

KATHMANDU UNIVERSITY
End Semester Examination
February/March 2019

Marks Scored:

Level : B.E.

Year : IV

Exam Roll No. :

Time : 30 mins.

Course : CIEG 402

Semester : I

F. M. : 10

Registration No. :

Date

FEB 21 2019

SECTION "A"

[20 Q × 0.5 = 10 marks]

Encircle the most appropriate answer.

1. High strength bolts are designed on the basis of
a) Friction b) Tension c) Compression d) Shear
2. The diameter of hole should be more than _____ mm than diameter of bolt.
a) 1 b) 1.5 c) 2 d) 2.5
3. The effective throat thickness of a fillet weld is K times the size of weld. For 90 degree angle between fusion faces, the value of K is
a) 0.7 b) 0.65 c) 0.6 d) 1.0
4. Minimum edge distance and end distance for rolled, machine flame cut is
a) $1.7 \times$ hole diameter b) $1.2 \times$ hole diameter
c) $1.5 \times$ hole diameter d) $2.0 \times$ hole diameter
5. Strength of bolt is
a) minimum of shear strength and bearing capacity of bolt
b) maximum of shear strength and bearing capacity of bolt
c) shear strength of bolt
d) bearing capacity of bolt
6. The efficiency of welded joint is _____ bolted joint.
a) More than b) Less than c) Same as of d) Not comparable to
7. A steel plate is 25 cm wide and 12 mm thick. If the diameter of bolt is 20mm, the net sectional area of plate is _____ cm^2 .
a) 27 b) 27.6 c) 276 d) 25
8. For a single unequal angle tie member, the leg preferred for making connection is
a) Shorter Leg b) Any of two
c) Longer leg d) longer if bolted, shorter if welded
9. The actual failure mode in bearing of tension member depends on
a) length of metal plate b) length of bolt
c) hole diameter d) bolt diameter
10. Minimum number of battens required in a built up column are:
a) 2 b) 3 c) 4 d) 5

11. If M 20 bolts are used in lacing bar for connection, then the minimum width of lacing bar must be
 a) 40 mm b) 60 mm c) 80 mm d) 100 mm
12. For same load, unsupported length and end conditions, a batten column compared to the lacing column is
 a) Stronger b) Weaker c) Equal d) cannot be compared
13. As per IS:800, the maximum deflection of beam should not exceed
 a) $L/180$ b) $L/250$ c) $L/325$ d) $L/360$
14. To ensure that compression flange of beam is restrained from moving laterally, the cross section must be
 a) Plastic b) Semi compact c) Compact d) Thin
15. The check for design bending strength for cantilever beams is given by
 a) $M_d = 2.4Z_p f_y / \gamma_{m0}$ b) $M_d \leq 1.5Z_p f_y / \gamma_{m0}$
 c) $M_d \leq 1.2Z_p f_y / \gamma_{m0}$ d) $M_d \geq 1.5Z_p f_y / \gamma_{m0}$
16. According to IS 875 part III, Design pressure P_z is directly proportional to which of the following design wind velocity
 a) V_z b) $\sqrt{V_z}$ c) V_z^2 d) V_z^3
17. Area of opening for building of large permeability is more than _____ of wall area.
 a) 10% b) 20% c) 30% d) 50%
18. The topography is called as plane if the slope of hill is less than _____ degrees.
 a) 3 b) 5 c) 7 d) 10
19. The value of s/d of a solid teak wood column is 13.25. The column is classified as
 a) short b) long c) intermediate d) not enough data
20. Bending moment of timber beam should be multiplied by form factor if its depth is greater than
 a) 250 mm b) 300 mm c) 350 mm d) 400 mm

KATHMANDU UNIVERSITY
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FEB 21 2019

Level : B.E.
Year : IV
Time : 2 hrs. 30 mins.

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

SECTION "B"

Assume the suitable data wherever necessary. Attempt ALL questions. Use of code IS800:2007, IS 808, IS883, IS 875 part 3 is allowed.

1. A tie member in a truss girder is 280 mm \times 15 mm size. It is welded to a 10 mm thick gusset plate by a fillet weld. The overlap is 300mm and size of weld is 6mm as shown in figure 1. Determine the design strength of weld. [4]

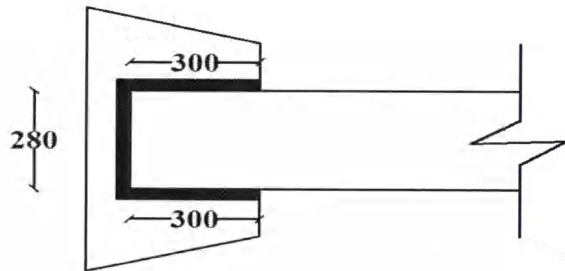


Fig : 1 (All dimension are in mm)

2. Design a tension member carrying a service tensile load of 550 kN using single angle section with bolted connections. Perform necessary checks. [8]
3. (a) Design a built-up Column section of length 6m laced with two channels placed front to front for supporting a working axial load of 800 kN. The column is effectively held in position at both ends and restrained against rotation in one end. Use Fe410 steel and design a single lacing system with bolted connection. [8]
- (b) Design a slab base for a column section 300@ 576.8 N/m subjected to a service compressive load of 965 kN. Grade of concrete is M20. Take Fe410 steel. [4]
4. A hall measuring 18 m \times 5 m consists of beams spaced 4m c/c. RCC slab of 125mm thickness is cast over the beam making it laterally supported. 50mm thick floor finish is above the slab of unit weight 22kN/m³. Imposed load in the slab is 3.5kN/m². The beam is supported in 225mm thick wall. Design an intermediate beam of a suitable hot roll section of grade Fe410. Perform necessary checks. [8]
5. (a) A building is situated in Madras. Find the wind pressure for the design of sloping roof of the building having following data.
Angle of roof slope = 28°, building height ratio h/w = 0.75, K₁ \times K₂ \times K₃ = 0.70 [4]
- (b) A sal timber column of size 235x235 mm has unsupported length of 3m. Find the safe load it can carry. [4]

