QUESTION BANK-1

CONNECTIONS

Q: 1 Explain advantages and disadvantages of steel structures.
Q: 2 Write design consideration for heavy moment resisting bolted connection.
Q: 3 Explain following connection with neat sketches.
Beam to beam web connection
Beam to column flange seat angle connection
Moment resistant beam to column connections
Q: 4 What you understand by class 4.6 and class 8.8 bolts? Explain briefly.
Q: 5 What is stiffener angle? Write the detailed steps for design of stiffened welded seat connection.
Q: 6 A beam ISLB-300 is connected to flange of column ISHB300 to transmit end reaction of 150kN due to factored loads. Design web angle angle connection using M20 bolts of 4.6 grade and steel Fe410.
Q: 7 Design a suitable web cleat connection between main beam ISWB 500 @ 95.2 kg/m and secondary beam ISWB 400 @ 66.7kg/m connected on one side of the web of the main beam. Secondary beam has to transmit an end reaction of 200kN , due to factored loads. Use 8.8 bolts of 20 mm dia, steel grade 410Mpa.

QUESTION BANK-2

INDUSTRIAL BUILDING

Q: 1 Explain various components of an industrial building with Suitable sketches.
Q: 2 State the factors to be considered for the planning and site selection of an Industrial Building.
Q: 3 Explain the analysis of roof column in Industrial building.
Q: 4 For analysis of Industrial building bends for column hinged at base, What are the assumption normally made.
Q: 5 Explain the role of bracing in industrial buildings.
Q: 6 What are risk-coefficient , terrain factor and topography factor?
Q: 7 Determine Dead load, Live load and wind load per panel point for the roof Truss of a workshop shed constructed at Ahmedabad for the following Requirements:

I. Span of truss = 15 meters
II. Spacing of truss = 4 m c/c
III. Rise of truss = 3 meters
IV. Heights of truss above G.L. = 20 meters
V. A.C.C sheets @150 N/m^2 are used as roof covering

VI. Assume weight of Purlin and other fixtures = 120 N/m^2 per plan area
VII. Total nos. of panels = 8
VIII. Opening of wall area = 10%
IX. Probable life of roof truss = 25 years, Terrain category = 3 and class = A structures
X. Topography = Plain horizontal ground and upwind slope less than 3˚

Q: 8 Design an angle section for a purlin having 3.0 m span. It carries design load (Working) of 2.5 kN/m and supported on four supports. Angle of roof truss is 26˚.

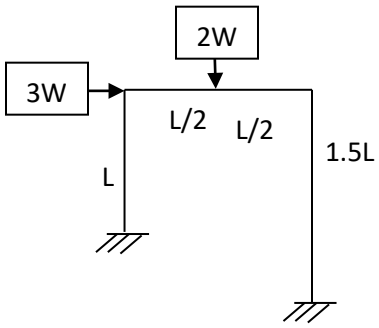
Q: 9 Design a steel roof truss for the following data:
Location: Ahmedabad
Span of roof truss: 14m
Spacing of roof truss: 5m
Pitch: 1/4
(a) Fix configuration of truss (b) Compute DL, LL, and WL at nodal point (c) Design purlin (d) Design principle rafter (e) Design main tie
Assume suitable data if necessary.

Q: 10 Calculate nodal loads (per panel point load) for the howe roof truss due to Dead load, live load and wind load for an industrial building of size 18 m x 40 m situated in Surat with terrain category-3 and classB. Spacing between two trusses = 4 m c/c. Rise of truss = 4 m. Consider 10% wall openings. The truss has total 10 segments. Corrugated GI Sheets are used as roofing material. Height of eaves level is 12 m. Assume suitable data if necessary.

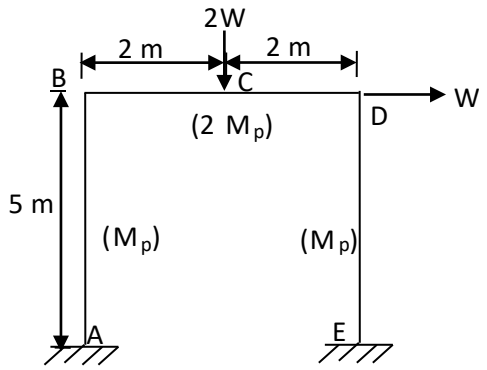
QUESTION BANK-3

PLASTIC DESIGN

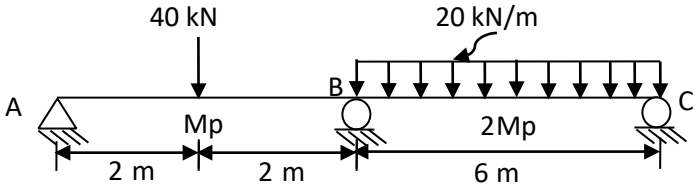
1. Define Shape Factor, Collapse load and Plastic Hinge.
2. Explain the hinge length and assumptions made in plastic analysis in detail.
3. What are the points at which a plastic hinge is likely to form?
4. A fixed beam of '2L' m in span, is subjected uniformly distributed load of 'W'on left half of beam. Determine the collapse load if beam has uniform cross-section.
5. Compute the collapse load in portal frame shown below



6. Compute the collapse load for the portal frame shown in fig and design the members if factored Wu = 72 kN and fy of steel is 250 MPa.



7. Derive the collapse load for fixed beam of length L, subjected to concentrated load W at centre.
8. Derive the collapse load for propped cantilever beam of length L, subjected to concentrated load W at centre.
9. Determine the shape factor for an I-section consists of 8 mm thick web and 12 mm thick flanges. The depth of web excluding flanges is 300mm. the width of flanges is 120 mm.
10. Determine plastic moment capacity for continuous beam as shown in fig. Take load factor = 1.5 .



QUESTION BANK-4

FOOT OVER BRIDGE

1. What is a foot bridge? What is the popular geometry of the foot bridge?
2. Design a top chord member of N - type lattice bridge girder of 20 m span and width of deck as 3.5 m. Consider dead load of 5 kN/m^2, LL of 4 kN/m^2 and floor finish of 1 kN/m^2. Consider total 08 panels.
3. Explain the types, components and applications of truss girder bridges with necessary sketches.
4. Design a foot bridge for the particulars: (a) cross beams (b) most heavily loaded bottom chord member (c) Vertical member in which maximum compression occur. Type of girder = Lattice types, Span of Girders = 16 m c/c, Cross girders spacing = 2 m c/c, Clear width between main girders = 2.5 m, Pedestrian traffic = 4000 N/m^2, Assume Self weight of flooring = 480 N/m^2, Self-weight of cross beam =300 N, Weight of one truss = 400 N/m, E = 1 x 10^4 N /mm^2.
5. A foot over bridge is of span 18 m and pedestrian load of 3 kN/m^2. The clear distance between two trusses is 3.0 m and truss height is 2.0 m. Take dead weight of truss is 1.2 kN/m. Assume Self weight of flooring 480 N/m^2, Self-weight of cross beam 300 N, Weight of one truss 400 N/m. Select type of truss and Design a) cross beams (b) most heavily loaded top chord member (c) Vertical member.