering
7.	Classify the types of bracket connections explain with neat sketch.	*BT-4*	Analysing
8.	Discuss the examples for connections subjected to eccentric shear.	*BT-2*	Understanding
9.	Illustrate the types of heavy moment connections?	*BT-2*	Understanding
10.	What are split beam connections?	*BT-1*	Remembering
11.	Draw the sketch of split beam connections	*BT-3*	Applying
12.	Describe bolted bracket connections with a neat sketch.	*BT-2*	Understanding
13.	Compose some examples for light moment connections	*BT-2*	Understanding
14.	Rewrite the formula for finding the bearing length of seat angle in the beam to column connection?	*BT-2*	Understanding
15.	Write the formula for finding the moment of resistance of clip angle.	*BT-1*	Remembering
16.	Explain how you will determine the diameter of the bolt hole.	*BT-3*	Applying
17.	Describe the advantages and disadvantages of bolted connections.	*BT-2*	Understanding
18.	Classify various types of bolts used for structural purposes?	*BT-3*	Applying
19.	List the categories of imperfections in welding.	*BT-1*	Remembering
20.	Explain the stiffened seat connection with a sketch	*BT-3*	Applying
21.	What are the factors that influence the behavior of joints or connections?	*BT-1*	Remembering
22.	Write short notes on rigid, simple, and semi-rigid joints.	*BT-2*	Understanding
23.	How are connection classified?	*BT-1*	Remembering
24.	List some of bolts that are used in structural connection.	*BT-2*	Understanding
PART - B			
1.	An ISLB 300 carrying udl of 50KN/m has effective span of 8m. This is to be connected to the web of girder ISMB 450. Design the framed connection using 20mm black bolts.	*BT-2*	Understanding
2.	An ISMB 450 is to be connected to the flange of a column ISHB 300 @ 618N/m. the end reaction transmitted by the beam is 120 KN. Design an unstiffened seated connection. Use M20 black bolts.	*BT-1*	Remembering
3.	An ISMB 500 beam transmits an end reaction of 250KN to the web of a column ISHB300@577N/m. design and sketch a stiffened seated connection. Use M24 black bolts.	*BT-3*	Applying
4.	A beam ISMB 300 transmits an end shear of 120KN and a moment of 20KN-m to the flange of a column ISHB 300 @577N/m. using 20mm dia shop bolts design suitable end connection.	*BT-2*	Understanding
5.	Design a bracket connection to connect a beam ISLB 500 to a column ISHB 400@ 806N/m, if vertical shear and moment to be transmitted are 120KN-m and 130KN-m respectively. Use M24 bolts at a pitch of 75mm. provide edge distance of 50mm for all connection.	*BT-2*	Understanding

6.	An ISLB 300 carrying udl of 40KN/m has effective span of 8m. This is to be connected to the web of girder ISMB 400. Design the framed connection using 20mm black bolts.	*BT-3*	Applying
7.	An ISMB 400 beam is to be connected to an ISHB 250@ 537N/m to transfer end force of 140 KN. Design double plated welded connection.	*BT-2*	Understanding
8.	An ISMB 400 beam is to be connected to an ISHB 250@ 537N/m to transfer end force of 140 KN. Design double angle framed connection.	*BT-1*	Remembering
9.	An ISMB 400 transfer an end reaction of 160KN to the flange of an ISHB 300@ 577N/m. design an un stiffened welded seat connection. Take f_b=0.75x250= 187.5N/mm^2.	*BT-2*	Understanding
10.	Design a stiffened seat connection to connect ISMB 500 transferring a load of 260 KN to an ISHB 300@ 577N/m.	*BT-2*	Understanding
11.	An ISMB 400 transfer an end reaction of 160KN and an end moment of 80KN-m to the flange of an ISHB 300@577N/m. design the moment connection.	*BT-2*	Understanding
12.	i) Give examples for light moment connection ii) Design a split beam connection to transfer a factored shear 150KN and a moment of 50KNm from the end of the beam ISMB 350 to a column of ISHB 300 use 16mm dia bolts.	*BT-1*	Remembering
13.	i) Explain the two main types of moment-resistance connections? ii) Explain (a)Split-T beam Connection (b) Column spice & beam Spice	*BT-2*	Understanding
14.	Write Short Notes on: (i) Unstiffened seat angle connection (ii) Stiffened seat angle connection (iii) Framed Connection	*BT-1*	Remembering
15.	Explain the design principle of moment connection using tension plate and welds for transfer.	*BT-3*	Applying
16.	Explain the design procedure for unstiffened seated connection i) Bolted connection ii) Welded connection	*BT-1*	Remembering
17.	Explain the design procedure for stiffened seated connection i) Bolted connection ii) Welded connection	*BT-2*	Understanding
18.	An ISLB 300 @369.8 N/m transmits an end reaction of 385KN, under factored loads, to the web of ISMB 450 @ 710.2 N/m. design a bolted framed connection. Steel is of grade Fe410 and bolts are of grade 4.6.	*BT-3*	Applying

19.	Design a seat connection for a factored beam end reaction of 110 KN. The beam section is ISMB 250 @ 365.9N/m using bolted connections. Steel is of grade Fe410 and bolts of grade 4.6.	*BT-1*	Remembering
20.	Design a stiffened seat connection for an ISMB 350@514N/m transmitting an end reaction of 320KN (due to factored loads) to a column section ISHB 300 @ 576.8N/m. the steel of grade Fe410 and bolts of grade 4.6	*BT-2*	Understanding

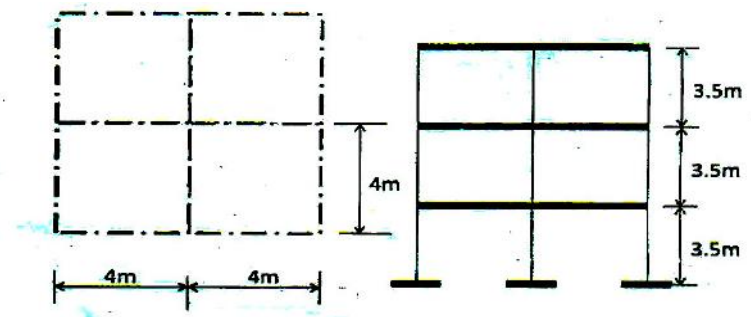
UNIT III ANALYSIS AND DESIGN OF INDUSTRIAL BUILDINGS

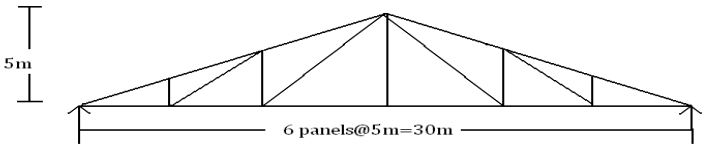
Structural Configurations - Functional and Serviceability Requirements- Analysis and design of different types of trusses – Analysis and design of industrial buildings – Sway and non-sway frames –Gantry Girders –Earthquake resistant design of steel buildings

PART - A

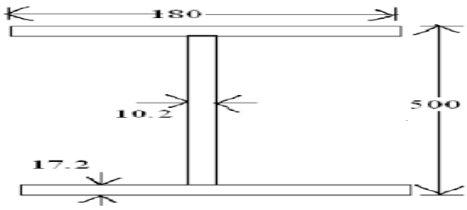
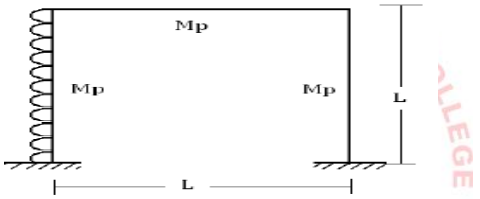
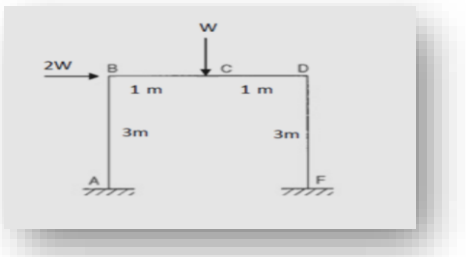
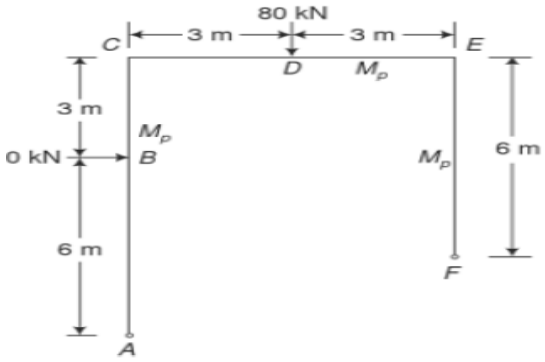
Q.No	Questions	BT Level	Competence
1.	What is the main purpose of gantry girder?	*BT-2*	Understanding
2.	Classify the types of loads for which an industrial building is to be designed.	*BT-3*	Applying
3.	List few types of crane.	*BT-1*	Remembering
4.	Write about connection which is generally adopted for tubular steel trusses? State its benefits.	*BT-3*	Applying
5.	What are the requirements to be considered by the designer while selecting a crane and designing a crane supporting structure?	*BT-2*	Understanding
6.	List the loads that should be considered while designing a gantry girder.	*BT-1*	Remembering
7.	What is the difference between surge load and drag load of cranes?	*BT-3*	Applying
8.	Discuss about sway and non-sway frames.	*BT-2*	Understanding
9.	Explain about the major components of an industrial building.	*BT-2*	Understanding
10.	Discuss about a gantry girder and draw a sketch of it.	*BT-2*	Understanding
11.	Discuss the application of Pratt-truss and draw a neat sketch of it	*BT-2*	Understanding
12.	What are the loads that will act on roof trusses?	*BT-1*	Remembering
13.	Summarize the methods available for the analysis of roof trusses.	*BT-1*	Remembering
14.	What are end bearings?	*BT-1*	Remembering
15.	Explain the types of crane column.	*BT-1*	Remembering
16.	What are girts?	*BT-1*	Remembering
17.	Draw the neat sketch of live pan truss and mention its application.	*BT-3*	Applying
18.	How is economical spacing of roof trusses obtained?	*BT-3*	Applying

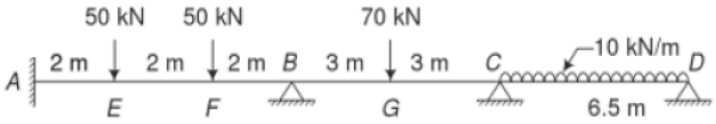
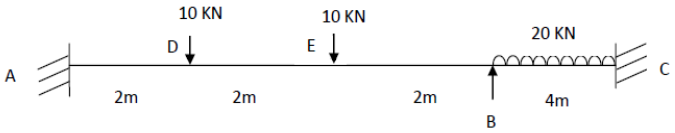
19.	Identify the loads that will act on the column of crane girder.	*BT-1*	Remembering
20.	Describe some examples for industrial building.	*BT-2*	Understanding
21.	List the items that are to be considered while planning and designing an industrial building.	*BT-1*	Remembering
22.	What is the function of bracing?	*BT-1*	Remembering
23.	State the difference between a purlin and a girt.	*BT-2*	Understanding
24.	State the advantage of using a knee brace.	*BT-3*	Applying
PART - B			
1.	Write a brief note about the various serviceability considered by the codes.	*BT-2*	Understanding
2.	Design a simply supported gantry girder to carry an electric overhead travelling crane, given: Span of gantry girder=6.5m Span of crane girder=16m Crane capacity=250KN Self-weight of crane girder excluding trolley=200KN Self-weight of trolley=50KN Minimum hook approach=1m Distance between wheels=3.5m Self-weight of rails=0.3KN/m	*BT-1*	Remembering
3.	A roof truss shed is to be built in luck now for an industry. The size of shed is 24mx40m.the height of building is 12m at the eves. Determine the basic wind pressure.	*BT-2*	Understanding
4.	Describe and design a simply supported gantry girder to for the following data: Crane capacity : 160 KN Self-weight of crane girder : 200 KN Self-weight trolley, electric motor, hooks etc. : 50KN Min. approach of crane hook to the gantry girder : 1.6 m Wheel base : 2.8 m c/c distance between gantry rail : 12 m c/c distance between column : 6m Self-weight of rail section : 300 N/m Check the section for maximum bending moment due to vertical forces, lateral forces and longitudinal forces.	*BT-1*	Remembering
5.	Briefly explain the various steps involved in the design of roof trusses.	*BT-3*	Applying
6.	A power plant structure having maximum dimension more than 60m is proposed to be built on downhill side near Dehradun. The height of the hill 400m with a slope of 1 in 3. If the location is 250m from the crest of the hill on downward slope, and its eve board is at a height of 9m, determine the design wind pressure.	*BT-2*	Understanding

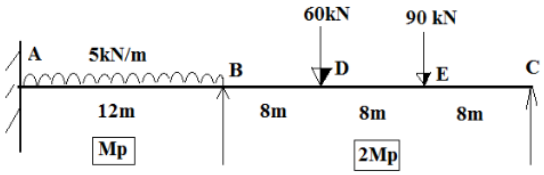
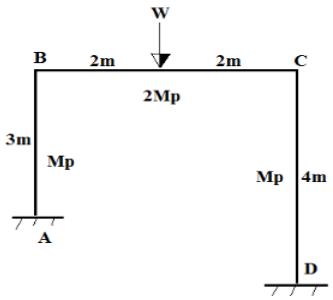
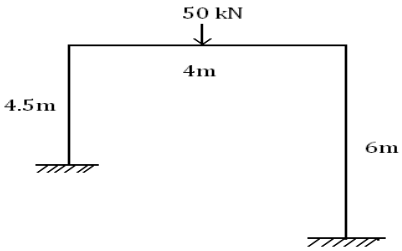
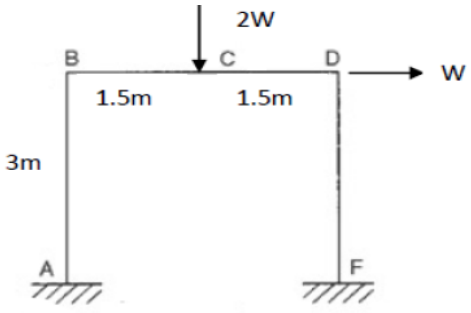
7.	Discuss and design a fink type roof truss for an industrial building for the following data: Overall length-48m Overall width-16.5m Width c/c roof column-16m Height of column-11m Roofing material- asbestos cement sheets Side covering- asbestos cement sheets The industrial building is situated in Allahabad. Assume the missing data.	*BT-2*	Understanding
8.	Illustrate elaborately about the items that are to be considered while planning and designing an industrial building.	*BT-3*	Applying
9.	Explain various steps involved in the design of gantry girder.	*BT-2*	Understanding
10.	An industrial building is made of 10 portal frames spaced 6m apart. The frame has a span of 20m and 4m rise with a column height of 6m above ground level. Assuming the column bases are hinged, discuss and design the frame for dead, live and wind loads as per IS875.	*BT-2*	Understanding
11.	(i) Explain about Live pan, Pratt and north light trusses roof. (ii) Write down the steps involved in the design the roof trusses	*BT-3*	Applying
12.	The Plan and elevation of a three- story school building is shown in figure. The building is located at Kolkata (Zone III). The type of soil encounted is medium stiff and it is proposed to design the building with special moment frames. The intensity of DL is 10KN/m^2 and the floors are to cater IL of 3KN/m^2. Determine the Lateral loads on the various floor levels of the Structure by Static analysis  Plan Elevation	*BT-3*	Applying
13.	Explain in detail about Sway and Non Sway frames.	*BT-3*	Applying
14.	Discuss in detail about Aseismic design of steel buildings.	*BT-2*	Understanding

15.	Determine the design loads on the purlins of an industrial building near Visakhapatnam, given: Class of building: general with life of 50 years Terrain: category 2, Permeability: medium Maximum dimension: 40m Width of building:15m Height at eve level: 8m Topography: ɵ less than 30^0 Span of truss: 15m, Pitch:1/5 Sheeting: A.C sheet Spacing of purlins: 1.35m, Spacing of trusses: 4m.	*BT-1*	Remembering
16.	Explain the following with neat sketches: i) Bracing system in roof trusses ii) Anchorage of truss with concrete column iii) Connection of purlin to rafter	*BT-3*	Applying
17.	Determine the basic wind pressure to be considered for a shed in the outskirts of Bangalore. Structure: general purpose with probable life of 50 years. Terrain category: I Building class B. Eye board height: 11m Topography: plain area.	*BT-2*	Understanding Understanding
18.	A roof truss shed is to be built in Chennai for an industry. The size of shed is 25mx45m.the height of building is 12m at the eves. Determine the basic wind pressure.	*BT-1*	Remembering
19.	Describe and design a gantry girder to be used in an industrial building carrying a manually operated overhead travelling crane , for the following data: Crane capacity:200kN Self-weight of the crane girder excluding trolley:200kN Self-weight of the trolley, electric motor, hook etc:40kN Approx. minimum approach of the crane hook to the gantry girdr:1.2m Wheel base:3.5m c/c distance between gantry rails:16m c/c distance between columns:8m self-weight of rail section:300N/m Diameter of crane wheels:150mm Steel is of grade Fe410.	*BT-3*	Applying
20.	Describe and design a Pratt-truss as shown in fig. the design wind pressure is $1200N/m^2$. The trusses are covered with AC sheets and the centre-to-centre spacing of trusses is 6m. 	*BT-2*	Understanding

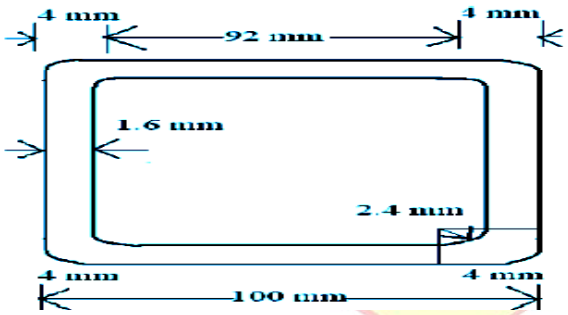
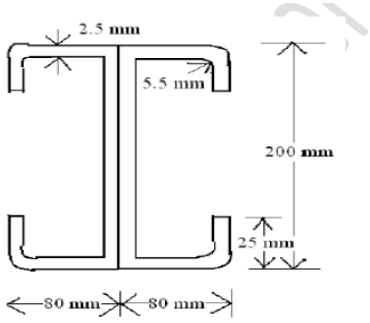
UNIT IV PLASTIC ANALYSIS OF STRUCTURES			
Introduction, Shape factor - Moment redistribution - Beam, Sway, Joint and Gable mechanisms - Combined mechanisms– Analysis of portal frames, Effect of axial force and shear force on plastic moment capacity, Connection Requirements– Moment resisting connections - Design of Straight Corner Connections –Design of continuous beams.			
PART - A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Describe the plastic method of design.	*BT-2*	Understanding
2.	Define ductility.	*BT-1*	Remembering
3.	Draw the stress strain curve for mild steel.	*BT-3*	Applying
4.	What are perfectly plastic materials?	*BT-1*	Remembering
5.	Define plastic section modulus.	*BT-1*	Remembering
6.	Explain a plastic hinge.	*BT-3*	Applying
7.	Write about the shape factor.	*BT-3*	Applying
8.	Write the fundamental conditions for plastic analysis.	*BT-1*	Remembering
9.	Explain about beam mechanism.	*BT-2*	Understanding
10.	Write about the load factor.	*BT-1*	Remembering
11.	Recall the types of mechanism in plastic analysis.	*BT-2*	Understanding
12.	Explain upper bound theorem.	*BT-2*	Understanding
13.	Illustrate lower bound theorem	*BT-3*	Applying
14.	Summarize the limitations of plastic analysis?	*BT-1*	Remembering
15.	What is the length and profile of plastic hinge for a simply supported beam with UDL?	*BT-1*	Remembering
16.	Discuss the concept of redistribution of moments.	*BT-2*	Understanding
17.	Explain the principle of virtual work	*BT-1*	Remembering
18.	Illustrate the methods available for plastic analysis	*BT-3*	Applying
19.	Describe the section classification as per IS800:2007	*BT-2*	Understanding
20.	What is the collapse load for a simply supported beam with UDL?	*BT-1*	Remembering
21.	Compose plastic moment of resistance.	*BT-1*	Remembering
22.	Describe plastic modulus of a section.	*BT-2*	Understanding
23.	Explain about symmetric frames and how are they analyzed.	*BT-1*	Remembering
24.	Explain about unsymmetrical frames and how are they analyzed.	*BT-2*	Understanding
PART - B			
1.	Write the formula and find the shape factor for the following sections i) Rectangular section ii) Circular section iii) Diamond section	*BT-1*	Remembering

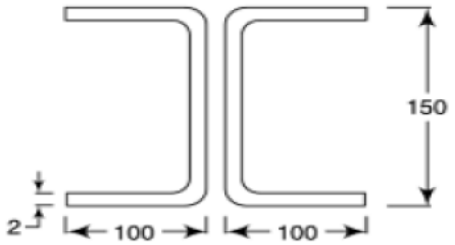
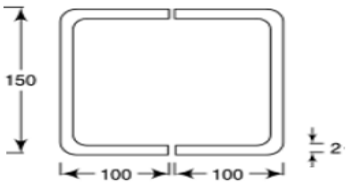
2.	Write the formula and find the shape factor for the following sections i) Symmetric I section ii) Triangular section	*BT-1*	Remembering
3.	Determine the collapse load in the simply supported beam with eccentric point load W_c.	*BT-1*	Remembering
4.	Write the formulae and determine the plastic modulus for the section shown.(All dimensions are in mm) 	*BT-1*	Remembering
5.	Determine the collapse load in simply supported beam subjected to uniformly distributed load W over the entire span.	*BT-3*	Analysing
6.	Discuss and find out the collapse load for a portal frame of uniform cross-section as shown in fig. 	*BT-2*	Understanding
7.	Discuss and determine the collapse load for the frame shown below: 	*BT-2*	Understanding
8.	Describe and find the fully plastic moment for the frame as shown in the fig. 	*BT-2*	Understanding

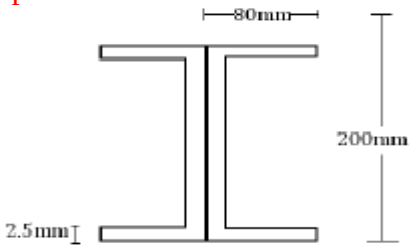
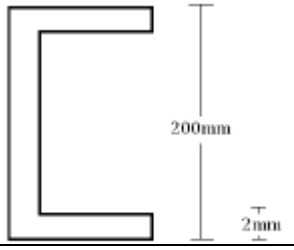
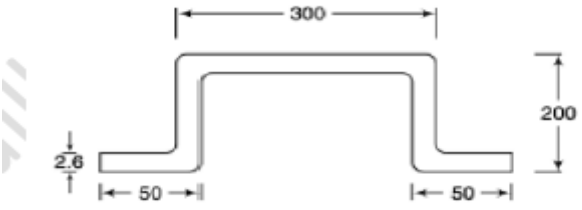
9.	Design the continuous beam with the service load as shown in the fig. The load factor may be assumed as 1.7. Provide a uniform cross section throughout the beam. 	BT-3	Applying
10.	A two span continuous beam of uniform section loaded with ultimate loads as shown in Fig. Determine the required plastic moment of resistance. 	BT-3	Applying
11.	Determine the collapse load in a propped cantilever of span L subjected to central concentrated load W_c.	*BT-1*	Remembering
12.	Determine the collapse load in a fixed beam of span L carrying udl w/unit length over entire span.	*BT-2*	Understanding
13.	A propped cantilever subjected to udl over its entire span interior plastic hinge is formed at a distance 0.414 times span from the propped end. Hence, find its load carrying capacity	*BT-2*	Understanding
14.	A mild steel I-section 200mm wide and 250mm deep has a mean flange thickness of 20mm and a web thickness of 10mm.Analyse the S.F. and the fully plastic moment if σ_y=252N/mm².	BT-3	Applying
15.	Analyze the shape factor of the I-section with top flange 100mm wide, bottom flange 150mm wide, 20mm thick and web depth 150mm and web thickness 20mm.	*BT-1*	Remembering
16.	Examine the shape factor of the T-section of depth 100mm and width of flange100mm,flangethickness and web thickness 10mm.	*BT-2*	Understanding

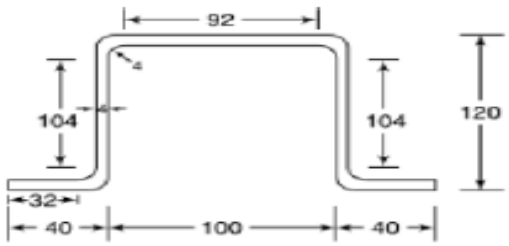
17.	A continuous beam ABC is loaded as shown in the Fig. Examine the required Mp if the load factor is 3.2. 	*BT-2*	Understanding
18.	Examine and find out the collapse load for the frame shown in fig. 	*BT-1*	Remembering
19.	Explain fully plastic moment and determine the fully plastic moment required for the frame shown in fig., if all the members have the same value of Mp. 	*BT-2*	Understanding
20.	Calculate the collapse load for frame as shown in the fig. 	BT-3	Applying

UNIT V- DESIGN OF LIGHT GAUGE STEEL STRUCTURES			
Introduction to Direct Strength Method - Behaviour of Compression Elements - Effective width for load and deflection determination – Behaviour of Unstiffened and Stiffened Elements – Design of webs of beams – Flexural members – Lateral buckling of beams – Shear Lag – Flange Curling – Design of Compression Members – Wall Studs.			
PART - A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	What are light gauge steel structures?	*BT-1*	Remembering
2.	Discuss the uses of light gauge steel structural members.	*BT-2*	Understanding
3.	Explain the codal provisions available for the design of light gauge steel structural members.	*BT-1*	Remembering
4.	Draw the various section available in light gauge steel structural members.	*BT-3*	Applying
5.	Discuss about stiffened compression elements with neat sketches	*BT-2*	Understanding
6.	Explain unstiffened compression elements.	*BT-1*	Remembering
7.	What is the significance of shear lag?	*BT-1*	Remembering
8.	Illustrate flat-width ratio.	*BT-3*	Applying
9.	What is effective design width?	*BT-1*	Remembering
10.	Explain local buckling.	*BT-2*	Understanding
11.	Write the maximum allowable flat to width ratio for various elements as per IS801:1975.	*BT-2*	Understanding
12.	Illustrate shear lag.	*BT-3*	Applying
13.	Discuss about the torsional buckling.	*BT-2*	Understanding
14.	What is point symmetric section?	*BT-1*	Remembering
15.	Discuss the bending stress distribution diagram at different stages of loading with neat sketches?	*BT-2*	Understanding
16.	Write the formula for finding the b/t ratio for load determination.	*BT-1*	Remembering
17.	Rewrite the formula for finding the b/t ratio for deflection determination.	*BT-2*	Understanding
18.	What is flange curling?	*BT-1*	Remembering
19.	What are cold-formed steel structures?	*BT-1*	Remembering
20.	Explain effective width calculation in light gauged steel sections.	*BT-3*	Applying
21.	Identify the three regions of idealized stress-strain curve of mild steel. Which of these region is used for limit design?	*BT-1*	Remembering
22.	Why is the plastic method of design more useful for redundant structures than the determinate structures?	*BT-3*	Applying
23.	How first order plastic analysis does differs from the second order inelastic analysis? Why are restraints required in members designed by plastic method?	*BT-3*	Applying
24.	Classify the types of steel section.	*BT-1*	Remembering

PART - B			
1.	Two channels with 200mm x 800mm with bent lips are connected with webs to act as a beam. The thickness of the plate is 2.5mm and the depth of lip is 25mm. the beam has an effective span of 4m. Formulate the equations and determine the allowable load on the beam and also find the deflection at the allowable load. The yield stress of steel is 235N/mm^2 and E=2 ×10^5 N/ mm^2	*BT-1*	Remembering
2.	Illustrate the following with sketches with reference to light-gauge sections (i)Stiffened and unstiffened compression elements (ii)Flat-width ratio (iii)Effective design width (iv)Torsional flexural buckling (v)Point symmetric section	*BT-3*	Applying
3.	Calculate the column section properties and allowable load for the column section shown in fig below. The effective length of the column is 3.2 m. Take fy = 235 N/mm^2 	*BT-3*	Applying
4.	Two channel 200 mm × 80 mm with bent lips are connected with webs to act as beam as shown. The thickness of plate is 2.5 mm and the depth of lip is 25 mm. The beam has an effective span of 4 m. Determine the allowable load per meter on the beam. Also, determine the deflection at the allowable load. The steel has a yield point of 235 N/mm^2. Take E=2 ×10^5 N/mm^2. 	*BT-1*	Remembering
5.	(i)Summarize the merits and demerits of cold from light gauge steel section. (ii)Also enlist and draw the different sections used in cold from steel.	*BT-1*	Remembering

6.	Identify and determine the allowable load per metre on the beam as shown below. Also, determine the deflection at the allowable load. The length of the column is 3.1m. the two sections are joined together by spot welding. The steel has a yield point of 235N/mm^2. Take E = 2 ×10^5 N/mm^2. 	*BT-1*	Remembering
7.	Estimate the allowable load on the light gauge steel beam of channel section with a lip. The width of web:325mm;Width of lip:60mm;Width of flange:250mm;Thickness of section: 2.5mm	*BT-1*	Remembering
8.	Discuss the following: a) Lateral torsional buckling b) Shear lag c) Effective design width	*BT-2*	Understanding
9.	Describe and determine the allowable load per metre on the composite section beam as shown below. Also, determine the deflection at the allowable load. The length of the column is 3.0m. The two sections are joined together by spot welding. The steel has a yield point of 235 N/ mm^2. Take E:2 ×10^5 MPa. 	*BT-1*	Remembering
10.	Estimate the allowable load on the light gauge steel beam of channel section with a lip. The width of web:300mm;Width of lip:50mm;Width of flange:200mm;Thickness of section: 2.6mm	*BT-2*	Understanding
11.	Two channels with 180mm x 780mm with bent lips are connected with webs to act as a beam. The thickness of the plate is 2mm and the depth of lip is 30mm. the beam has an effective span of 4.5 m. Formulate the equations and determine the allowable load on the beam and also find the deflection at the allowable load. The yield stress of steel is 235N/mm^2 and E=2 ×10^5 N/ mm^2	*BT-2*	Understanding
12.	Describe in detail about the following: i) Lateral buckling of beams ii) Compression member	*BT-3*	Applying

13.	Two channels with 250mm x 850mm with bent lips are connected with webs to act as a beam. The thickness of the plate is 3mm and the depth of lip is 35mm. the beam has an effective span of 4.5m. Formulate the equations and determine the allowable load on the beam and also find the deflection at the allowable load. The yield stress of steel is 235N/mm^2 and E=2 ×10^5 N/ mm^2.		
14.	Describe in detail about the following: i) Flange Curling ii) Wall Studs.	*BT-2*	Understanding
15.	Two channel 200 mm × 80 mm with bent lips are connected with webs to act as beam as shown. The thickness of plate is 2.5 mm. The beam has an effective span of 4.5 m. Estimate the allowable load per metre on the beam. 	*BT-2*	Understanding
16.	Formulate the equations and determine the allowable load per metre on the beam as shown below. Also, determine the deflection at the allowable load. The length of the column is 3.2m. The steel has a yield point of 235 N/ mm^2. Take E = 2 ×10^5 N/mm^2. 	*BT-3*	Applying
17.	Identify and compute the allowable load on the light gauge steel beam as shown below: 	*BT-1*	Remembering

18.	A top chord member of a roof truss is of hat section as shown in the fig. It is subjected to a compression of 132.5kN and a moment of 1636 kNm. The span is 1.7m.Check the safety of the section if fy=210N/mm$^{2.}$ 	*BT-3*	Applying
19.	Define and describe the following: i) Stiffened element ii) Un-stiffened element	*BT-1*	Remembering
20.	Define and describe the following: i) Multiple-stiffened element ii) local buckling	*BT-1*	Remembering