MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : CE(PC)604/CE602 Design of Steel Structures

UPID : 006651

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) High carbon steel is used in _____

(II) Which of the following relation is correct?
a) Net area = Gross area / deductions
b) Net area = Gross area – deductions
c) Net area = Gross area * deductions
d) Net area = Gross area + deductions

(III) What is compression member?

(IV) Write true or false: Angles and T section are strong in bending.

(V) Which of the following assumptions were not made while deriving expression for elastic critical moment?
a) beam is initially undisturbed and without imperfections
b) behaviour of beam is elastic
c) load acts in plane of web only
d) ends of beam are fixed support

(VI) When only transverse stiffeners are provided and $d/t_w < 345 \varepsilon f$ to meet compression flange buckling criteria, the range of c should be _____

(VII) Bars and rods are not used as _____

(VIII) Which of the following is not an imperfection in column?
a) material not being isotropic
b) geometric variations of columns
c) material being homogenous
d) eccentricity of load

(IX) What is beam?

(X) The thickness of flange cover plate should be _____ flange angle in bolted connections.

(XI) High strength fatigue is advantage of _____ over bearing type bolts.

(XII) Member instability effects cannot be ignored is not an assumption of _____ of rigid jointed frame.

Group-B (Short Answer Type Question)

Answer any three of the following : [5 x 3 = 15]

2. Design using fillet weld to transfer an axial load of 500 KN. Dimensions of two plates are 250 mm X 10 mm and 350mm by 10 mm. Assume shop weld and use steel of grade Fe410. [5]
3. A tensile member is subjected to a force of 500 KN. Design the member. [5]
4. What Is Structural Steel Design? [5]
5. An ISA 100X 100X 6 is used as a strut in a truss. The length of the strut between the intersections at each end is 3 m. Calculate the strength of the strut if it is connected by 2 bolts at each end. [5]
6. Explain the design process Of structural steel. [5]

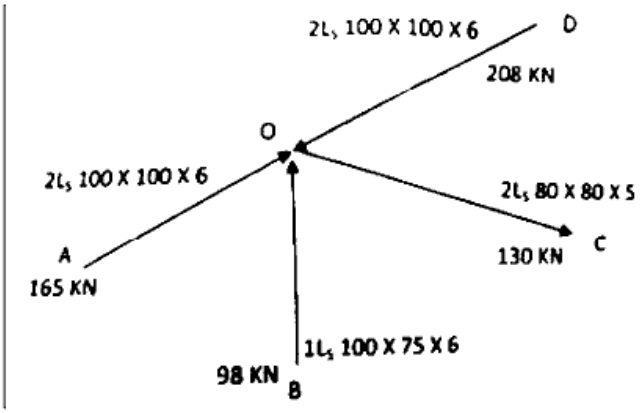
Group-C (Long Answer Type Question)

Answer any three of the following : [15 x 3 = 45]

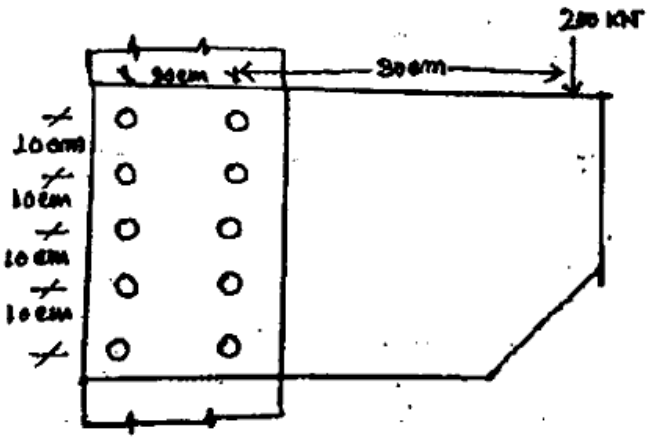
7. Design an ISMB/ISMC section of purlin, for an industrial building to support a galvanised corrugated iron sheet roof for the following data: [15]
spacing of truss c/c= 6.0 m
Space of truss c/c=6.0 m
Span of truss - 12.0 m

slope of truss =30 degree
spacing of purlins c/c= 1.5 m
Intensity of wind pressure = 2 kN/m sq
Grade of steel Fe410
Consider the wind pressure is of thrust type

8. Design the bolted connection of a roof truss using suitable gusset plate and M16 bolt of grade 4.6 as shown in figure below The section and force in each member are also given. Assume all other data. [15]



9. A load of 200 KN is carried by a plate bracket bolted to a column as shown in the fig. Calculate the maximum force taken up by any rivet [15]



10. Determine the Plastic Section Moduli of Zpz and Zpy of ISMB 225@306.07 N/m. [15]
11. Design a laterally unsupported beam of effective span 5 m subjected to a total udl of 150 KN/m. Assume Fe410 [15]

*** END OF PAPER ***