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Total Number of Pages: 02

M.TECH
CEPE208

2nd Sem Regular / Back Examination – 2015-16
ADVANCED STEEL STRUCTURES
Q.CODE:W800
Time: 3 Hours
Max marks: 70

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)
- a) What is the importance of structural integrity? How it can be achieved?
 - b) How are residual stresses induced in steel structures?
 - c) What is inelastic buckling?
 - d) Which section performs best in torsion & why?
 - e) Define laterally restrained beam.
 - f) Define shear lag.
 - g) What are perfectly plastic materials?
 - h) What is the purpose of using tension splice?
 - i) Why are only plastic sections to be used in indeterminate frames?
 - j) What is moment amplification factor?
- Q2 a) Sketch various lateral load resisting system & state its application. (5)
- b) Analyse the beam ABC of length 5m propped cantilever at end C & fixed at end A. The beam is loaded by load 2W at B, which is at 2m. from C. The plastic moment of resistance for portion AB is 2Mp & for portion BC is Mp..Determine collapse load. (5)
- Q3 A column section ISHB 225 @ 459.1 is to be spliced at floor level .The factored forces at the section, the axial load, transverse shear force and bending moment are 550KN, 150KN, 50KNm respectively. Design the splice plates and bolted connections using bolts of grade 4.6.Grade of Steel used is Fe 410. (10)
- Q4 Design a base plate for a ISHB300 column subjected to a factored axial load of 350 kN, bending moment of 50 KN-m & a shear force of 150 KN .Use Fe410 grade steel & the foundation is M25 concrete. (10)
- Q5 a) Determine the moment carrying capacity & shear strength of a laterally unrestrained ISMB500 member of length 4m.Yield strength of steel is 250 Mpa. (5)
- b) An ISMB 400 transfers an end reaction of 150 KN and an end moment of 75 KNm to the flange of an ISHB 300 @ 577 N/m. Design the moment resistant connection. (5)

- Q6 a) Design a welded splice for an ISMB 300 section to transfer a factored bending moment of 90 KN-m and a shear of 50KN .Assume the flange splice carries all the moment & that the web splice carries only the shear. (5)
- b) What are the different types of beam column connections? (5)
- Q7 Design a laterally unrestrained beam to carry a uniformly distributed load of 45KN/m .The beam is unsupported for a length of 4m and is simply placed on longitudinal beams at its ends. Use grade of steel as Fe410. (10)
- Q8 Write Short Notes. (any two) (5 x 2)
- a) Moment Resistant Connections
 - b) Beam Column Splices
 - c) Local and Lateral buckling of Beams
 - d) Equivalent Moment Factor