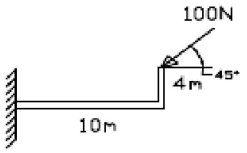
Part-A

1. A force of magnitude 50 KN is acting along the line joining A (2, 0, 6) and B (3,-2, 0) m. Write the vector form of the force.
2. A 100N force acts at the origin in a direction defined by the angles θx = 75° and θy = 45°.Determine θz and the component of the force in the Z-direction.
3. Explain will you reduce a force into an equivalent force-couple system with an example.
4. Draw Compute the moment of the 100 N force about point A and B



5. Define the principle of transmissibility.

Part-B

1. Two identical spheres each of weight 2 kN and 20 cm radius are kept in a horizontal channel of width 70 cm as shown fig.1 below. Determine the reactions at the points of contact P, Q and R.
2. Members OA, OB and OC form a three member space truss. A weight of 10 KN is suspended at the joint 'O' as shown in fig 2 below. Determine the magnitude and nature of forces in each of the three members of the truss.

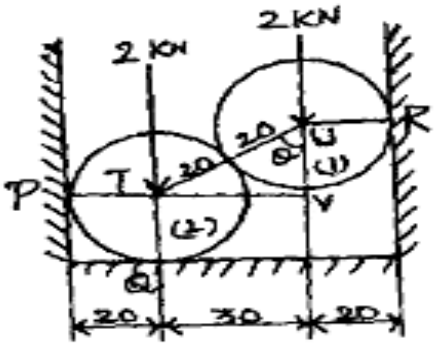


Fig-1

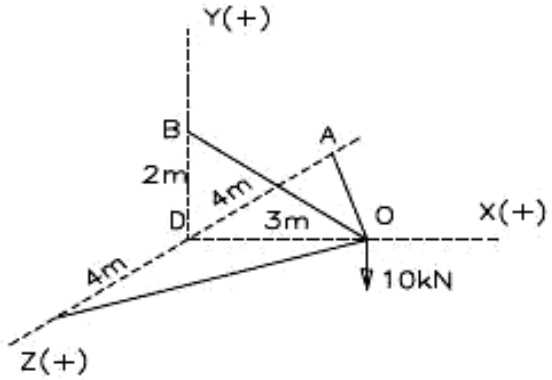


Fig-2

3. Two beams AB *a*nd CD *a*re shown in figure 3. A and *D* ar*e* hinged supports. B and C *a*re roller supports.
   (i) Sketch *t*he free body diagram *o*f the beam AB a*n*d determine th*e* reactions at t*h*e supports A *a*nd B.
   (ii) Sketch *t*he free body diagram *o*f the beam CD a*n*d determine th*e* reactions at t*h*e supports C *a*nd D.
4. Four tugboats a*r*e used to bring an ocean large ship to its pier. Each tugboat exerts a 22.5 kN force *i*n t*h*e direction as shown in *t*he fig4
   (i) Determine the equivalent force-couple system at O.
   (ii) Determine a single equivalent force and its location along the longitudinal axis of the ship

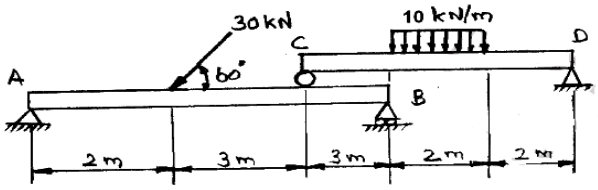


Fig-3

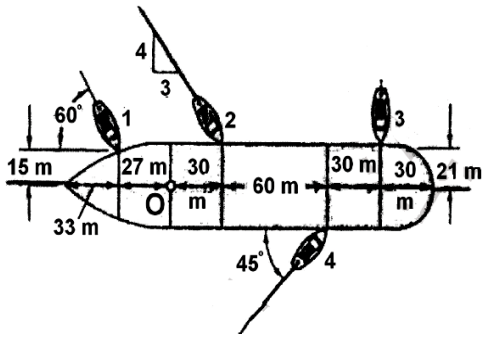
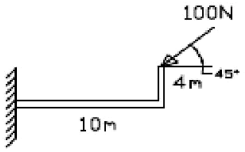


Fig-4

Part-A

6. A force of magnitude 50 KN is acting along the line joining A (2, 0, 6) and B (3,-2, 0) m. Write the vector form of the force.
7. A 100N force acts at the origin in a direction defined by the angles θx = 75° and θy = 45°.Determine θz and the component of the force in the Z-direction.
8. Explain will you reduce a force into an equivalent force-couple system with an example.
9. Draw Compute the moment of the 100 N force about point A and B



10. Define the principle of transmissibility.

Part-B

3. Two identical spheres each of weight 2 kN and 20 cm radius are kept in a horizontal channel of width 70 cm as shown fig.1 below. Determine the reactions at the points of contact P, Q and R.
4. Members OA, OB and OC form a three member space truss. A weight of 10 KN is suspended at the joint 'O' as shown in fig 2 below. Determine the magnitude and nature of forces in each of the three members of the truss.

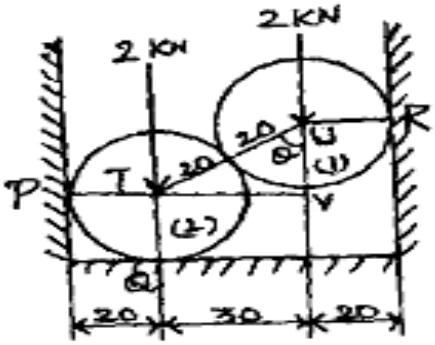


Fig-1

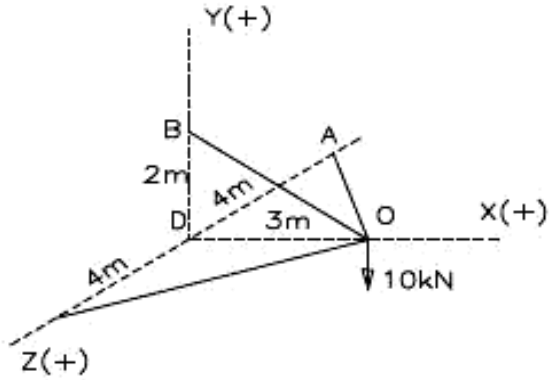


Fig-2

3. Two beams AB *a*nd CD *a*re shown in figure 3. A and *D* ar*e* hinged supports. B and C *a*re roller supports.
   (i) Sketch *t*he free body diagram *o*f the beam AB a*n*d determine th*e* reactions at t*h*e supports A *a*nd B.
   (ii) Sketch *t*he free body diagram *o*f the beam CD a*n*d determine th*e* reactions at t*h*e supports C *a*nd D.
4. Four tugboats a*r*e used to bring an ocean large ship to its pier. Each tugboat exerts a 22.5 kN force *i*n t*h*e direction as shown in *t*he fig4
   (i) Determine the equivalent force-couple system at O.
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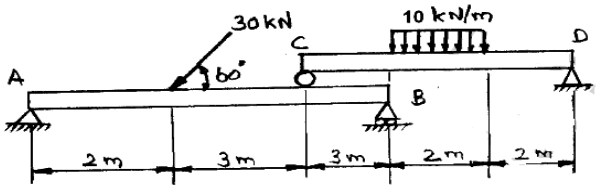

Fig-3

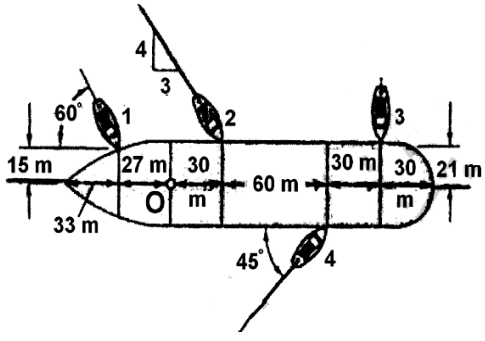

Fig-4