



8. As per Indian Standard, the I – section beam is classified into
  - a) 3
  - b) 4
  - c) 5
  - d) 6
9. Generally the purlins are placed at the panel points so as to avoid
  - a) Axial force in rafter
  - b) Shear force in rafter
  - c) Deflection of rafter
  - d) B. M. in rafter
10. Angle of inclination of the lacing bar with the longitudinal axis of the column should be in the range of
  - a)  $10^{\circ}$  to  $30^{\circ}$
  - b)  $30^{\circ}$  to  $40^{\circ}$
  - c)  $40^{\circ}$  to  $70^{\circ}$
  - d) more than  $70^{\circ}$
11. The effective length  $l$  of a simply supported beam with ends restrained in position not in direction, is equal to \_\_\_\_\_ m, if span of beam(L)= 3m.
  - a) 2.1
  - b) 2.4
  - c) 3
  - d) 6
12. Horizontal stiffeners are provided if the thickness of the web is less than \_\_\_\_\_ (where  $d_w$  is the depth of web).
  - a)  $d_w/85$
  - b)  $d_w/200$
  - c)  $d_w/250$
  - d)  $d_w/400$
13. The ultimate strength design of steel structures make use of
  - a) Plastic analysis
  - b) Elastic analysis
  - c) Ultimate analysis
  - d) Elastic and Plastic analysis
14. In the case of channels, the lug angles and their connections to the gusset or other supporting member shall be capable of developing strength in excess of the force by
  - a) 10 %
  - b) 20%
  - c) 30%
  - d) 40%
15. Bearing stiffeners are designed as
  - a) Columns
  - b) Ties
  - c) Beams
  - d) Beam-Ties
16. Slenderness ratio of a compression member subjected to dead load and live load shall not exceed
  - a) 150
  - b) 180
  - c) 250
  - d) 400
17. Timber is about  $1/12^{\text{th}}$  in the density as of structural steel. Its strength compared to steel is about
  - a) 5%
  - b) 10%
  - c) 20%
  - d) 25%
18. The slenderness ratio(S/d) of a solid timber column should not be greater than
  - a) 8
  - b) 11
  - c) 35
  - d) 50
19. A structural member subjected to axial tensile stress is known as
  - a) Strut
  - b) Tie
  - c) Beam
  - d) Column
20. The ratio of plastic section modulus to elastic section modulus
  - a) Is always less than 1
  - b) Is always greater than 1
  - c) Is equal to 1
  - d) Can be less than 1

KATHMANDU UNIVERSITY  
End Semester Examination  
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Level : B. E.  
Year : IV  
Time : 2 hrs. 30 mins.

Course : CIEG 402  
Semester : I  
F. M. : 40

SECTION "B"

Use of IS 800:2007, IS 883:1994, IS 875 part III and Steel Table are permitted.  
Attempt ALL questions.

1. What are the different types of welded joints? Describe them in brief with neat sketches. Design a suitable fillet weld for the bracket which is eccentrically loaded by working load  $P = 100$  kN and having eccentricity  $e = 150$  mm. Thickness of the bracket plate is 12 mm and the column used is ISHB 300 @618 N/m. [3+5]
2. Design a single angle discontinuous strut for a truss to support a service compressive axial load of 50 kN. The length of the strut is 3 m between the intersections at the ends. The strut is connected to the 12 mm thick gusset plate at each end through one of its legs by 20 mm diameter 4.6 grade black bolts. The grade of structural steel is Fe410. [8]
3. In a Fink type roof truss located at New Baneshwor, Kathmandu. Determine the Dead load, Live load and wind pressure with following data: [8]  
Overall length of building = 40m  
Overall width of building = 15m  
Width(C/C of roof columns) = 14.5m  
Rise of truss = 1/5 of span  
Height of column = 11m  
Roofing and side covering = A.C. Sheets  
Take the permeability of the building as zero.

**OR**

- By using Fe 410 grade steel, design a welded plate girder of span 25 m to carry superimposed load of 35 kN/m. Avoid the use of bearing and intermediate stiffeners. [8]
4. a) A simply supported Kailtimber (Grade I) beam in outside location carries a UDL of 14 kN/m inclusive of self-weight. The clear span of beam is 4m. Design the beam using rectangular section timber. [4]  
b) Design a built up column of 3 m length to carry 500 kN compressive load. Take Deodar (Grade I) timber inside location. Assume the necessary data. [4]
  5. Design a Gantry Girder for an electric overhead crane with the following data: [8]  
Capacity of Crane = 200 kN, Span of gantry girder = 6m, Span of crane girder = 18m, Self wt. of crane girder = 180 kN, Self wt. of Trolley = 75 kN, Min. Hook approach = 1m, Distance between wheels = 3.5 m and self wt. of rails = 0.3 kN/m. Check only for Moment capacity and Combined local capacity.

