YOUTUBE QUESTIONS PRACTICE

STRENGTH OF MATERIAL

TRANSFORMATION OF STRESS & STRAIN

Q :) The ratio of tangential and normal components of a stress on an inclined plane through θ° to the direction of the force is-

A : Sinθ°

B : cosθ°

C : tanθ°

D : cosecθ°

Q :) According to the maximum strain energy theory, yield locus is______.

A : A rectangle

B : A circle

C : A hexagon

D : An ellipse

Q :) Principal planes are subjected to______.

A : Normal stresses only

B : Tangential stresses only

C : Normal stresses as well as tangential stresses

D : None of these

Q :) The angle between the principal plane and the maximum shear is:

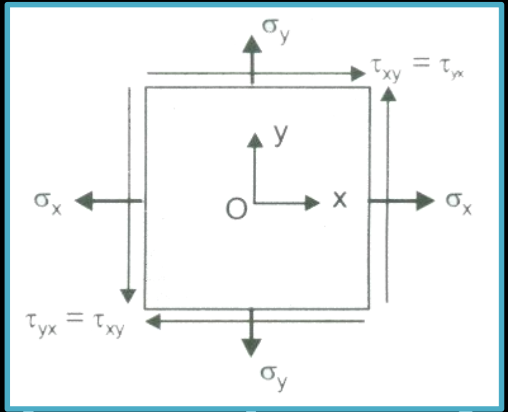
A : 90^o

B : 135^o

C : 60^o

D : None of these

Q :) On an element shown in the given figure, the stresses are (in Mpa)



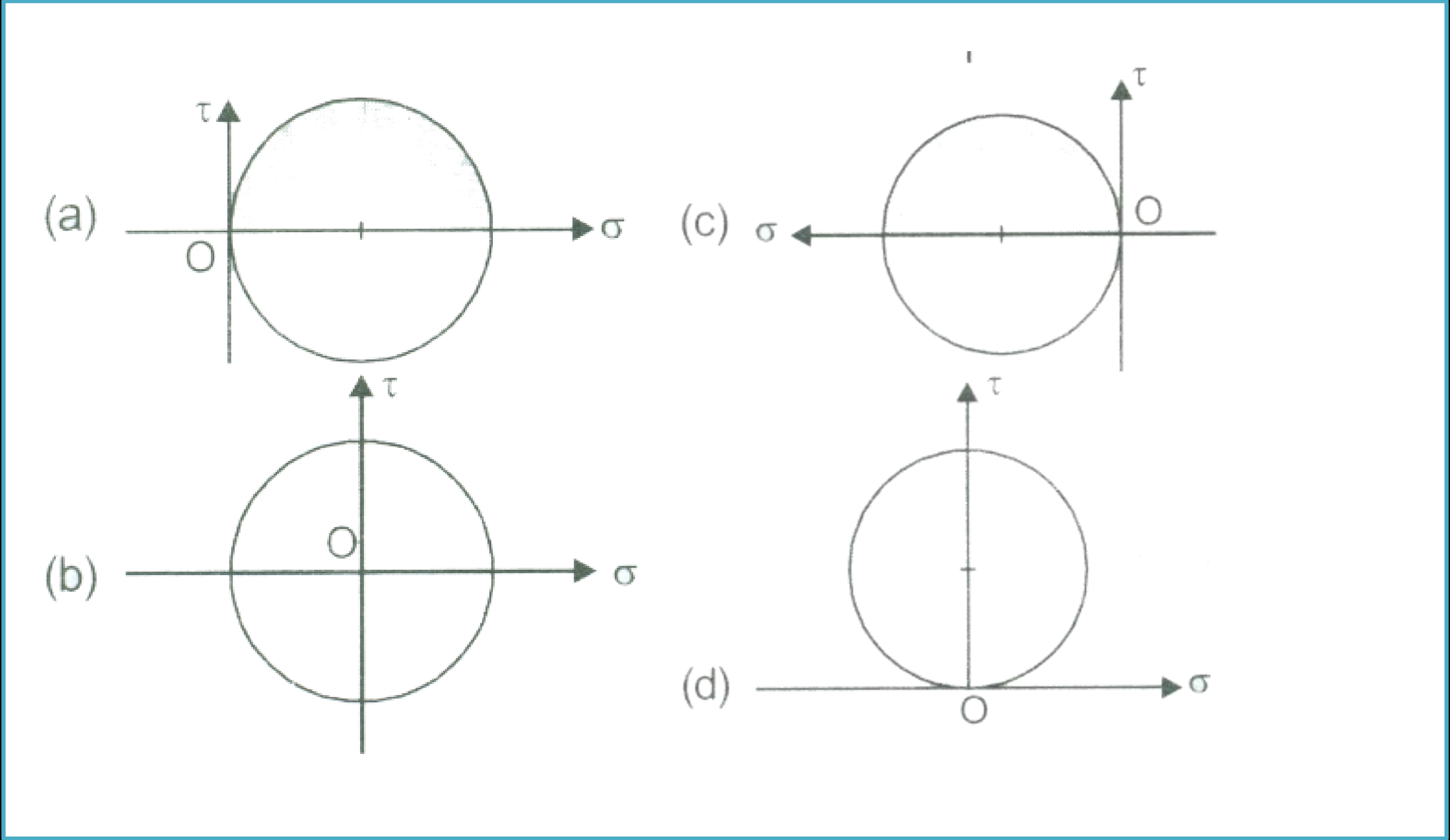
The radius of mohr's circle and the principle stresses σ_1 σ_2 are (in Mpa) Radius =

	r	σ_2	σ_1
a.	50	120	20
b.	55	30	110
c.	60	140	20
d.	70	140	20

Q :) The radius of mohr’s circle is zero when the state of stress is such that

a. Shear stress is zero
b. There is pure shear
c. There is no shear stress but identical direct stresses
d. There is no shear stress but equal identical direct stresses, opposite in nature , in two mutually perpendicular directions

Q :) Which one of the following mohr's circles represents the state of pure shear ?



Q :) If a point in a strained material is subjected to equal normal and tangential stresses, then the angle of obliquity is

a. 0°
b. 45°
c. $\tan^{-1}(1/2)$
d. $Tan^{-2}(2)$

Q :) If the principal stresses at a point in a strained body are p and p (p-p), then the resultant stress on a plane carrying the maximum shear stress is equal to

a. $\sqrt{p_1^2 + p_2^2}$

b. $\sqrt{\frac{p_2^2+p_2^2}{2}}$

c. $\sqrt{\frac{p_1^2-p_2^2}{2}}$

d. $\sqrt{\frac{p_1^2+p_2^2}{2}}$

Q :) The sum of normal stresses is

a. Constant
b. Variable
c. Dependent on the planes
d. None of the above

BRNDING STRESS IN BEAMS

Q :) The ratio of flexural rigidity of a beam (B X d) to another one (b X 2d) of similar material will be

A : $\frac{1}{2}$

B : $\frac{1}{4}$

C : $\frac{1}{8}$

D : $\frac{1}{16}$

Q :) Two beam one of the circular cross-section and the other of square cross-section have equal area of cross-section if subjected to bending then

A : Both section are equally economical

B : Both sections are equally stiff

C : Circular cross-section is more economical

D : Square cross-section is more economical

Q :) The curvature at any point (1/R) along the curve representing the defamed shape of a beam is given by:

A : $\pm \left(\frac{dy}{dx}\right) / \left(1+\frac{d^2y}{dx^2}\right)^{1/2}$

B : $\pm \left(\frac{d^2y}{dx^2}\right) / \left(\left(1+\frac{dy}{dx}\right)^2\right)^{3/2}$

C : $\pm \left(\frac{d^2y}{dx^2}\right) / \left(1+\frac{d^2y}{dx^2}\right)^{1/2}$

D : $\pm \left(\frac{dy}{dx}\right) / \left(1+\frac{d^2y}{dx^2}\right)^{2}$

Q :) A steel wire of 20 mm diameter is bent into a circular shape of 10 radius . If E, the modulus of elasticity is 2×10^6 kg / cm^2 then the maximum stress induced in the wire is

a. 10^3 kg / cm^2
b. 2×10^3 kg / cm^2
c. 4×10^3 kg / cm^2
d. 6×10^3 kg / cm^2

Q :) **Assertion (A) :** I section is preferred to rectangular section for resisting bending moment

Reason (R) : In – section more than 80% of bending moment is resisted by flanges only.

A simply supported beam of span ‘*l*’ carries a point load W at midspan. The breadth ‘b’ of the beam along the entire span is constant. Given , f = permissible stress in bending , for a beam of uniform strength , the depth of the beam at any cross section at a distance ‘x’ from the support would be

a. 6 W x /fb

b. $\sqrt{6Wx/fb}$

c. 3 W x /fb

d. $\sqrt{3Wx/fb}$

Q :) A beam of uniform strength has at every cross-section same

a. Bending moment
b. Bending stress
c. Deflection
d. stiffness

Q :) The portion, which should be removed from top and bottom of a circular cross-section of diameter d in order to obtain maximum section modulus, is

a. 0.01 d
b. 0.1 d
c. 0.011 d
d. 0.11 d

Q :) An I-section beam, made of structural steel has an overall depth of 30 cm. if the developed flange stresses at the top and bottom of the beam are 1200 kg/cm^2 and 300 kg/cm^2 respectively, then the depth of the neutral axis from the top the beam would be

a. 25 cm
b. 24 cm
c. 20 cm
d. 18 cm

SHEAR STRESS IN BEAMS

Q :) For the rectangular beam, the maximum shear stress is related to average shear stress 'τ_{av}'.

A : τ_{av}

B : $1.25\tau_{av}$

C : $1.50\tau_{av}$

D : $1.75\tau_{av}$

Q :) Maximum allowable shear stress in as section is $100kg/(cm^2)$.If bar is subjected to tensile force 5000 kg and if the section is square shaped, what will be dimension of sides of squares?

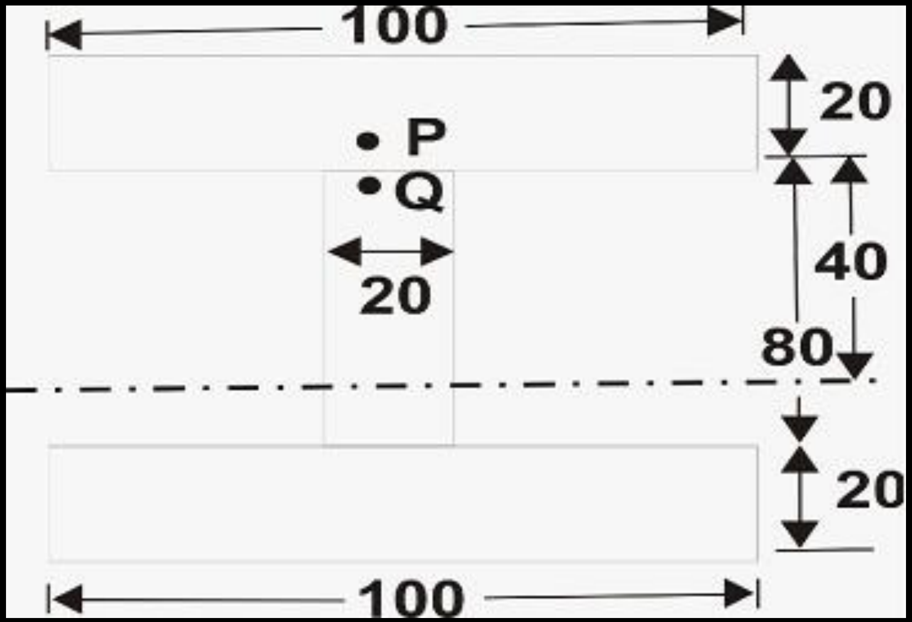
A : 10 cm

B : 5 cm

C : 12 cm

D : 14cm

Q :) The figure (all dimension are in mm) below shows an I-section of the bean. The shear at point P (very close to the bottom of the flange) is 12 MPa. The stress at point Q in the web (very close to flange) is:



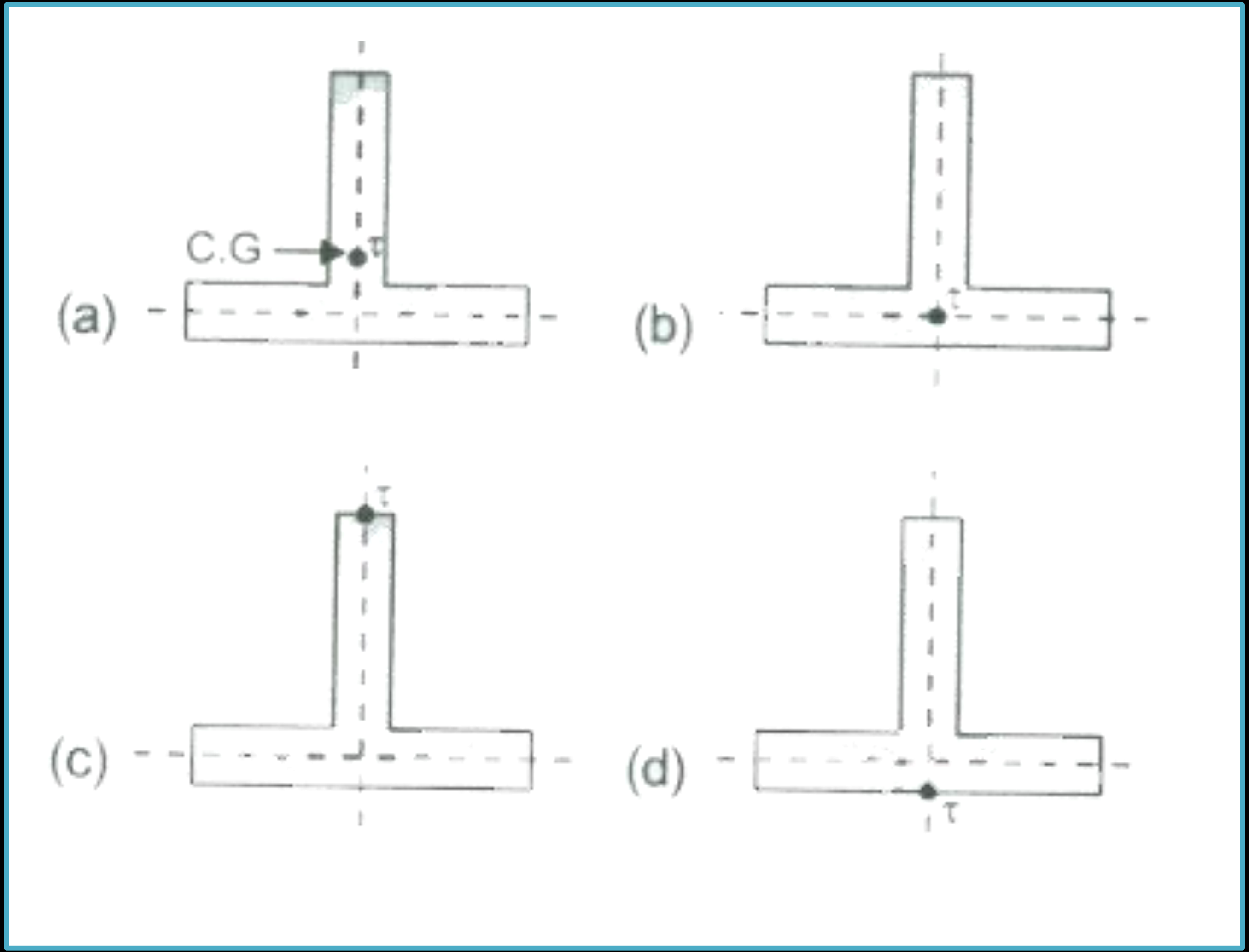
A : Indeterminable due to incomplete data

B : 60 MPa

C : 18 MPa

D : 12 Mpa

Q :) In a thin – walled T – section, the shear centre C located at the point shown in



Q :) A symmetrical L section is subjected to shear force. The shear force induced across the section is maximum at which location ?

a. Extreme fibres
b. At the bottom of flanges in flanges
c. At the bottom of flanges in web portion
d. At the neutral axis

Q :) A rectangular beam of width 100 mm is subjected to a maximum shear force of 60 kN. The corresponding maximum shear stress in the cross-section is 4 N/mm^2. the depth of the beam should be

a. 200 mm
b. 150 mm
c. 100 mm
d. 225 mm

Q :) Maximum allowable shear stress in as section is 100kg/(cm^2).If bar is subjected to tensile force 5000 kg and if the section is square shaped, what will be dimension of sides of squares?

A : 10 cm

B : 5 cm

C : 12 cm

D : 14cm

Q :) A beam of square cross-section with side 100 mm is placed with one diagram vertical. If the force acting on the section is 10 kN, the maximum shear stress is

a. 1 N/mm^2
b. 1.125N/mm^2
c. 2 N/mm^2
d. 2.25 N/mm^2

Q :) The portion, which should be removed from top and bottom of a circular cross-section of diameter d in order to obtain maximum section modulus, is

a. 0.01 d
b. 0.1 d
c. 0.011 d
d. 0.11 d

Q :) A short column of external diameter of 250 mm and internal diameter of 150 mm carries an eccentricity which the load can have without producing tension anywhere is

a. 20 mm
b. 32.25 mm
c. 37.5 mm
d. 42.5 mm