

## FACULTY OF ENGINEERING

B.E. (Civil) VI – Semester (CBCS) (Main) Examination, April / May 2019

Subject: Steel Structures

Time: 3 Hours

Max.Marks: 70

Note: Answer all questions form Part-A and any five questions from Part-B

## PART – A (10x2 = 20 Marks)

- 1 Illustrate the fillet weld using neat sketch in case of  
(a) T joint (b) Lap joint
- 2 What are advantages of welded connections over bolted connections?
- 3 What is the effective length of a compression member if it is effectively held in position and rotation at both ends?
- 4 Differentiate between stiffened and unstiffened beam end connections.
- 5 Briefly discuss about block shear failure with neat sketch.
- 6 What are the forces for which the lateral bracing system for column is designed?
- 7 Write short note on splicing of column.
- 8 Mention codal provisions to prevent web crippling and web buckling.
- 9 What is the economical spacing of roof truss?
- 10 Find shape factor for square of side  $f$  with its diagonal parallel to x-x axis.

## PART – B (5x10 = 50 Marks)

- 11 Two plates 12mm and 20mm thick are to be jointed by double cover butt joint to sustain a factored design load of 825 kN use 4.6 grade 20 mm diameter bolts, and Fe 410 grade steel. 8 mm thick Cover plates 2 (one on each side). Design butt joint.
- 12 An ISLC 300 @ 324.7 N/m Fe 410 grade of steel is to carry a factored tensile force of 900 kN. The channel section is to be welded at the site to a gusset plate of 12 mm thick. Design a fillet weld, if the overlap is limited to 350 mm.
- 13 A tension member ISA 100 x 75 x 8 mm is connected to a 10 mm thick gusset plate the longer leg is connected to the plate using 4 Nos. of M20 bolts of 4.6 grade. Find the load carrying capacity of Tension Member.
- 14 Design a built up column 10m long to carry an axial load of  $750 \times 10^3$  N. The column is restrained in position but not in direction at both the ends. Provide single lacing system with riveted connections. Assume  $f = 250$  MPa. Design the column with two channels placed toe-to-toe, also design lacing system with welded connections.
- 15 Design a laterally unsupported beam of effective span 6m subjected to 500kNm bending moment and 200kN shear force use Fe 410 grade of Steel.
- 16 Design an I- section purlin, for an industrial building, to support a galvanized corrugated iron sheet roof for following data:  
Spacing of truss c/c = 6.0 m  
Span of truss = 12.0 m  
Spacing of purlin c/c = 1.5 m  
Intensity of wind pressure =  $2 \text{ kN/m}^2$   
Weight of galvanized sheet =  $130 \text{ N/m}^2$   
Fe 410 Grade of steel
- 17 Write short note on the following:  
a) Working stress method and limit state method  
b) Shape factor

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