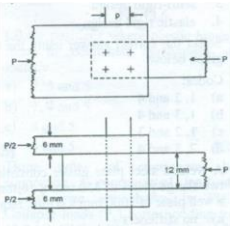


01. Consider the riveted joint shown in fig. the maximum permissible value of 'p' (rivet diameter 20 mm) is

- a. 50 mm b. 60 mm
c. 72 mm d. 96 mm



02. Synthetic rubber used elastomeric bearings should have respectively, hardness (IRHD) and ultimate tensile elongation of

- a. 65 and 400 %
b. 65 and 3500 %
c. 55 and 4000 %
d. 55 and 350 %

03. A steel plate is 30 cm wide and 10 mm thick A rivet of nominal diameter 18 mm is driven. The net sectional area of the plate is

- a. 18 . 00 cm²
b. 28 . 20 cm²
c. 28 . 05 cm²
d. 32 . 42 cm²

04. A cantilever steel beam of 3 m span carries a uniformly distributed load of 20 kN/m inclusive of self-weight. The beam comprises ISLB 200 @ 198 N/m, flange 100 mm x 7.3, web thickness 5.4 mm, $I_{xx} = 1696.6 \text{ cm}^4$, $I_{yy} = 115.4 \text{ cm}^4$. bending and shear stresses in the beam are respectively

- a. 530.47 n/mm² and 55.55 n/mm²
b. 3899.48 n/mm² and 82.19 n/mm²
c. 132.62 n/mm² and 27.78 n/mm²
d. 1949.74 n/mm² and 41.10 n/mm²

05. Which one of the following is the most important consideration in the design of a riveted joint between structural members when the centroid of the rivets does not coincide with the axis of the load?

- a. direct shear force in each rivet is proportional to its radial distance from its centroid and the resultant force in each rivet should not exceed its rivet value.
b. Shear force caused in each rivet due to eccentricity of the load is proportional to its radial distance from its centroid and the direct shear force in each rivet should be limited to half the rivet value.
c. The shear force caused in each rivet due to eccentricity of the load is proportional to the radial distance of the rivet from the centroid of the rivet group and the maximum resultant force in any rivet should not exceed the rivet value
d. The shear force caused in the rivet due to eccentricity of load as well as direct shear force caused in the rivet should not exceed rivet value individually.

06. The common assumption that all rivets share equally a non-eccentric load is valid at a load

- a. Below the working load
b. Equal to the working load
c. Above the working load
d. Equal to the failure load

07. At the location of plastic hinge

- a. Radius of curvature is infinite
b. Curvature is infinite
c. Moment is infinite
d. Flexural stress is infinite

08. Z-purlins may be fixed in either orientation, A or B as shown in fig.



Which one of the following statements is correct in this regard?

- a. Orientation A is structurally more efficient than orientation B
b. Orientation B is structurally more efficient than orientation A
c. Both the Orientations are structurally equally efficient
d. Neither of the two orientations is structurally efficient

09. For an I beam the shape factor is 1.12 the factor of safety in bending is 1.5. if the allowable stress is increased by 20% for wind and earthquake loads, then the load factor is

- a. 1.10
b. 1.25
c. 1.35
d. 1.40

10. Intermediate vertical stiffeners are provided in plate girders to

- a. Eliminate web buckling
b. Eliminate local buckling
c. Transfer concentrated loads
d. Prevent excessive deflection

11. Consider the following statements: Aluminum is being increasingly used for structural purposes because

1. Its modulus of elasticity is double that of steel.
2. Its coefficient of thermal expansion is half that of steel
3. It require less maintenance.
4. The strength to unit weight ratio of aluminum is high.

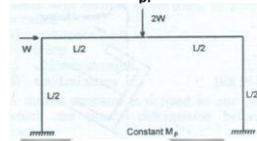
Of these statements

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

12. The weakest plane in a fillet weld is

- a. A side parallel to the force
b. A side normal to the force
c. The one along the throat
d. The one normal to the throat

13. Figure shown a portal frame with loads. All members of frame have same plastic moment of resistance M_p .



The value of W at collapse will be

- a. $2 M_p / L$
b. $4 M_p / L$
c. $6 M_p / L$
d. $8 M_p / L$

14. A rectangular steel section of which 'b' and depth 'h' has been stressed up to yield point (σ_y) up to depth of h/4 from both the top and bottom face under the action of a moment 'M' the magnitude of the moment 'M' is

- a. $(10/24) bh^2 \cdot \sigma_y$
b. $(10/24) bh^2 \cdot \sigma_y$
c. $(10/24) bh^2 \cdot \sigma_y$
d. $(10/24) bh^2 \cdot \sigma_y$

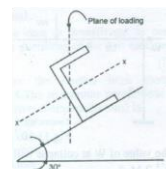
15. A simply supported beam of span 'L' supports a concentrated load 'W' at its midspan. If the cross-section of the beam is an I-section then the length of elastic plastic zone of the plastic hinge will be

- a. L/8
b. L/4
c. L/2
d. 3L/4

16. A continuous beam of constant M_p has three equal spans and carries total uniformly distributed load 'W' on each span. The value of collapse load for the beam will be

- a. $12 M_p / L$
b. $11.656 m_p / L$
c. $8.65 M_p / L$
d. $4 M_p / L$

17. A channel section is placed in an inclined position carrying vertical loads as shown in fig.



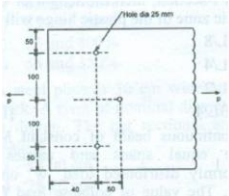
If the applied moment for the channel is 'M' due to vertical load, then M_{xx} is given by

- a. $\sqrt{3} M / 2$
b. $1/2 M$
c. $1 / \sqrt{2} M$
d. $2 M$

18. The thickness of web for unstiffened plate girder with clear distance d between the flanges shall not be less than

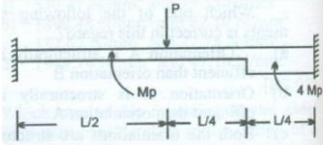
- a. $d/200$
- b. $d/85$
- c. $d/100$
- d. $d/160$

19. What is the effective net width of plate shown in fig. for carrying tension ?



- a. 212.5 mm
- b. 237.5 mm
- c. 250 mm
- d. 275 mm

For the beam shown in fig. the collapse load P is given by



- a. $16 M_p / L$
- b. $14 M_p / L$
- c. $12 M_p / L$
- d. $10 M_p / L$

