Q:) A wooden diving board of length 3.5 m is hinged at one end and supported 2 m from this end by a spring with a constant of 35 kN/m. How much will the spring deflect if a young man weighing 400 N stands at the end of the board?

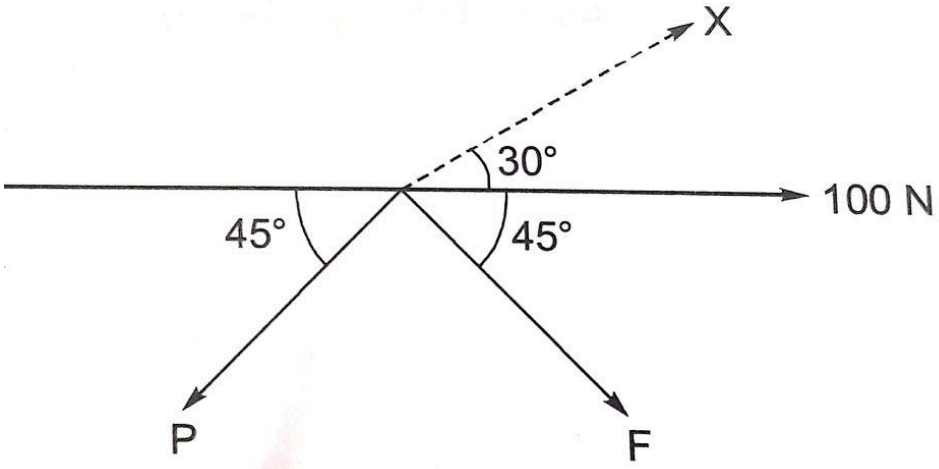
A : 0.002 m

B : 0.2 m

C : 0.02 m

D : 2.0 m

Q:) Select the equation that represents force equilibrium in X-direction as shown:



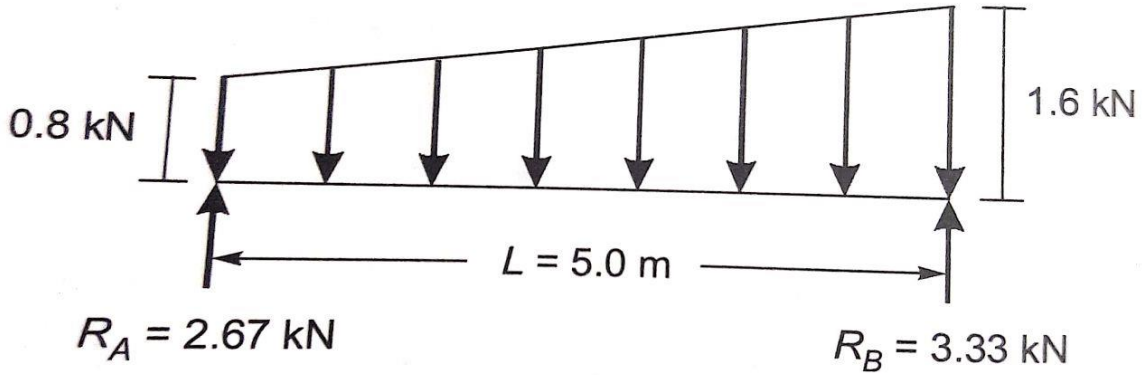
A : $P \cos 45^\circ - F \cos 45^\circ + 100 \cos 30^\circ = 0$

B : $-P \cos 45^\circ + F \cos 75^\circ + 100 \cos 30^\circ = 0$

C : $100 \cos 30^\circ + F \cos 75^\circ - P \cos 15^\circ = 0$

D : $-P \cos 45^\circ - F \cos 75^\circ - 100 \cos 30^\circ = 0$

Q:) The position and magnitude of maximum bending moment (from support with reaction R^A) for the beam shown in figure is:



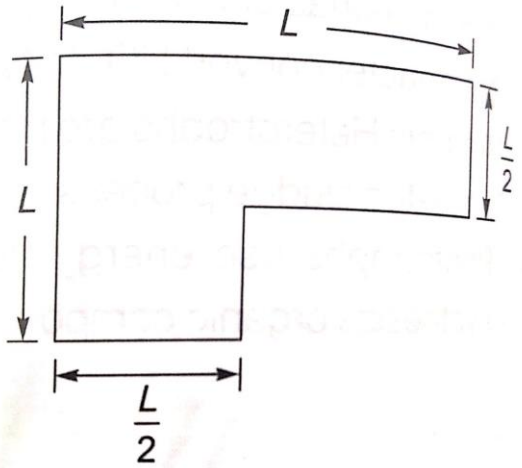
A : 2.5 m, 3.65 kN-m

B : 2.97 m, 2.75 kN-m

C : 2.63 m, 3.79 kN-m

D : 2.44 m, 3.56 kN-m

Q:) For the section shown in the figure, the neutral axis lies at:



A : L/3 from the top

B : L/12 from the top

C : 5L/12 from the top

D : 7L/12 from the top

Q:) In a simply supported rectangular beam loaded transversely, the maximum tensile bending stress occurs at:

A : top fiber

B : bottom fiber

C : neutral axis

D : between top fiber and neutral axis

Q:) A thin plate having stress components as σ_x = 40 MPa, σ_y = -20 MPa and σ_{xy} = 10 MPa. What will be the yield strength in simple tension as per Mises criterion?

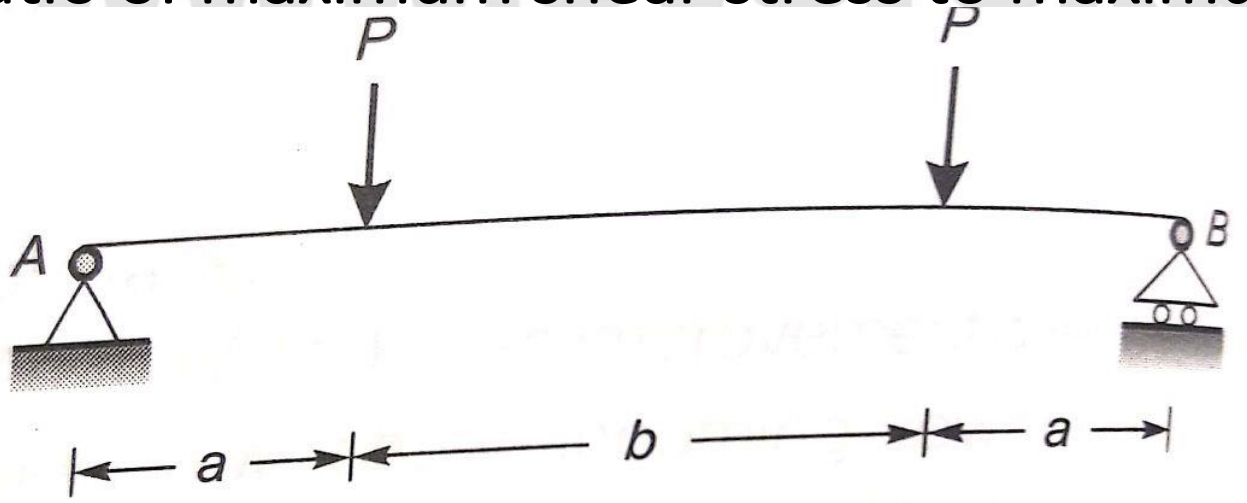
A : Y = 3100 MPa

B : Y = 55.67 MPa

C : Y = 54.3 MPa

D : Y = 1500 MPa

Q:) For a rectangular beam with cross-section having width b and depth d and loaded as shown in figure, choose the ratio of maximum shear stress to maximum bending stress:



A : d/4a

B : d/2a

C : b/4a

D : b/2a

Q:) Yield strength is:

A : stress required to produce certain arbitrary plastic deformation

B : stress required to produce certain arbitrary elastic deformation

C : stress required to cause fracture

D : stress required to cause fatigue

Q:) Pure torsion of a shaft produces:

A : longitudinal normal stress in shaft

B : only direct shear stress in the transverse section of the shaft

C : circumferential shear stress on a surface element of shaft

D : a longitudinal shear stress and a circumferential shear stress on a surface element of shaft

Q:) In a circular shaft subjected to pure twisting moment, the principal stress at a point close to the outer periphery of shaft act on a plane:

A : 90^{o} to the axis of the shaft

B : 45^{o} to the axis of the shaft

C : 30^{o} to the axis of the shaft

D : Parallel to the axis of the shaft

Q:) If the deflection at the free end of a uniformly loaded cantilever beam in 15 mm and the slope of deflection curve at free end is 0.02 radian, then the length of the beam is:

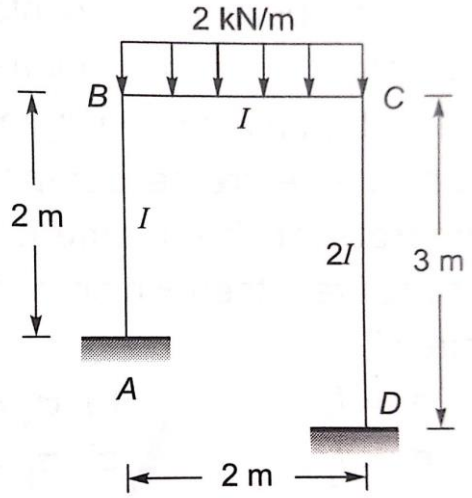
A : 0.8 m

B : 1.0 m

C : 1.13 m

D : 1.5 m

Q:) If a portal frame is subjected to a uniformly distributed load of intensity '2 kN/m' as shown in the figure, the ratio of sway moments in columns AB (of 2 m length) and CD (of 3 m length) will be equal to:



A : 43832

B : 43864

C : 44070

D : 44082

Q:) Match List-I (Elastic constant) with List-II (Definition) and select the correct answer using the codes given below the lists:

List-I (Elastic constant)	List-II (Definition)
A. Young's modulus	1.The ratio of lateral strain to linear strain within elastic limit
B. Poisson's ratio	2.The ratio of stress to strain within elastic limit
C. Bulk modulus	3.The ratio of shear stress to shear strain within
D. Rigidity modulus	4.The ratio of direct stress to cores-ponding volumetric strain

A : A-3, B-1, C-4, D-2

B : A-2, B-1, C-4, D-3

C : A-2, B-4, C-1, D-3

D : A-3, B-4, C-1, D-2

Q:) A concrete member under compressive load is called pedestal when the ratio of effective length and least lateral dimension does not exceeds:

A : 3

B : 6

C : 12

D : 60

Q:) In two-way slabs, the torsional reinforcement is provided at:

A : mid-depth only

B : top face only

C : bottom face only

D : top and bottom face both

Q:) If a rectangular under-reinforced section is subjected to bending moment equal to its moment carrying capacity and the stress in steel and extreme compression fiber of concrete at this moment are σ^s and σ^c respectively then which of the following is correct?

A : $\sigma_c = f_c$

B : $\sigma_s = f_y$

C : $\sigma_s < f_y$

D : $\sigma_s = f_y \; and \; \sigma_c = f_c$

Q:) For the calculation of wind loading, the entire country is divided into _____ zones.

A : Four

B : Six

C : Three

D : Five

Q:) Concrete is sea-water or exposed directly along the sea-coast shall be at-least _____ in case of reinforcement concrete.

A : M 20

B : M 30

C : M 25

D : M 40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