

KATHMANDU UNIVERSITY
End semester Examination [C]
June, 2018

JUN 19 2018

Level : B.E.
Year : IV

Course : CIEG 402
Semester: I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

1. The partial safety factor for the material of bolts is
(a) 1.0 (b) 1.10 (c) 1.15 (d) 1.25
2. Design of pins is primarily governed by
(a) shear (b) bearing (c) flexure (d) axial
3. In a fillet weld cross section, the throat is the
(a) Minimum Dimension (c) Maximum Dimension
(b) Average Dimension (d) Leg Length
4. The effective throat thickness of a fillet weld is "K" times the size of weld. For a 95° angle between fusion faces, "K" is
(a) 0.7 (b) 0.65 (c) 0.6 (d) 1.0
5. The slenderness ratio of tension member as per IS code where reversal load other than wind or seismic load should not exceed
(a) 350 (b) 100 (c) 180 (d) 60
6. In case of angle section with lug angles, their attachment to the member should be capable of developing x% in excess of the force in outstanding leg of angle, where x is
(a) 20 (b) 10 (c) 40 (d) 30
7. Thickness of single lacing bar should not be less than th effective length
(a) 1/40 (b) 1/50 (c) 1/60 (d) 1/70
8. Effective length of column effectively held in position at both ends and restrained in direction at one end is
(a) 0.67 L (b) 0.8 L (c) L (d) 1.2 L
9. If 20mm bolt are used in lacing bars then the minimum width of lacing bar should be
(a) 40mm (b) 60 mm (c) 80 mm (d) 10 mm
10. As per IS 800, the maximum deflection in beam should not exceed
(a) L/180 (b) L/250 (c) L/325 (d) L/360
11. A beam is classified as high shear beam if factored SF is greater then
(a) $0.4 V_d$ (b) $0.6 V_d$ (c) $0.8 V_d$ (d) $1.0 V_d$
12. The thickness of gusset plate should not be less than
(a) 6mm (b) 8mm (c) 12mm (d) 16mm

13. Joist is known as
(a) Tension member (c) Compression member
(b) Flexure member (d) Torsion member
14. Roof is called inaccessible if its slope is greater than
(a) 10° (b) 20° (c) 40° (d) 45°
15. The value of s/d of a solid Sal wood column is 13. The column is classified as
(a) Short (b) Long (c) intermediate (d) not enough data
16. Permeability is normal if its opening is
(a) 5% (b) (5-20)% (c) (20-30)% (d) $>30\%$
17. For a basic wind velocity 39 m/s and life of structure as 25 years, risk coefficient (k_1) is
(a) 1 (b) 0.76 (c) 0.92 (d) 1.06
18. For a timber beam of size 300x400mm. Its section modulus is
(a) $5 \times 10^5 \text{ mm}^3$ (b) $6 \times 10^5 \text{ mm}^3$ (c) $7 \times 10^5 \text{ mm}^3$ (d) $8 \times 10^5 \text{ mm}^3$
19. Snow load in roof is assigned as _____ per mm depth of snow
(a) 2 kN/m^2 (b) 2.5 kN/m^2 (c) 3 kN/m^2 (d) 3.5 kN/m^2
20. Slenderness ratio of the lacing bar for the compression member should not exceed
(a) 125 (b) 135 (c) 145 (d) 150

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SECTION "B"

Assume the suitable data wherever necessary. Attempt ALL questions.

Use of code IS 800:2007, IS 808, IS 883, IS 875 part 3 is allowed.

1. Find the strength and efficiency of joints shown in the figure 1. M18 bolts of grade 4.6 and Fe410 plates are used. Fe400 grade bolts are used. [4]
2. Design a tension member carrying a service tensile load of 350 kN using single angle section with bolted connections. Perform necessary checks. [8]
3. (a) Design a built-up Column section of length 8m laced with two channels placed back to back for supporting a working axial load of 1200 kN. The column is effectively held in position at both ends and restrained against rotation in one end. Use Fe 410 steel and design a single lacing system also. [8]
(b) Design a slab base for a column section $300@ 576.8$ N/m subjected to a service compressive load of 1000 kN. Grade of concrete is M20. Take Fe410 steel. [4]
4. A floor of a hall measuring 7.5×21 m consists of 120mm thick reinforced concrete slab on rolled steel I-beams spaced 3m C/C with the flange laterally supported. The floor slab is to support the dead and live load of 4 kN/m^2 and 1.40 kN/m^2 respectively. The end bearing of beam is 300mm. Design a suitable hot rolled sections of grade Fe410. Perform necessary checks. [8]
5. (a) Find the wind pressure for design of a sloping roof of span 10m and pitch $1/4^{\text{th}}$ of span. The height of eaves is 5m above ground. It is located in Delhi. Its permeability is normal [4]
(b) Design a Sal timber beam carrying a maximum bending moment of 3 kN-m [4]

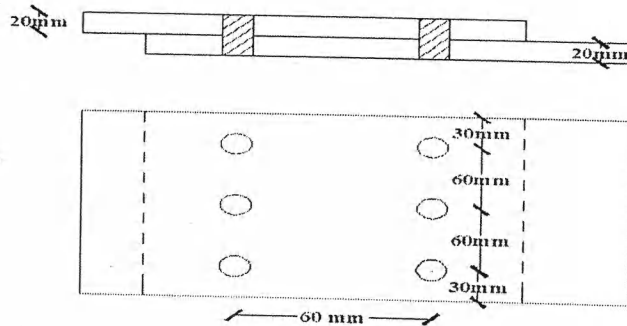


Fig. 1

