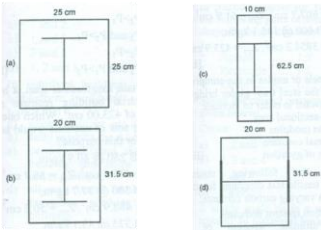


01. Consider the following statements in respect of design of web and flange splices.
- Flange splice shall be designed for actual BM at the section
 - Flange splice shall be designed to resist the actual shear at the section
 - Web splice shall be designed to resist the actual BM at the section
 - Web splice shall be designed for actual BM

Of these statements

- (i) and (iii) are correct
 - (i) and (iv) are correct
 - (ii) and (iv) are correct
 - (i) (iii) and (iv) are correct
02. A base plate of area 625 cm² has to be provided for an axially loaded column ISMB 200 (flange width 100). Which one of the arrangements shown in fig. would result in least base plate thickness?



03. Battens provided for a compression member shall be designed to carry a transverse shear equal to

- 2.5 % of axial force in member
- 5 % of axial force in member
- 10 % of axial force in member
- 20 % of axial force in member

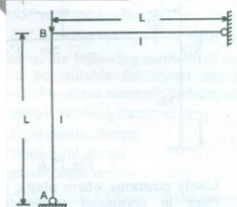
04. The following observations relate to designing of laced column:

- Single lacing systems on opposite planes shall preferably be in the same direction so that one is the shadow of the other.
- Lacing bar should only be a flat.
- The slenderness ratio of the lacing bars for compression shall not exceed 180.
- Laced compression members are to be provided with tie plates at ends.

Of these observations

- 1,2,3 and 4 are correct
- 3 and 4 are correct
- 2 and 3 are correct
- 1 and 4 are correct

05.



The effective length of column AB shown in fig. is

- 0.7L
- Less than 0.7L
- Greater than 0.7L but less than L
- L

06. Match List I with List II and select the correct answer using the codes given below the lists:

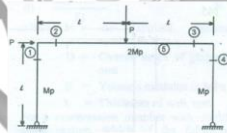
List I (Types of stress)	List II (Allowable value of stress)
A. Axial tension	1. $0.75 f_y$
B. Bending tension	2. $0.66 f_y$
C. Maximum shear stress	3. $0.60 f_y$
D. Bending stress	4. $0.40 f_y$

(f_y = minimum yield stress of steel)

Codes:

- A-2, B-3, C-1, D-4
- A-3, B-2, C-4, D-1
- A-2, B-3, C-4, D-1
- A-3, B-2, C-1, D-4

07. A portal frame subjected to central concentrated load is shown in fig.



Likely positions where plastic hinges can form in combined mechanism would include

- 2, 3, and 5
- 1, 4 and 5
- 4 and 5
- 3 and 5

08. Three types of continuous beams supported a concentrated load at the central span are shown in fig. collapse loads (P_u) corresponding to fig. (a), (b), (c) respectively are P_1 , P_2 and P_3 which one of the following conclusions is correct?

- $P_3 > P_2 > P_1$
- $P_3 = P_2$ and $P_2 > P_1$
- $P_1 = P_2 = P_3$
- $P_1 > P_3$ and $P_1 > P_2$

09. For a certain longitudinal span, a beams in an industrial building requires section modulus of 423.00 cm³. which one of the following sets of sections would be most suitable for this purpose ?

- ISWB 250 @ 40.9 kg/m, $Z_{xx} = 475.4 \text{ cm}^3$, $Z_{yy} = 85.7 \text{ cm}^3$
- ISWB 300 @ 40.9 kg/m, $Z_{xx} = 488.9 \text{ cm}^3$, $Z_{yy} = 50.2 \text{ cm}^3$
- ISWB 325 @ 43.1 kg/m, $Z_{xx} = 607.7 \text{ cm}^3$, $Z_{yy} = 61.9 \text{ cm}^3$
- ISWB 600 @ 145.1 kg/m, $Z_{xx} = 3854.2 \text{ cm}^3$, $Z_{yy} = 423.9 \text{ cm}^3$

10. The channels or angles in the compression chords of the steel truss girder bridges are turned outward on order to increase

- Cross-sectional area
- Section modulus
- Torsional constant
- Radius of gyration

11. Consider the following statements regarding tensile test diagrams for carbon steels with varying carbon contents :

As the carbon contents increases

- The ultimate strength of steel decreases.
- The elongation before fracture increases.
- The ductility of the metal decreases.
- The ultimate strength increases.

Of these statements

- 3 and 4 are correct
- 1 and 3 are correct
- 1,2 and 3 are correct
- 1 and 2 are correct

12. Consider the following factors :

- Large number of loading cycles.
- Large variations in stress.
- Large stress concentrations.

Those associated with fatigue failure would include

- 1 and 2
- 1 and 3
- 2 and 3
- 1,2 and 3

13. In industrial buildings in the northern hemisphere, the advantage of a north-light roof is that it

- Allows sunlight into the building.
- Fully exploits the aurora borealis.
- Permits diffused daylight into the building and helps avoid glare of direct sunlight
- Allows both sunlight and the prevailing northern breeze in the building.

14. In plastic analysis for flexure , which of the following pairs of shape of section and shape factor are correctly matched ?

- I..... 1.4
- Square..... 1.5
- Rectangle.....1.5
- Circle.....1.7

Select the correct answer using the codes given below:

codes:

- 1,2 and 3
- 2,3 and 4
- 3 and 4
- 1 and 2

15. A single angle tie in a welded steel roof truss of an industrial building is subjected to an axial tensile force of 60 kN. If the yield stress of the material is 250 Mpa then the section that would best satisfy the requirement of IS : 800 is

- ISA 50 50 5
- ISA 50 50 6
- ISA 55 55 5
- ISA 55 55 6

16. A part from gravity loads, which of the following loads are also considered in the design of a gantry girder located within an industrial building

1. Wind loads.
2. Longitudinal loads.
3. Lateral loads.

Select the correct answer using the codes given below:

codes:

- a. 1 and 2
- b. 1 and 3
- c. 2 and 3
- d. 1,2 and 3

17. The angle of dispersion of a concentrated load on the flange to the web plate of a steel beam is

- a. 90° with the horizontal
- b. 60° with the vertical
- c. 45° with the horizontal
- d. 30° with the vertical

18. Which of the following methods of design would be suitable for metal structures subjected to stress reversals and impact ?

- a. Simple working stress design
- b. Rigid-plastic design
- c. Semi-rigid design
- d. Elastic rigid design

Select the correct answer using the codes given below

Codes:

- a. 1, 2 and 4
- b. 1, 3 and 4
- c. 1, 2 and 3
- d. 2, 3 and 4

19. A welded steel plate girder consisting of two flange plates of 350 mm x 16 mm and a web plate of 1000 mm x 6 mm, requires

- a. No stiffeners
- b. Vertical stiffeners
- c. Intermediate vertical stiffeners
- d. Vertical and horizontal stiffeners

20. The following observations refer to two metal specimens 'A' and 'B' of the same size subjected to uni-axial tension test upto failure :

1. The elastic strain energy of A is more than that of B.
2. Area under stress-strain curve of A is less than that of B
3. The yield strength of A is more than that of B
4. The percentage elongation of A and B are equal.

Which one of following statements is true in this regard?

- a. Specimen A is more ductile than specimen B
- b. Specimen B is more ductile than specimen A
- c. The ductility of the two specimens is equal
- d. The data is insufficient to compare the ductilities of the two specimens

