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Reg. No. : .....

Name : .....

First Semester M.Tech. Degree Examination, March 2013
Branch : Civil (2008 Scheme)
Structural Engineering
CSC 1003 : ADVANCED METAL STRUCTURES

Time : 3 Hours Max. Marks : 100

Instructions : *Answer* ***any five full*** *questions. Use of* ***IS : 800, IS : 801, IS : 811, IS : 8147*** *and steel tables are* ***permitted.***

1. a) Distinguish with sketches, between stiffened and unstiffened seated connection for beams. 5

   b) A beam ISMB 500 @ 86.9 kg/m transmits an end reaction of 320 kN to the flange of ISHB 300 @ 58.8 kg/m. Design a stiffened seat connection, using double angle stiffeners. 15

2. a) Explain the length of a plastic hinge in a steel beam. 5

   b) Figure 1 shows a portal frame with two concentrated loads. Find the ultimate/ collapse value of P, if M_p= 150 kN-m. 15

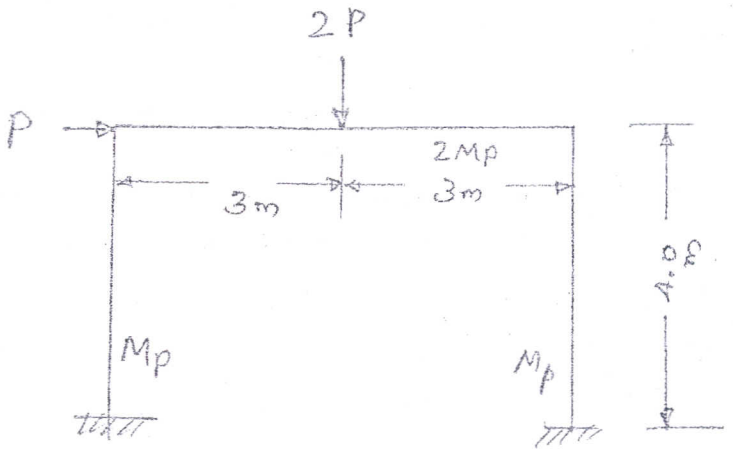

Figure 1

P.T.O.

3. Figure 2 shows the cross section of a light gauge structural steel beam, over a simply supported effective span of 4.0 m. Determine the allowable load per metre on the beam. Take $F_y = 235$ MPa, $E = 2 \times 10^5$ MPa. 20

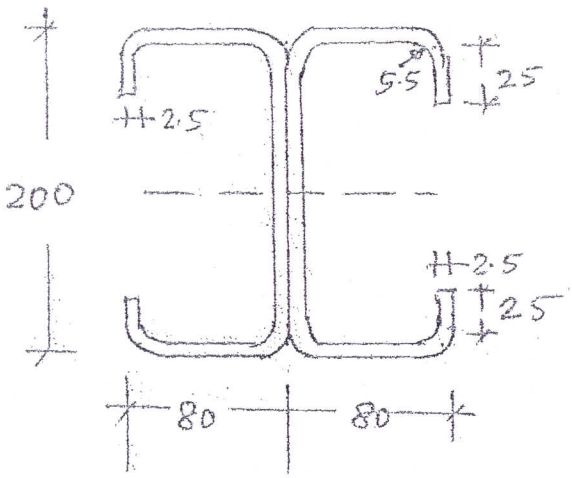

Figure 2

4. a) Sketch the various types of trusses used in industrial buildings and indicate their span ranges and functional aspects. 7

   b) Explain bracing systems in industrial buildings. 6

   c) Explain with good sketches, the overhead cranes layouts and support systems in industrial buildings. 7

5. An aluminium I section 300 mm depth and 140 mm flange width is used as a column of effective length 4 m. Taking $F_y = 150$ MPa and equivalent column dimension of MB 300, find the vertical load P which can be kept in the plane of the web with an eccentricity of 200 mm. $\sigma_y = 120$ MPa , $E = 70$ GPa. 20

6. a) Explain with sketches the different types of foundations for towers, their applicability with respect to type of tower, type of soil etc. 10

   b) Sketch a typical cross arm of a transmission line tower and show the different loads acting on it. 5

   c) Discuss the temperature induced loads by conductors on transmission line towers. 5