

Forces and Free-Body Force Diagrams

1.

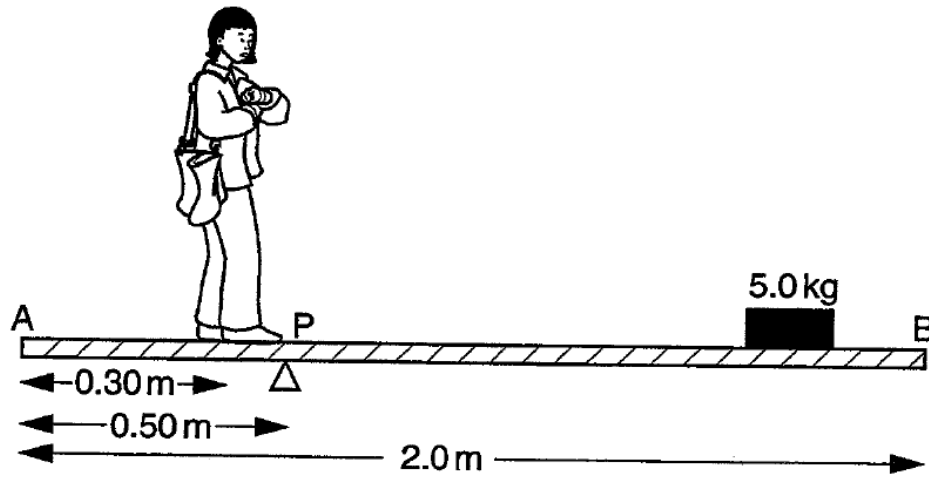


Figure 1

Figure 1 shows a student standing at rest on a plank of wood. The plank itself rests on a support at point P.

Draw separate free-body force diagrams showing the forces acting on each of the following objects. Label the forces on your diagrams.

- (a) The student
- (b) The 5.0 kg object
- (c) The plank of wood

2.

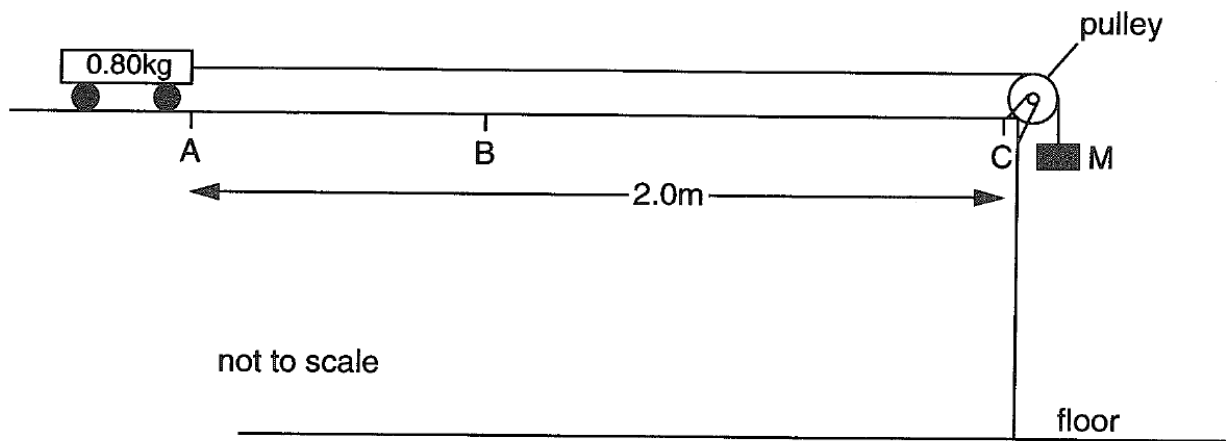


Figure 2

Figure 2 shows a trolley which is connected to a mass M by a light string. The string passes over a smooth pulley. The trolley is on a surface above the floor.

Draw separate free-body force diagrams showing the forces acting on each of the following objects. Label the forces on your diagrams.

- (a) The trolley
- (b) The mass M

State where in your diagrams/answers above you used the facts that the string is light and the pulley is smooth.

3.

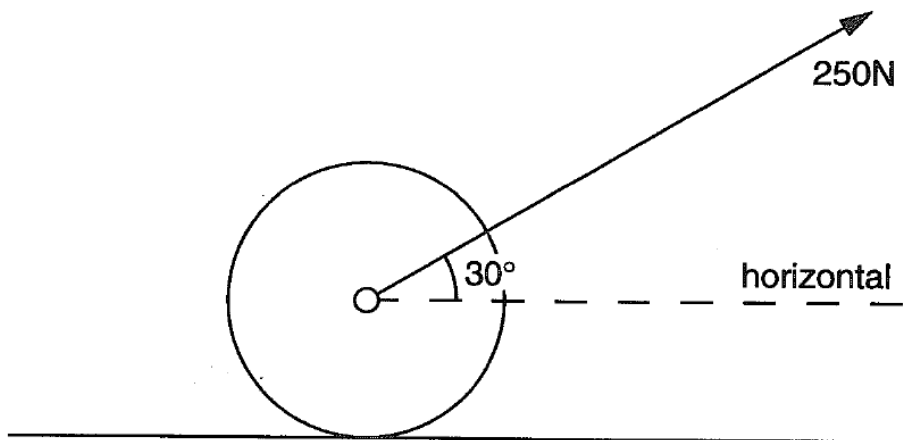


Figure 3

Figure 3 shows a garden roller being pulled with a force of 250 N at an angle of 30° to the horizontal.

Draw a free-body force diagram showing the forces acting on the garden roller. Label the forces on your diagram.

4.



Figure 4.1

Figure 4.1 shows a ball at rest, hanging on a vertical thread from a fixed support, S.

Draw a free-body force diagram showing the forces acting on the ball. Label the forces on your diagram.

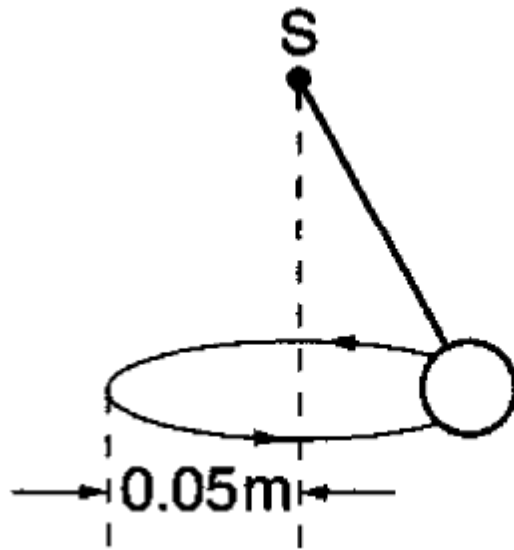


Figure 4.2

Figure 4.2 shows the ball moving on a horizontal circle about a vertical axis through S.

Draw a free-body force diagram showing the forces acting on the ball while it is moving. Label the forces on your diagram.

5.

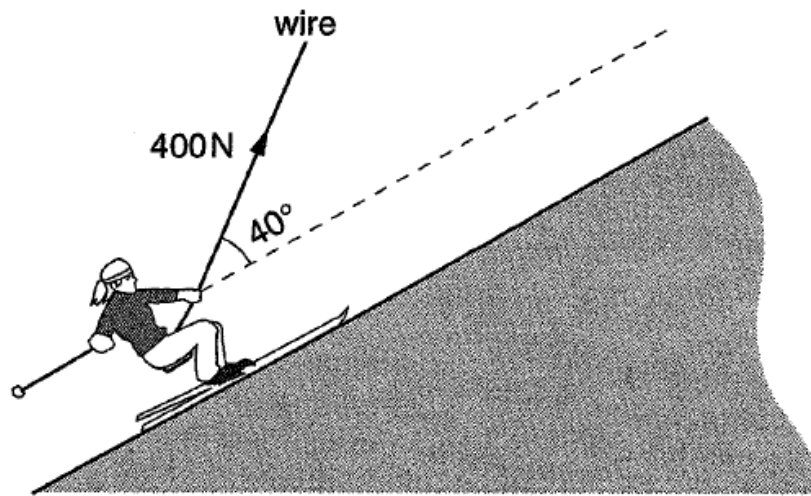


Figure 5

Figure 5 shows a skier being pulled up a slope.

One force acting on the skier is shown in the diagram.

Draw a free-body force diagram showing all the forces acting on the skier. Label the forces on your diagram.

6.



Figure 6

Figure 6 shows a car pulling a caravan.

Draw separate free-body force diagrams showing the forces acting on each of the following objects. Label the forces on your diagrams.

- (a) The car
- (b) The caravan

7.

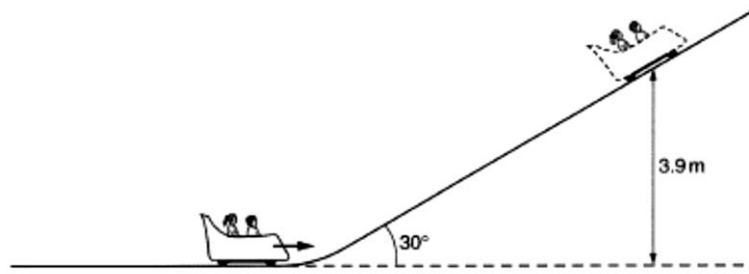


Figure 7

Figure 7 shows part of a fairground ride with a carriage on rails.

Draw separate free-body force diagrams showing the forces acting on the carriage on each of the positions marked A and B.