01. The effective length of a battened strut effectively held in position at both ends but not restrained in direction is taken as

a. 1.8 L
b. L
c. 1.1 L
d. 1.5 L

02. The maximum slenderness ratio of a compression member carrying both dead and superimposed load is

a. 180
b. 200
c. 250
d. 350

03. The maximum slenderness ratio of a column, the design of which is governed by wind or seismic forces is

a. 150
b. 180
c. 150
d. 350

04. According to IS:800, in the merchant- Rankine formula the value of imperfection index(n) is

a. 1.0
b. 1.4
c. 1.8
d. 2.0

05. The best arrangement to provide unified behaviour in built up steel columns is by

a. Lacing
b. Battening
c. Tie plates
d. Perforated cover plates

06. If the 20 mm rivets are used in lacing bars, then the minimum width of lacing bar should be

a. 40 mm
b. 60 mm
c. 80 mm
d. 100 mm

07. The use of tie plates in laced columns is

a. Prohibited
b. Not Prohibited
c. Prohibited at start and end of lacing system only
d. Prohibited between two parts of the lacing

08. Lacing bars in a steel column should be designed to resist

a. Bending moment due to 2.5% of the column load
b. Shear force due 2.5% of the column load
c. 2.5% of the column load
d. Both (a) and (b)

09. Angle of inclination of the lacing bar with the longitudinal axis of the column should preferably be between

a. 10◦ to 30◦
b. 30◦ to 40◦
c. 40◦ to 70◦
d. 90◦

10. Battening is preferable when the

i. Column carries axial load only
ii. Space between the two main components is not very large
iii. Column is eccentrically loaded

The correct answer is

a. Only (i)
b. Only (iii)
c. (i) and (ii)
d. (ii) and (iii)

11. The effective length of a battened column is increase by

a. 5%
b. 10%
c. 15%
d. 20%

12. The overlap of batten plates with the main members in welded connections should be more than

a. 3 t
b. 4 t
c. 6 t
d. 8 t

Where t= thickness of the batten plate

13. The slenderness ratio of lacing bars should not exceed

a. 100
b. 120
c. 145
d. 180

14. Economical depth of a plate girder corresponds to

a. Minimum weight
b. Minimum depth
c. Maximum weight
d. Minimum thickness of web

15. Economical depth of a plate girder is given by

a. $\sqrt{\frac{M}{\sigma t_w}}$ b. $1.1\sqrt{\frac{M}{\sigma t_w}}$

c. $1.2\sqrt{\frac{M}{\sigma t_w}}$ d. $1.3\sqrt{\frac{M}{\sigma t_w}}$

Where M is maximum moment in the plate girder, σ Is allowable bending stress and t_W is thickness of web

16. Shear bucking of web in a plate girder is prevented by using

a. Vertical intermediate stiffener
b. Horizontal stiffener at neutral axis
c. Bearing stiffener
d. None of the above

17. Horizontal stiffener in a plate girder is provided to safeguard against
    a. Shear bucking of web plate
    b. Compression bucking of web plate
    c. Compression bucking of web plate
    d. All of the above

18. Minimum thickness of web in a plate girder, when the plate is accessible and also exposed to weather, is
    a. 5 mm
    b. 6 mm
    c. 8 mm
    d. 10 mm

19. The web crippling due to excessive bearing stress can be avoided by
    a. Increasing the web thickness
    b. Providing suitable stiffeners
    c. Increasing the length of the bearing plates
    d. None of the above

20. As per IS : 800, for compression flange, the outstand of flange plates should not exceed
    a. 12 t
    b. 16 t
    c. 20 t
    d. 25 t

    Where t = thickness of thinnest flange plate

21. Intermediate vertical stiffeners in a plate girder need be provided if the depth of web exceeds
    a. 50 t
    b. 85 t
    c. 200 t
    d. 250 t

    Where t is thickness of web

22. Bearing stiffener in a plate girder is used to
    a. Transfer the load from the top flange to the bottom one
    b. Prevent bucking of web
    c. Decrease the effective depth of web
    d. Prevent excessive deflection

23. The forces acting on the web splice of a plate girder are
    a. Axial forces
    b. Shear and axial forces
    c. Shear and bending forces
    d. Axial and bending forces

24. Gantry girder are designed to resist
    a. Lateral loads
    b. Longitudinal loads and vertical loads
    c. Lateral, Longitudinal and vertical loads
    d. Lateral, and Longitudinal loads

25. Minimum spacing of vertical stiffeners is limited to
    a. d/4
    b. d/3
    c. d/2
    d. 2d/3

    Where d is distance between flange angles

26. Bearing stiffeners are provided at
    i. The supports
    ii. The mid span
    iii. The point of application of concentrated loads

    The correct answer is
    a. Only (i)
    b. Both (i) and (ii)
    c. Both (i) and (iii)
    d. (i), (ii) and (iii)

27. Rivets connecting flange angles to cover plates in a plate girder are subjected to
    a. Horizontal shear only
    b. Vertical load only
    c. Both (i) and (b)
    d. None of the above

28. The maximum spacing of vertical stiffeners is
    a. 1.33d
    b. 1.25 d
    c. 1.5 d
    d. 1.75 d

    Where d is the distance between flange angles

29. The range of economical spacing of trusses varies from
    a. L/3 to L/5
    b. L/4 to 2L/5
    c. L/3 to L/2
    d. 2L/5 to 3L/5

    Where L is span

30. The maximum permissible span of asbestos cement sheets is
    a. 650 mm
    b. 810 mm
    c. 1250 mm
    d. 1680 mm