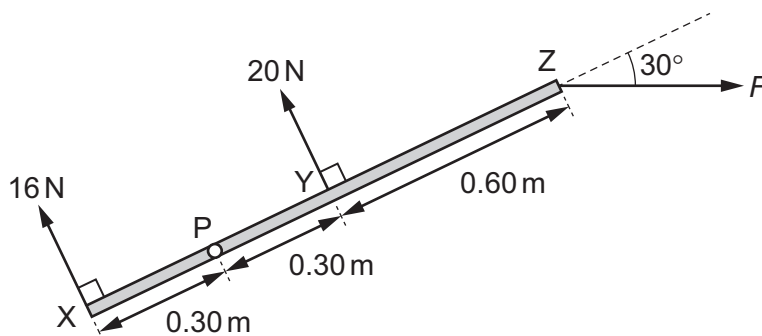


- 13** A uniform rigid bar XZ with negligible mass is 1.20 m long. The bar is pivoted at point P. Three coplanar forces act on the bar as shown. Forces of 16 N and 20 N act perpendicularly to the bar at points X and Y respectively. Force  $F$  acts at point Z at an angle of  $30^\circ$  to the axis of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

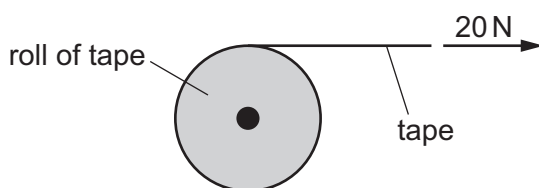
The distances along the bar of the pivot and of the forces are shown.



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  $1000 \text{ kg m}^{-3}$  and the density of the oil is  $800 \text{ kg m}^{-3}$ .  
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