

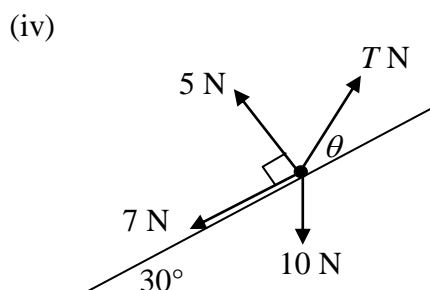
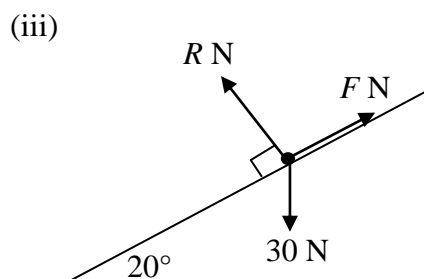
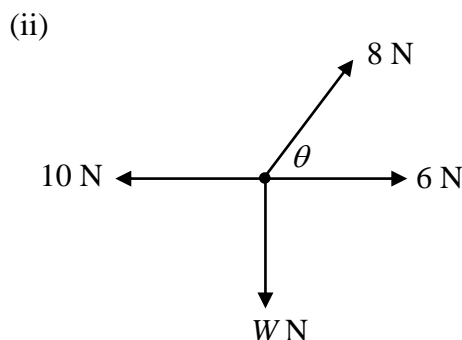
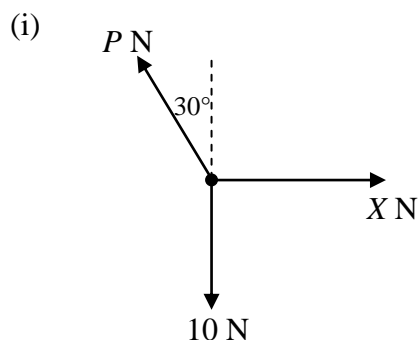
# Edexcel Mechanics 1

## Statics

### Section 1: Forces and equilibrium

#### Exercise

1. Each of the diagrams below shows a particle in equilibrium under the action of various forces. In each case find the values of the unknown forces and angles.



2. A particle of weight 40 N is attached to the end of a light inextensible string of length 2 m. The other end of the string is attached to a vertical wall. The particle is held at a distance of 1.2 m from the wall by a horizontal force  $F$ . Find the magnitude of  $F$  and the tension in the string
3. A small weight of 20 N is at rest on a smooth plane inclined at  $30^\circ$  to the horizontal. It is held in position by a light rope. The angle between the rope and the plane is  $20^\circ$ . Find the tension in the rope and the reaction at the plane.
4. A body of mass 8 kg is held at rest on a smooth plane inclined at  $60^\circ$  to the horizontal by a force  $F$ . Find  $F$  given that it acts
- Horizontally
  - vertically upwards
  - parallel to the plane.
5. A block of weight 20 N is held at rest on a smooth plane inclined at  $20^\circ$  to the horizontal by a string that makes angle  $\alpha$  with the plane. If the tension in the string

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is 10 N find  $\alpha$  and the reaction between the block and the plane.

6. In this question take  $g$  to be  $10 \text{ ms}^{-2}$ .  
A particle of mass 0.8 kg is at rest on a rough horizontal plane. The coefficient of friction between the particle and the plane is 0.5. Find the least force required to pull the particle along the plane if the force is
  - (i) Horizontal
  - (ii) at an angle of  $30^\circ$  to the plane.
  
7. A block of weight 18 N rests in equilibrium on a rough horizontal plane under the action of a force of 9 N. Find the magnitude of the frictional force on the block given that the external force acts
  - (i) horizontally
  - (ii) vertically downwards
  - (iii) downwards at an angle of  $60^\circ$  to the horizontal.
  
8. A block of weight 20 N rests on a rough plane inclined at  $30^\circ$  to the horizontal. Given that the block is on the point of sliding down the plane, find the coefficient of friction.