KATHMANDU UNIVERSITY
End Semester Examination
May/June, 2022

Marks Scored:	

Level : B.Arch. Course : CIEG 241
Year : II Semester : II
Exam Roll No: Time: 30 mins. F. M. : 10
Registration No.: Date :

SECTION "A"
[20Q × 0.5 = 10 marks]

Encircle the most appropriate option.

1. Hook's law holds good in _____.
   a. elastic limit b. plastic limit c. yield limit d. proportional limit

2. A high carbon steel specimen as compared with mild steel specimen _____.
   a. is more ductile b. is stronger
   c. has a more defined yield point d. has more Poisson's ratio

3. To express the stress strain relations for a homogeneous isotropic, linearly elastic material, minimum number of material constant needed is ___.
   a. two b. three c. six d. nine

4. Shear centre _____.
   a. always coincides with the centroid of the beam cross – section.
   b. always lies within the boundaries of the cross – section
   c. is a point in the lane of the beam cross – section through which the resultant of shear forces must pass
   d. is a point in the beam cross –section representing zero shear stress.

5. The maximum deflection of a cantilever beam of span L due to concentrated load P at the free end is _____-.
   a. $PL^3/2EI$ b. $PL^2/2EI$ c. $PL^3/3EI$ d. $PL^3/4EI$

6. The energy absorbed in a body, when it is strained within the elastic limits, is known as _____.
   a. Strain energy b. Resilience c. Proof Resilience d. Modulus of Resilience

7. A simply supported beam with a gradually varying load from zero at 'B' and '*w*' per unit length at 'A' is shown in the Figure 1. The shear force at 'B' is equal to _____.
   a. *wl*/6 b. *wl*/3
   c. *wl* d. 2*wl*/3

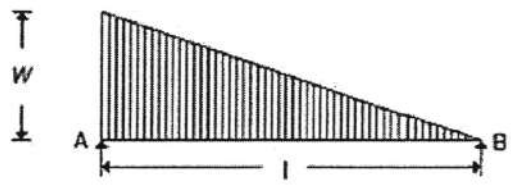

Figure 1

8. Figure 2 shows the Mohr's circle of stress for two unequal and like principal stresses (σ_x and σ_y) acting at a body across two mutually perpendicular planes. The normal stress on an oblique section making an angle θ with the minor principle plane is given by _____.

a. *OC* b. *OP*
c. *OQ* d. *PQ*

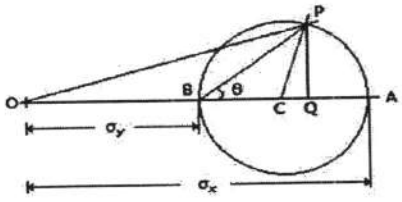

Figure 2

9. The bulk modulus of elasticity of a material is twice of its modulus of rigidity. The Poisson's ratio of the material is ___.

a. 1/7 b. 2/7 c. 3/7 d. 4/7

10. A bar of uniform section is subjected to axial tensile loads such that normal strain in the axial direction is 1.25 mm per meter. If the Poisson's ratio of the material of the bar is 0.3, the volumetric strain would be ___.

a. 2×10^{-4} b. 3×10^{-4} c. 4×10^{-4} d. 5×10^{-4}

11. A copper wire of 25 cm length is fixed by means of supports at its ends. Supports can yield (total) by 0.01 cm, if temperature of the bar is raised by 100°C, then stress induced in bar for $\alpha = 20 \times 10^{-6}$/°C and $E = 1 \times 10^6$ kg/cm^2, will be ___.

a. 400 kg/cm^2 b. 800 kg/cm^2 c. 1600 kg/cm^2 d. 3200 kg/cm^2

12. A cantilever beam of tubular section consists of two materials, copper as outer cylinder and steel as inner cylinder independent of each other. It is subjected to a temperature rise of 20°C and $\alpha_{copper} > \alpha_{steel}$. The stresses developed in the tubes will be ___.

a. tensile in steel, compressive in copper b. compressive in steel, tensile in copper
c. tensile in both d. no stress in both

13. Shear stress on a principal plane is ___.

a. maximum b. minimum
c. zero d. either maximum or minimum

14. In a beam of I – section, the maximum shear forces is carried by ___.

a. the upper flange b. the web c. the lower flange d. any of these

15. When a body is subjected to a direct tensile stress (σ) in one plane, the maximum shear stress is _____ the maximum normal stress.

a. equal to b. one– half c. two – third d. twice

16. A simply supported laterally loaded beam was found to deflect more than a specified value. Which of the following measures will reduce the deflection?

a. Select a different material having lesser modulus of elasticity
b. Increase the span of the beam
c. Magnitude of the load to be increased
d. Increase the moment of inertia

17. A simply supported beam of rectangular cross section having width of 100mm is subjected to a maximum shear force of 50 kN, the corresponding maximum shear stress being 3 N/mm^2. The depth of the beam is equal to _____.
a. 200 mm b. 300 mm c. 250 mm d. 350 mm

18. Calculate the modulus of section of rectangle beam of size 240 mm × 400 mm.
a. $5.4 \times 10^6\ mm^3$ b. $5.5 \times 10^6\ mm^3$ c. $6.2 \times 10^6\ mm^3$ d. $6.4 \times 10^6\ mm^3$

19. Some structural members subjected to a long time sustained loads deform progressively with time especially at elevated temperatures. Such a phenomenon is called?
a. Fatigue b. Creep relaxation c. Creep d. Fracture

20. The center of gravity of a triangle lies at the point of _____.
a. concurrence of the medians b. intersection of bisector of angles
c. intersection of its altitudes d. intersection of diagonals