Future Secure Institute®
SOM

Q1. Select the proper sequence :-

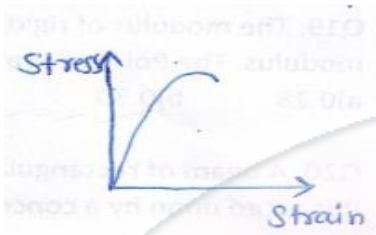
1) Proportion limit 2) Elastic limit 3) Yield point 4) Fracture point

a) 1-2-3-4 b) 2-1-3-4 c) 1-2-4-3 d) 2-1-4-3

Q2. The value of E&G are 200GPa & 80GPa, then μ=- :-

a) .5 b) 1 c) 1.25 d) .25

Q3. The above stress strain diagram is for:-



a) Ductile material b) Brittle material c) Soft material d) None of these

Q4. The steel bar is elongated by the application of axial compressive load of 200 kn. Determine the elongation if the cross-section of bar is 40mm x40mm length of bar is 2m and E=200GPa:-

a) 1.25 mm b) 2.70mm c) 4.05 mm d) 5.40mm

Q5. The ratio of modulus of rigidity to modules of elasticity of a material for a Poisson's ratio of.25 would be:-

a) .5 b) .4 c) .3 d).1

Q6. The modulus of rigidity of an elastic material is found to be 38.5% of the value of its young's modulus. The Poisson's ratio μ of the material is nearly:-

a) 0.28 b)0.30 c)0.33 d)0.35

Q7. A beam of rectangular section (12 cm wide x 20 cm deep) is simply supported over a span of 12 m. it is acted upon by a concentrated load of 80 kN at the mid span. The maximum bending stress induced is:-

a) 400MPa b)300MPa c)200MPa d)100MPa

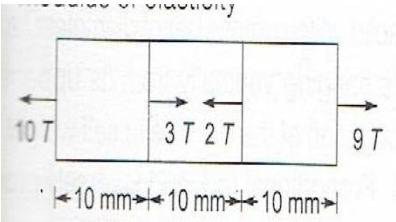
Q8. A 10 mm diameter bar of mild steel of elastic modulus 200 x 10^9 Pa is subjected to a tensile load of 50000 N, taking it just beyond its yield point. The elastic recovery of strain that would occur upon removal of tensile load will be:-

a)1.38 x 10^{-3} b)2.68 x 10^{-3} c)3.18 x 10^{-3} d)4.62 x 10^{-3}

Q9. The total extension of the bar loaded as shown in the figure is

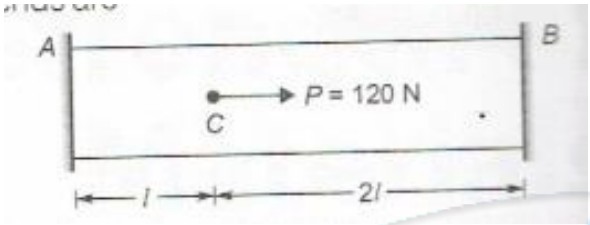
A = area of cross-section

E= modulus of elasticity



a) 10 x 30/AE b)26X10/AE c)9 x 30/AE d)30 x 22/AE

Q10. A straight bar is fixed at edges A and B its elastic modulus is E and cross-section is A there is a load P=120 N acting at C. the reactions at the ends are:-



a)60 N at A,60 N at B b)30N at A,90 N at B c)40 N at A,80 N at B d)80 N at A, 40 N at B

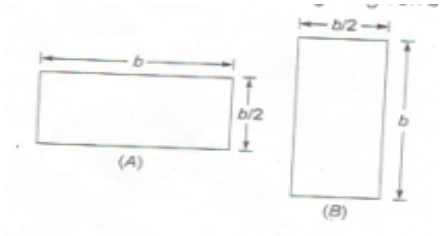
Q11. A copper rod of 2 cm diameter is 2 cm and outer diameter 4 cm under an axial load, the stress in the tube is 100 N/mm²
If Es =2 Ec then the stress in the copper rod is
a) 50 N/mm² b) 33.33 N/mm² c) 100N/mm² d) 300 N/mm²

Q12. The number of independent elastic constants required to express the stress-strain relationship for a linearly elastic isotropic material is:-
a) One b) Two c) Three d) Four

Q13. If E,G and denote young's modulus, modulus of rigidity and bulk modulus, respectively, for an elastic material, then which one of the following can be possible true for certain value of poisson's ratio?
a) G=2K b)G=E c)K=E d) G=K=E

Q14. What is the relationship between the liner elastic properties, young's modulus(E), rigidity modulus (G) and bulk modulus (K)?
a) $\frac{1}{E}=\frac{9}{K}+\frac{3}{G}$ b) $\frac{3}{E}=\frac{9}{K}+\frac{1}{G}$ c) $\frac{9}{E}=\frac{3}{K}+\frac{1}{G}$ d) $\frac{9}{E}=\frac{1}{K}+\frac{3}{G}$

Q15. A beam cross-section is used in two different orientations as shown in the figure given below. bending moment applied to the beam in both cases are same, the max bending stress in case A & B are related as:-



a) σ A = σ B b) σ A = 2σ B c) σ A = $\frac{\sigma B}{2}$ d) σ A = $\frac{\sigma B}{2}$

Q16. Match List-1 with List -2 and select the correct answer using the codes given below the lists:

List-1	List -2
a) Point of inflection	1. Strain energy
b) Shearing strain	2. Equation of bending
c) Section modulus	3. Equation of torsion
d) Modulus of resilience	4. Bending moment diagram

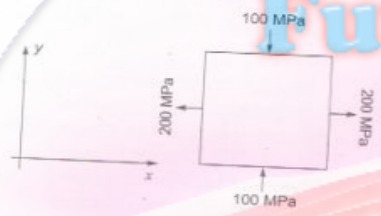
Codes:-

	A	B	C	D
a)	**1**	**3**	**2**	**4**
b)	**4**	**3**	**2**	**1**
c)	**1**	**2**	**3**	**4**
d)	**4**	**2**	**3**	**1**

Q17. A 100 mm x5 mm x 5 mm steel bar free to expand is heated from 15°C to. What shall be developed?

a) Thermal stress b) Tensile stress c) Compressive stress d) No stress

Q18. Consider a two dimensional state of stress given for an element as shown In the diagram given below:-



What are the coordinates of the centre of Mohr's circle?

a) (0,0) b)(100,200) c)(200,100) d)(50,0)

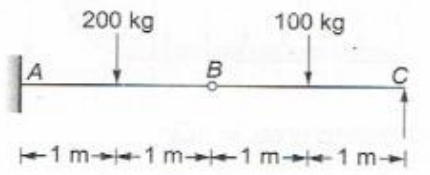
Q19.in a Mohr's circle, the radius of the circle is taken as:-

a) $\frac{\sqrt{(\sigma x+\sigma y)}^2}{2}+(\tau xy)^2$ b) $\frac{\sqrt{(\sigma x-\sigma y)}^2}{2}+(\tau xy)^2$

b) $\frac{\sqrt{(\sigma x-\sigma y)}^2}{2}-(\tau xy)^2$ d) $\sqrt{(\sigma x-\sigma y)^2-(\tau xy)^2}$

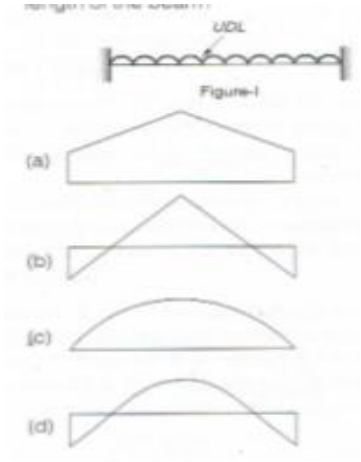
Where σx and σy are normal stresses along x and y directions respectively, and τxy is the shear stress

Q20 the given figure shows a beam BC simply supported at C and hinged at B a cantilever AB. The beam and the cantilever carry forces of 100Kg) and 200Kg respectively .the bending moment at B is:-



a) Zero b)100kg-m c)150kg-m d)200kg-m

Q21. A beam, built in both ends ,carries a uniformly distributed load over its entire span as shown in figure, which one of the diagrams given below represents bending moment distribution along the length of the beam?



Ans: (d)

Q22. Match List1 with List 2 and select the correct answer using the codes below the lists:-

List-1

a) Bending moment is constant
b) Bending moment is maximum or minimum
c) Bending moment is zero
d) Loading is constant

List-2

1. Point of contra flexure
2. Shear force changes sign
3. Slope of shear force diagram is zero over the portion of the beam
4. Shear force is zero over the portion of the beam

CODES:-

	A	B	C	D
a)	**4**	**1**	**2**	**3**
b)	**3**	**2**	**1**	**4**
c)	**4**	**2**	**1**	**3**
d)	**3**	**1**	**2**	**4**