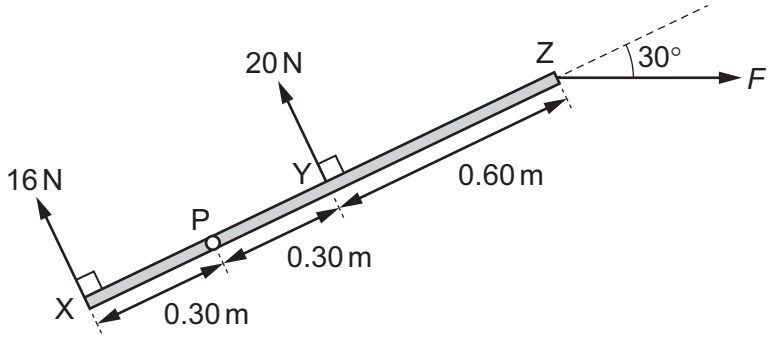
13 A uniform rigid bar XZ with negligible mass is 1.20 m long. The bar is pivoted at point P. Three coplanar forces act on the bar as shown. Forces of 16 N and 20 N act perpendicularly to the bar at points X and Y respectively. Force *F* acts at point Z at an angle of 30° to the axis of the bar.

The distances along the bar of the pivot and of the forces are shown.



The bar experiences a resultant moment about P of 6.0 N m in a clockwise direction.

What is the magnitude of *F*?

A 9.2 N **B** 11 N **C** 16 N **D** 24 N

14 Water of depth 9.0 cm is covered by oil of depth 5.0 cm in a measuring cylinder.

The density of the water is 1000 kg m^{-3} and the density of the oil is 800 kg m^{-3}.

What is the total pressure exerted on the base of the measuring cylinder due to the oil and water?

A 390 Pa **B** 880 Pa **C** 1200 Pa **D** 1300 Pa

15 A rocket is fired upwards.

As it accelerates upwards after leaving the launch pad, which forms of energy are changing?

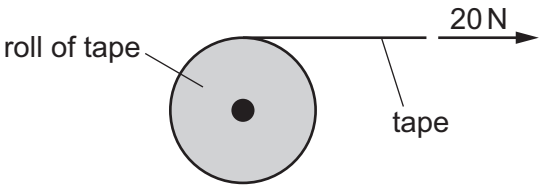
A chemical energy, gravitational potential energy and kinetic energy

B chemical energy and gravitational potential energy only

C chemical energy and kinetic energy only

D gravitational potential energy and kinetic energy only

16 A roll of tape of length 50 m requires a constant force of 20 N to unwrap it.



What is the work done in unwrapping the whole roll?

A 0.4 J **B** 2.5 J **C** 500 J **D** 1000 J