

ASSISTANT EXECUTIVE ENGINEERS (Notification No.09/2018)
Civil and Mechanical (Common Paper)
REVISED KEY

Q1 For the coplanar concurrent system of forces shown in Fig. 1, the system will be

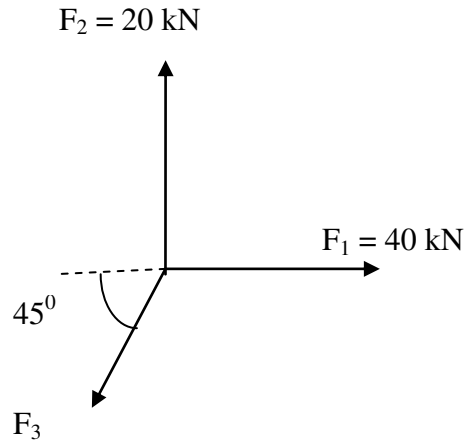
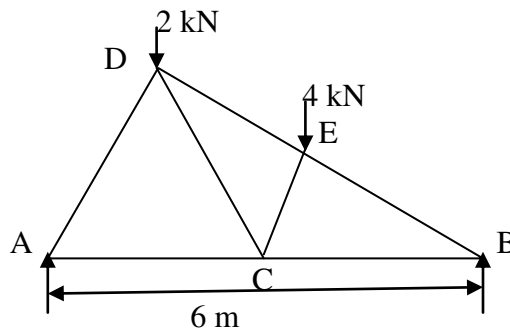


Fig. 1

in-equilibrium if $F_3 = 10$ kN (Options 1,2 &3 are same and correct)

Q6 Determine the force in member EC of a cantilever truss shown in Fig. 4.



Angle between all the members are 60° or 30°

Fig. 4

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Q25 For the beam ABCD, shown in the given Fig. 5, is loaded by udl of intensity 'w' on whole length such that the maximum positive bending moment is equal to the maximum negative bending moment. The value of L_1 is

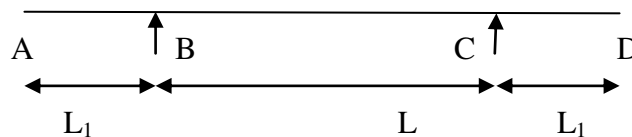


Fig. 5

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Q29 The fixed end moment M_A of the beam ABCD as shown in Fig.8, is

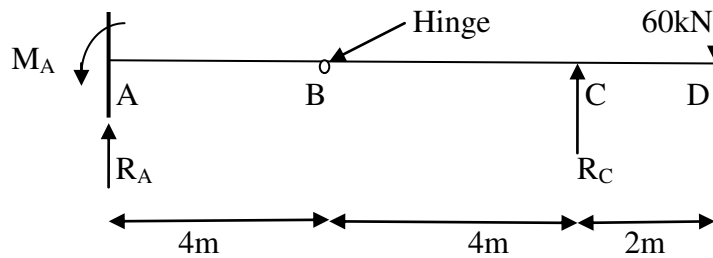


Fig. 8

Both +120 kNm and -120kNm

Q37 Normal stresses of equal magnitude σ but of opposite signs, act at a point of a strained material in perpendicular direction. What is the magnitude of the stress on a plane inclined at 45° to the applied stresses?

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Q41 In a 2D stress system, the two principal stress are $p_1=180 \text{ N/mm}^2$ (tensile) and p_2 (compressive). For the materials, yield stress in simple tension and compression is 240 N/mm^2 and Poisson's ratio is 0.25. According to maximum normal strain theory for what value of p_2 shall yielding occur in compression?

240 N/mm^2

Q50 The maximum efficiency (η_{max}) of a lifting machine is given as

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Q53 The law for an ideal machine is given by

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Q55 Virtual work is the product of

Displacement and virtual displacement

Q67 A close coiled helical spring has 100mm mean diameter and is made of 20 turns of 10mm diameter steel wire. The spring carries an axial load of 120 N. Modulus of rigidity is 84 GPa. The shearing stress developed in the spring in N/mm^2 is

$100/\pi$

Q89 The velocity and density in diffuser are given by $u = u_0 e^{-x/L}$ and $\rho = \rho_0 e^{-2x/L}$. What will be the rate of change of density at $X = L$?

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Q150 Three like parallel forces 400N, 200N and 300N are acting at points A, B, C respectively on a straight line ABC. The distances are $AB=30\text{cm}$, $BC=40\text{cm}$ and $AC=70\text{cm}$. Find the resultant and also the distance of the resultant from point A on line ABC.

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