C-16-C-502

5817

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH / APRIL - 2019

DCE - V SEMESTER EXAMINATION

DESIGN OF STEEL STRUCTURES

Time : 3 Hours] [Total Marks : 80

PART - A 3×10=30

Instructions :
(1) Answer ALL questions.
(2) Each question carries THREE marks.
(3) Answer should be brief and straight to the point.
(4) Use of IS 800:2007,IS:875 and steel tables are permitted.
(5) Assume data suitably, if necessary.

1 What are the physical properties of steel? State with values.

2 List out the advantages and disadvantages of welded joints over riveted joints.

3 Sketch any six different forms of tension member.

4 Calculate the design strength of a tension member due to yielding of gross section for ISA 125 × 95 × 8mm. ; fy = 410 N/mm^2

5 Define : (a) Slenderness ratio (b) Effective length of column

6 Sketch the sectional elevation of revitted slab base and label the components.

7 Draw the cross-section of riveted plate girder and label its component parts.

http://www.sbtetonline.com

8 Define shape factor, and mention the shape factors values for circular and I-Section.

9 Draw the line sketches of (a) fan truss (b) fink truss

10 How much live load do you consider in the design of steel roof truss having angle of slope of truss 30°.

PART - B 10×5=50

Instructions :
(1) Answer any FIVE questions.
(2) Each question carries TEN marks.
(3) Answer should be comprehensive and criterion for valuation is the content but not the length of the answer.
(4) Assume suitable data where ever necessary.

11 An Angle tie ISA 150 mm × 115 mm × 10 mm carrying an axial tension 500KN is to be connected to a 12mm thick gusset plate through it longer leg by side fillet welds only at site. Design the joint, if ultimate shear stress in the weld is 410MPa.

12 Determine the design tensile strength of a tensile member ISA 125 mm × 75 mm × 8mm when its when its shorter leg is connected to 10m thick gusset plate by 7mm size fillet welds. The length of weld is 180mm Take $f_y = 250MPa$, $f_u = 410MPa$.

13 Compare the compressive strength of ISLBS 450 @ 653N/m and ISHB 300 @ 630N/m, when they are used as column of effective length 3.2m. Take $f_y = 300N/mm^2$.

14 Design a single angle section to carry a compression of 100KN.The Centre to Centre distance between the end connections is 2m. Assume that the end connection is done by the fillet welds. Yeild stress of steel is 250MPa.

http://www.sbtetonline.com

15 Design a slab base with rectangular base plate having equal projections for a column section consisting of ISHB 350 @ 661N/m carrying an axial load of 1200KN including self weight. Use M-20 grade concrete and Fe 250 grade steel. Also design the concrete pedestal if SBC of soil is 180KN/m^2.

16 A Simply support beam ISMB 350 @ 524N/m is subject to a B. M of 100KN-m arid SF of 80KN. Check the safety of the beam in bending and shear if the beam is laterally restrained.

17 Design a simply supported I-section to support the slab of hall 9m × 24m with beams spaced at 3m Centre to Centre. The thickness of the slab is 100mm, Consider a floor finish load of 0.5KN/m^2 and live load of 3KN/.^{2}. The grade of the steel is Fe 250. Assume that an adequate lateral support is provided to the compression flange.

18 A Pratt truss of span16m and pitch 25° is used for an A.C. sheet roofing The trusses are 4m apart and the wind pressure may be assumed as 1500N/m,^{2}.

Determine : (a) Dead load (b) Wind load (c) live load, at

(i) Intermediate panel points

(ii) End panel points of truss.

Assuming the following data :

Unit weight of AC sheet roofing	:	200N/m^2 of plan area
Unit weight of purling	:	100N/m^2 of plan
Unit weight of bracing	:	200N/m^2 of plan area
Permeability	:	medium
Height at eaves level	:	8m