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06CV72

Seventh Semester B.E. Degree Examination, Dec.09/Jan.10
Design of Steel Structures

Time: 3 hrs. Max. Marks:100

Note: ***1.Answer any FIVE full questions, selecting at least TWO questions from each part.***
2.Use of IS800:2007, IS875 and steel tables permitted.

PART – A

1 a. Explain the advantages and disadvantages of steel structures. **(10 Marks)**

b. Explain briefly, the necessity of partial safety factors and codes in structural design. **(06 Marks)**

c. Explain the failure criteria of steel. **(04 Marks)**

2 a. Explain various modes of failure (behaviour) of bolted connections, with neat sketches. **(08 Marks)**

b. Design a bolted connection between the flange of a column ISHB450@907 N/m and a bracket plate 15mm thickness. The bracket plate is supporting a load of 150 kN at an eccentricity of 350mm. Adopt HSFG bolts of property class 8.8. **(12 Marks)**

3 a. Explain the different types of welds used in practice. **(08 Marks)**

b. A bracket plate of thickness 16mm is welded to the flange of a column ISHB400@759 N/m to support a load of 150 kN as shown in Fig.3(b). Determine the size of the weld that would be required to support the load. **(12 Marks)**

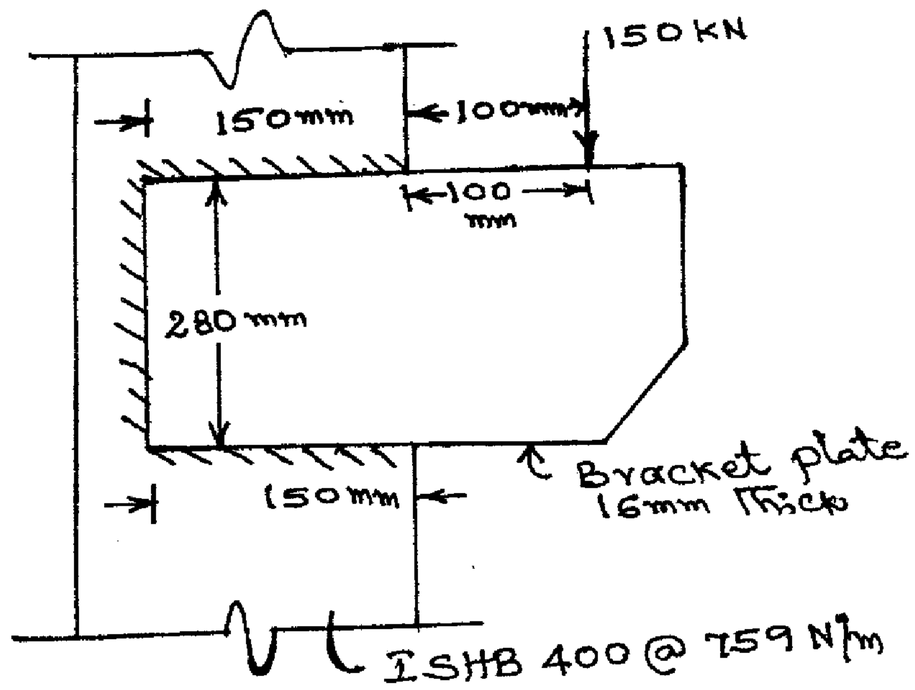

Fig.3(b)

4 a. Explain the term "Plastic hinge". **(04 Marks)**

b. Explain the theorems of plastic collapse. **(06 Marks)**

c. Analyse the continuous beam ABC subjected to working loads shown in Fig.4(c) and determine the plastic moment. Adopt a load factor of 1.85. **(10 Marks)**

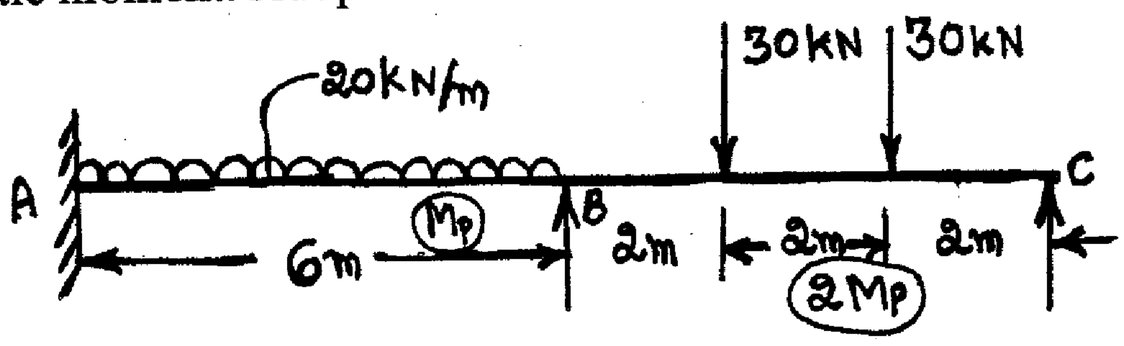

Fig.4(c)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – B

5 a. What is a lug angle and why is it not preferred? Explain. **(06 Marks)**

b. Design a single angle tension member to carry a design tensile load of 400kN. Gusset plate is of 8mm thickness . Adopt 20mm dia black bolts for connection. **(14 Marks)**

6 a. Explain the behaviour of compression members. **(06 Marks)**

b. Design a single angle section for a discontinuous strut to carry a load of 100 kN. The length of the member is 2.5m. **(14 Marks)**

7 Design a gussetted base on a concrete pedestal for a column ISHB 400@759 N/m with two flange plates 400×20mm carrying a factored load of 4000 kN. The column is to be supported on concrete pedestal to be built with M20 cncrete. **(20 Marks)**

8 a. Write a note on laterally supported beams. **(04 Marks)**

b. A roof of a hall measuring 6m×13.7m consists of 120mm thick R.C. slab supported on steel I - section spaced at 3.5m c/c. The hall is having wall of 30cm thickness alround. The finishing load on the roof is 1 kN/m^2 and live load is 2 kN/m^2. Design the steel beam and apply all the necessary checks on design. **(16 Marks)**

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