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C09-C-602

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BOARD DIPLOMA EXAMINATION, (C-09)  
OCTOBER/NOVEMBER-2018  
DCE - SIXTH SEMESTER EXAMINATION

STEEL STRUCTURES

Time : 3 Hours ]

[ Total Marks: 80

PART-A

3X10=30

*Instructions* :

1. Answer **All** questions.
2. Each question carries **three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. List out the advantages and disadvantages of steel structures.
2. Calculate the design strength of welded joint if the size of weld is 5mm and its length is 212mm. The ultimate shear stress in the weld is  $410 \text{ N/mm}^2$ . Assume connections are made in the work shop.
- \* 3. Define the terms (a) Net area (b) Net effective area.
4. What is meant by shear lag?
5. Sketch the different forms of compression members.
6. Define effective length of a column and write the values of effective length for any two cases of end conditions.
7. Define (a) Plastic section modulus (b) Shape factor.
8. Write down the component parts of a plate girder.
9. Draw the line sketches of (a) Fan truss (b) Fink truss.
10. What is purlin? List various loads used in the design of a Purlin.

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## PART-B

10X5=50

**Instructions** \*

1. Answer any **Five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. A tie member of a roof truss consists of 2 ISA 100 x 75 x 8 mm. The angles are connected to either sides of a 10mm gusset plate and the member is subjected to a working pull of 300 KN. Design the welded connection. Assume connections are made in the workshop. Take  $f_u = 410 \text{ N/mm}^2$
12. Design a single angle tension member of a roof truss to carry factored tensile force of 225 KN. The angle is to be connected to a gusset plate through its longer leg by fillet welds. Take  $f_y = 250 \text{ MPa}$ ,  $f_u = 410 \text{ MPa}$ . The length of member is 3m
13. Two channels ISMC 358 N/m are to be placed back to back and used as a column on an effective length of 6m. The yield stress of steel used may be taken as 400 MPa. Determine the minimum clear distance to be maintained between the backs of the channels to get max strength. Determine also the maximum design strength of the column.
14. A discontinuous double angle strut consisting of 2 angles ISA 90 x 60 x 10mm are placed back to back and connected to the same side of gusset plate of 12mm thick at both ends by suitable fillet welds. The gusset fixity may be taken as hinged, c/c distance of end connection is 2m. The yield stress of steel is 300 MPa. Determine the design compressive strength of the strut.
15. Write the design specification for lacing for built up column as per IS 800-2007
16. Design a simply supported I section to support the slab of hall 9m x 24m with beams spaced at 3m c/c. The thickness of the slab is 100mm consider a floor finish load of  $0.5 \text{ KN/m}^2$  and a live load of  $3 \text{ KN/m}^2$ . The grade of the steel is E250. Assume that an adequate lateral support is provided to the compression flange.
17. A simply supported beam ISMB 400@ 616 N/m is subjected to a B.M. of 100 KN-m and S.F. of 80 KN. Check the safety of beam in bending and shear if beam is laterally restrained.
18. A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24m x 40m. The height of building is 12m at the eaves. Determine the basic wind pressure

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