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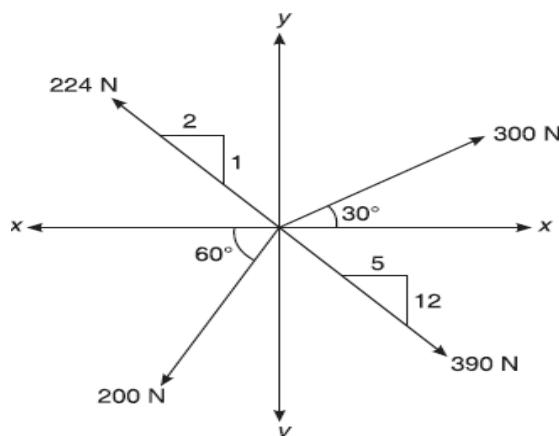
SEM: 1ST

COURSE: Engineering Mechanics (25EM105)

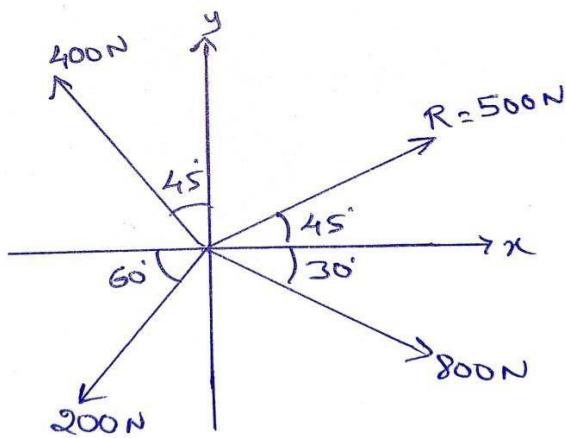
QUESTION BANK

Module 1

1. State and explain Basic Idealization of Mechanics.
2. State and explain Parallelogram Law of forces.
3. Explain classifications of force system.
4. Define force and explain it's characteristics.
5. Explain Principle of Transmissibility and Principle of Superposition with sketch.
6. Determine the magnitude and direction of the resultant of the coplanar concurrent force system shown in below Fig.

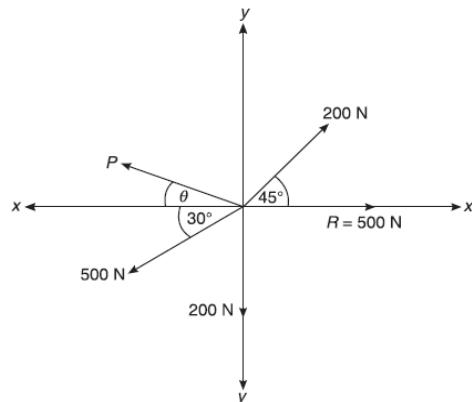


7. Determine the fourth unknown force in magnitude and direction so that the resultant R acts as shown in below Fig.

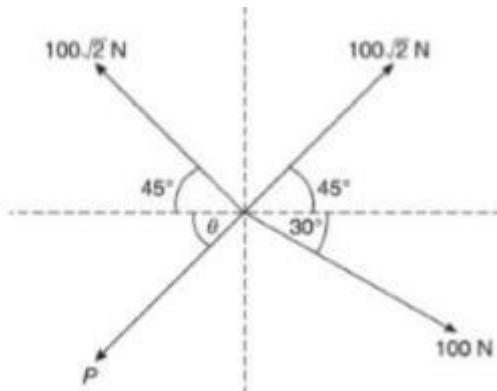


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8. Four coplanar forces acting at a point are shown in below Figure. One of the forces is unknown and its magnitude is shown by P . The resultant has a magnitude of 500 N and is acting along the x -axis. Determine the unknown force P and its inclination with the x -axis.
9. Determine the magnitude and direction of force P , which keeps the concurrent system of

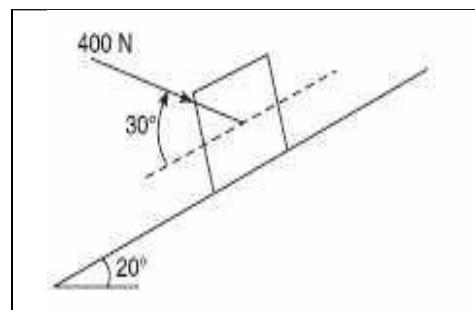


forces in equilibrium.

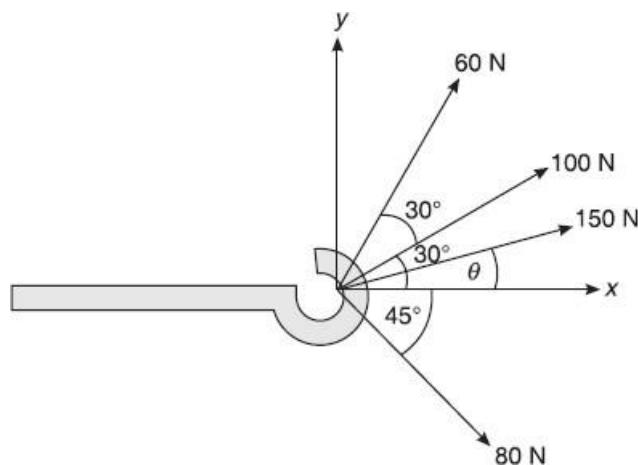


10. Resolve 400 N force acting on a block as shown in fig.

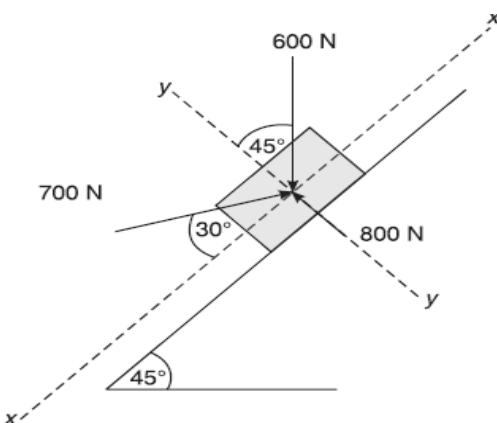
 - i) Into horizontal and vertical components.
 - ii) Along the inclined plane and right angles to the plane.



11. Four forces acting on a hook are shown in below Figure. Determine the direction of the force 150 N such that the hook is pulled in the x -direction. Determine the resultant force in the x -direction.

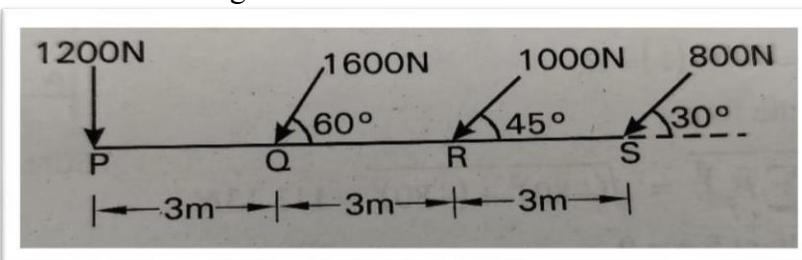


12. Determine the resultant of the system of forces acting on a body as shown in below Figure. Take the co-ordinate directions as shown in the figure.



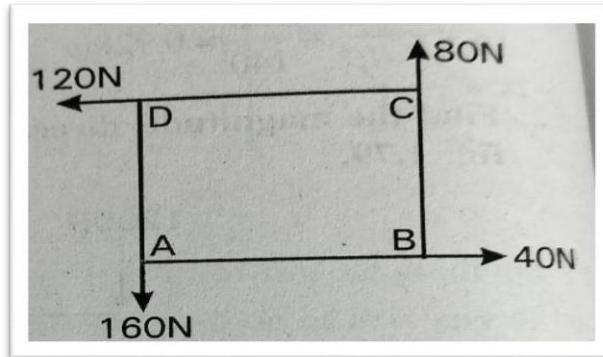
Module 2

1. State and prove Varignon's theorem.
2. Define moment of a force.
3. State and prove Lami's theorem.
4. What is meant by equilibrium? State the conditions of static equilibrium for both Coplanar concurrent and non-concurrent force system.
5. Explain free body diagram with examples.
6. Find the magnitude, direction and position of resultant for the force system from P shown in below Figure.

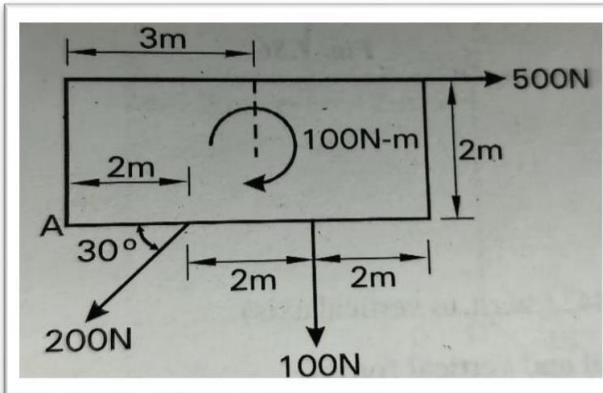


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7. Four forces having magnitude of 40N, 80N, 120N and 160N respectively are acting along four sides of square ABCD taken in order. If side of the square is 1m, determine the magnitude and direction of the resultant.



8. Determine the magnitude, direction and position of resultant at 'A' for the system of loading as shown in below Figure.



9. Determine the magnitude, direction and position of the resultant of the coplanar non concurrent force system, shown in Figure 12.1.

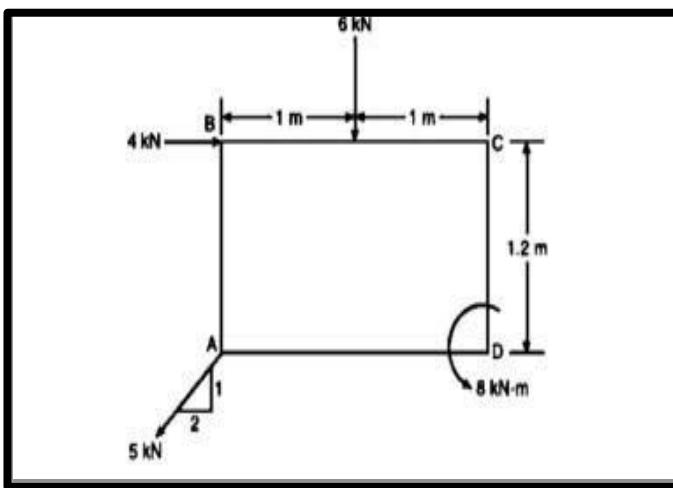
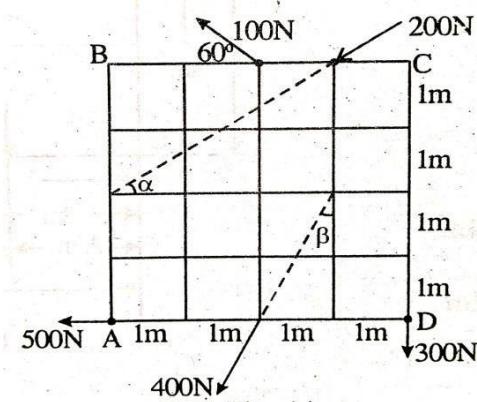
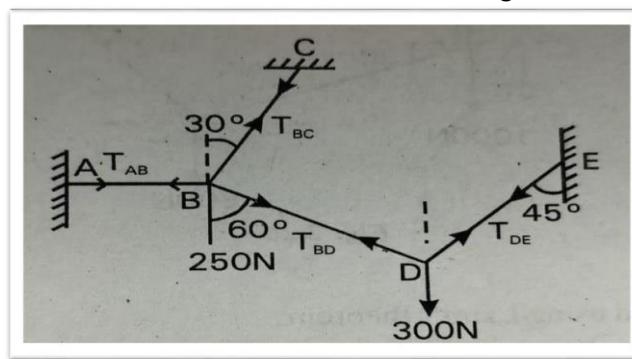


Figure 12.1

10. A flat lamina is subjected to the coplanar system of forces shown in Fig14.1. Each square of the inscribed grid is having a length of 1m. Determine magnitude, direction and position of resultant at A.



11. A system of connected flexible cables as shown in Figure 15.1 is supporting two Vertical forces at points 'B' and 'C'. Determine the forces in various segments of the cable.



Module 3

1. Define i) Friction ii) Limiting Friction
2. Define i) Coefficient of friction ii) Angle of friction iii) Angle of repose
3. Prove that angle of friction is equal to angle of repose
4. A block of mass 20 kg placed on an inclined plane as shown in Figure.1 is subjected to a force P that is parallel to the plane. Taking the inclination of plane with respect to horizontal as 30° and the coefficient of friction as 0.24, determine the value of P for
 - i) Motion of the body impending down the plane.
 - ii) Motion of the body impending up the plane.

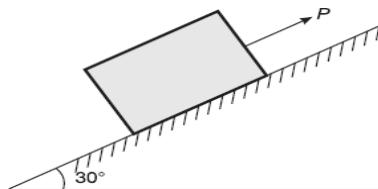


Fig.1

5. A block weighing 1500 N rests on a plane inclined at 20° to the horizontal Figure.2. If $\mu = 0.3$, find the force required to push the block up the plane when the line of action of force makes an angle of 30° with the plane.

