

Roll No

MVSE-301(C)

M.E./M.Tech., III Semester

Examination, December 2016

Design of Steel Structures (Elective - I)

Time : Three Hours

Maximum Marks : 70

- Note:** i) Attempt all questions, internal choices are given.
ii) Any missing data assumed suitably and stated clearly.

1. Attempt any two parts :
 - a) How does the limit state design methods differ from the working stress methods, describe clearly? 7
 - b) Describe the various types of structural steel, with their significant properties. Also draw stress-strain curve for mild steel with key points. 7
 - c) Describe the suitability of various IS rolled steel section for different types of steel members. Also describe the meaning of Plastic, Compact, Semi compact and Slender sections. 7
2. Attempt any two parts :
 - a) What is meaning of effective length of column. Give expression of effective length for different end conditions of braced frames. Also describe no sway columns. 7
 - b) What is the meaning of ideal strut? Draw specimen strength curve for an ideal strut. Also describe the torsion flexural buckling of column. 7
 - c) Describe the Robertson approach for design of column. Draw specimen design curve based on Robertson approach. 7

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3. Attempt any two parts :
 - a) Describe following in details : 7
 - i) Laterally supported and Laterally unsupported beams.
 - ii) Web buckling and Web crippling
 - b) Design a two span continuous beam 8m long, each span being 4.0m. It supports a design uniform load of 75kN/m. Use steel of grade Fe 410. 7
 - c) Design a laterally supported beam for the following data: 7
Effective span = 4.0m
Design Bending Moment = 550 kN m
Design Shear Force = 200 kN
Grade of Steel = Fe 410
4. Attempt any two parts :
 - a) Describe following in details : 7
 - i) Short beam column and Long beam column
 - ii) Local section failure and Overall member failure
 - b) Design a beam-column of length 6.3m to carry a load of 700 kN at an eccentricity of 100mm from centroidal axis of the column across the web. Both the ends of columns are pinned. 7
 - c) Design a beam-column of effective length 5.2m carrying factored forces as below : 7
Axial compressive load = 750 kN
Moments at top - $M_z = +200$ kN m and $M_y = +60$ kNm
Moments at bottom - $M_z = -200$ kN m and $M_y = +50$ kNm
5. Write short notes on following (any three) : 14
 - i) Capacity check and Buckling check of beams
 - ii) Torsional and Warping stresses in beams
 - iii) Combined effect of Bending moment and Torsion moment in beams
 - iv) Advantages of Box section over I section for beams
 - v) Design method for beam under torsional buckling

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