C16-**C-501**

6620

BOARD DIPLOMA EXAMINATIONS

OCT/NOV-2019

DCE – FIFTH SEMESTER

STEEL STRUCTURES

Time: 3 hours Max. Marks: 80

PART – A **3 X 10 = 30**

Instructions: *1. Answer **all** questions.*
*2. Each question carries **Three** Marks.*
3. Answer should be brief and straight to the point and should not exceed Five simple sentences.

1 Name and sketch any six forms of rolled steel sections.

2. Write any three advantages of welded joints over riveted joints.

3. Sketch a fillet weld and name various parts.

4. Determine the net effective area of single ISA 100mm X 65mm X 10mm When it longer leg is connected to 10mm thick gusset plate by fillet welds.

5. Difference between a column and a strut.

6. Define battening and mention any two specification of battering.

7. State different types of stiffeners provided in plate girders with their functionality.

8. Briefly explain (a) Web buckling and (b) Web crippling

9. Write the relation between design wind speed and design wind pressure.

10. Calculate the live load on a truss if the angle of slope of roof is $23^{0.}$

PART – B 5 X 10 = 50

Instructions: *1. Answer any **Five** questions*
*2. Each question carries **TEN** Marks.*
3. Answer should be comprehensive and Criteria for Valuation is the content but not the length of the answer.

11. A tie member of a roof truss consists of 2 ISA 100mm X 65mm X 8mm. The angles are connected to either side of a 10mm gusset plate and the member is subjected to a working load of 280KN. Design the side fillet weld only. Assume connections are made in the workshop. Take f_u = 410 N/mm^2.

12. Design a single angle tension member for a roof truss to carry a factored tensile force of 230 KN. Check for block failure is not necessary. Assume length of the connection as 160mm. [Give: f_y = 250 N/mm^2, f_u = 410 N/mm^2]

13. Determine the design compressive strength of single ISMB 350 @ 514 N/m When it is used as a column of 4 m height with both of its ends restrained against translation and rotation. They yield stress of steel used is 340 MPA. Take E= 2X10^5 N/mm^2.

14. Design a single-angle strut for a roof truss to carry a factored compressive load 180 KN. The length of the angle between centre to centre of intersection is 3 m. Assume the end condition to be fixed and f_y = 250 N/mm^2.

15. Design a slab base for a column ISHB 400 @ 759 N/m to carry an axial load of 1200KN. Assume M_{20} grade of concrete and yield stress of steel is 250MPA. Provide welded connection between column and base plate. Also design concrete pedestal, if the SBC of the soil is 200 KN/m^2.

16. (a) Write briefly about the shear buckling design methods.

(b) Determine the shape factor of a symmetrical I-section with flange dimensions 200mm X 10mm and web dimensions 10mm X 380mm.

17. Design a rolled steel beam using I – sect6ion for simply support beam of effective span of 5m carrying a UDL of 40 KN/m in including the self-weight of the beam. The beam is adequately supported laterally. Check the beam for deflection and share if E = $2X10^5$ N/mm^2 and f_y = 250 N/mm^2.

18. Determine the design loads on the nodal points of the truss of an industrial building near Vijayawada. The building is first class building with general life of 50 years with the following data:

Terrain--- category 2

Maxmium dimension---40

Width of building---15 m

Height at even level—8 m

Number of top panels –6

Topography --- slope less than 30^0

Permeability----Medium

Span of truss--- 15 m

Pitch--- 1/5

Sheeting----AC sheets

Spacing of purlins---1.35 m

Spacing of trusses----4 m