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Total No. of Questions: [09]

B. Tech Civil (Semester – 7th/8th)
DESIGN OF STEEL STRUCTURES - II
Subject Code: BCIES1821
Paper ID: 19110743

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

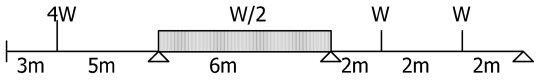
Section – A **(2 marks each)**

Q1. Attempt the following:

a) Explain the terms Load Factor and Shape Factor
b) What are different types of stiffeners used in a plate girder?
c) List different types of loads considered for design of gantry girder.
d) What is the function of sway bracings in steel bridges?
e) What are the additional stresses considered for design of stringers?
f) Explain upper bound theorem in plastic analysis of structures?
g) What are the different types of bracings used in an industrial building?
h) How wheel load can be calculated for gantry girders?
i) What do you understand by plastic hinge?
j) How wind load on gable wind girder can be calculated?

Section – B **(5 marks each)**

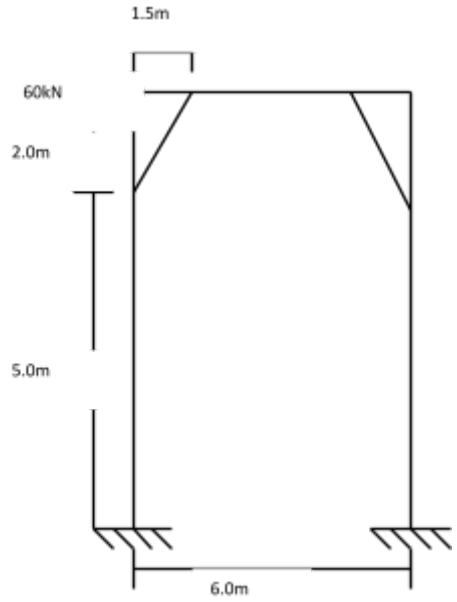
Q2. Calculate the collapse load W_u for the beam shown in fig.



Q3. What do you understand by Curtailment of Flange plates in a Plate Girder? Explain in detail all the methods.

Q4. Determine the column moments for the truss bent. It is given that the Crane is supported at a distance of 2.0m from top and 7.5m from the bottom of the column. if building carries a horizontal wind load of 1.5 kN/m acting on left column for its height of 5.0m and crane reactions are 300 kN and 150 kN acting on left and right columns at an eccentricities of 200mm from the axis of the column.

Q5. Design only knee bracing for a sway bracing in a railway bridge as shown in fig.



Q6. Draw the details of a steel footbridge and explain the design procedure for Rakers.

Section – C **(10 marks each)**

Q7. Design the Column bracing for an Industrial building for the following data:

a) Size of the building = 20m x 60m
b) Height of Building = 12.5m
c) Height of Column = 10m
d) Wind intensity = 1.5 kN/m2
e) Longitudinal force in gantry girder at7.5m = 35kN
f) Reaction from Gable end girder = 65kN

Q8. Design Timber flooring and Floor beams for a foot bridge of effective span 24m.

Q9. Calculate the stresses in the top and bottom flanges of a stringer due to vertical loads, longitudinal loads, lateral loads including wind and racking loads. The stringers are 2.0m apart and the length of stringer is 7.0m. Each flange of stringer consists of a flange plate 400mmx15mm and 2ISA 200x200x12 and web consists of 750mm x 10mm plate.