KATHMANDU UNIVERSITY
End Semester Examination
05 January 2024

Marks Scored:

Level : B.E.
Year : IV
Course : CIEG 402
Semester : I
Exam Roll No. :
Time: 30 mins.
F. M. : 10
Registration No.:
Date :

SECTION "A"
[20Q. × 0.5 =10 marks]

Encircle the most appropriate option from each set of choices.

1. Which of the following is not a limit state of strength?
   a. Fracture due to fatigue
   b. Rupture of the structure
   c. Brittle fracture
   d. Vibrations in structures

2. If the strength of bolted joint based on shear is 250 kN and based on bearing is 145 kN, and that of solid plate is 500 kN, then efficiency of joint is:
   a. 50%
   b. 29%
   c. 21%
   d. 79%

3. Which one of the following statement is **TRUE** for eccentrically loaded connection with axis of load lying in the plane of bolt group?
   a. The bolts are subjected to shear and tension due to moment.
   b. The critical bolt is one which is nearest to the center of gravity of bolt group.
   c. The bolts are subjected to shear and torsion.
   d. The connection will be safe when the resultant force in each bolt is greater than the strength of bolt.

4. Minimum size of fillet weld as per IS 800:2007 is:
   a. 6mm
   b. 5mm
   c. 4mm
   d. 3mm

5. The ratio of effective throat of the fillet weld to its size is:
   a. 0.707
   b. Less than or equal to 0.707
   c. Less than 1.0
   d. More than 0.707

6. A steel plate is 50 cm wide and 12 mm thick. If three holes of diameter 22 mm and one hole of diameter 26 mm is made on the plate, the net section area of the plate is:
   a. 4896 mm^2
   b. 6000 mm^2
   c. 5908 mm^2
   d. 508 mm^2

7. The design strength of a tension member is given by:
   a. Maximum of yielding strength, rupture strength and block shear strength
   b. Maximum of joint strength, rupture strength and block shear strength
   c. Minimum of joint strength, rupture strength and block shear strength
   d. Minimum of yielding strength, rupture strength and block shear strength

8. The lacing bars in built-up columns should be designed to resist a total transverse shear equal to:
   a. 3.5% of axial force in the column
   b. 2.5% of lateral force in the column
   c. 2.5% of axial force in the column
   d. 3.5% of axial force in the column

9. Which of the following statement is **TRUE** in case of compression members?
   a. Compression member in trusses are called as ties.
   b. The capacity of compression member depends upon the section modulus of the section.
   c. As slenderness ratio increases, design compressive stress value decreases.
   d. Compression member belonging to buckling class 'c' have higher load carrying capacity.

10. The compressive strength of concrete (f_{ck}) is given as 25 N/mm^2. Taking bearing strength of concrete as $0.45f_{ck}$, the area of base plate required to carry an axial load of 120 kN is :
a. 48 cm^2 b. 106.66 cm^2 c. 10.66 cm^2 d. 480 cm^2

11. Shear force does not have any influence on the bending moment capacity of beam when:
a. V< 0.6 V_d b. V< 0.8 V_d c. V> 0.6 V_d d. V> 0.8 V_d

12. Consider the following statements:
Lateral support in case of a steel beam can be achieved by:
I. embedding its compression flange in a reinforced brick slab
II. bracing the compression flanges of adjacent beams
III. providing shear connectors on compression flange
Of the above statements,
a. I, II & III are correct
b. I & II are correct
c. I & III are correct
d. II & III are correct

13. The optimum depth of plate girder is given by:
a. $\left(\frac{M}{f_y k^2}\right)^{0.33}$ b. $\left(\frac{Mk^2}{f_y}\right)^{0.33}$ c. $\left(\frac{Mk}{f_y}\right)^{0.33}$ d. $\left(\frac{M}{f_y k}\right)^{0.33}$

14. Maximum shear force in a gantry girder carrying an over-head travelling crane occurs when:
a. one of the wheel loads is at support
b. the centre of the span coincides with c.g. of wheel loads
c. one of the wheel load is at mid-span and the other wheel on adjacent span
d. either (a) or (c)

15. A structure is to be constructed where basic wind speed is 47 m/s, risk factor is 1, terrain and size factor is 0.98, topographic factor is 1.0. The design wind pressure would be about:
a. 46.06 N/mm^2 b. 15.6 N/mm^2 c. 2120 N/mm^2 d. 1273 N/mm^2

16. The economic spacing of a roof truss depends upon the:
a. cost of roof covering and dead load of roof truss
b. cost of purlins and cost of roof covering
c. dead loads and live loads
d. live loads and cost of purlins

17. A solid circular timber column having effective length 5m and diameter 150mm has the slenderness ratio of:
a. 33.33 b. 26.67 c. 37.62 d. 41.62

18. Which of the following statement is **TRUE** in case of timber beam design?
a. Form factor is used when the depth of beam is less than 300mm.
b. The minimum width of beam shall not be less than 1/50 of span.
c. The depth of beam shall not be taken more than 5 times its width without lateral stiffening.
d. Form factor for solid circular cross-section is taken as 1.414.

19. For a solid wood columns, the value of slenderness ratio shall not exceed:
a. 50 b. 40 c. 60 d. 30

20. A simply supported timber beam made up of Sal wood has a size of 150mm × 250mm and effective span of 3m. If the permissible bending stress for Sal wood is 10 N/mm^2, then the uniformly distributed load that can be carried by the beam is:
a. 20.83 kN/m b. 22.83 kN/m c. 13.89 kN/m d. 9.26 kN/m

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