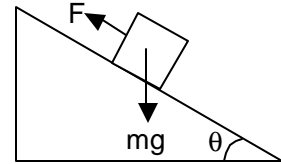


**P.82 (11 – 14, 16 - 18)**

11. (a)  $F = mg \sin\theta = 2(10) \sin 30^\circ = 10\text{N}$   
 (b)  $R = mg \cos\theta = 2(10) \cos 30^\circ = 17.3\text{N}$



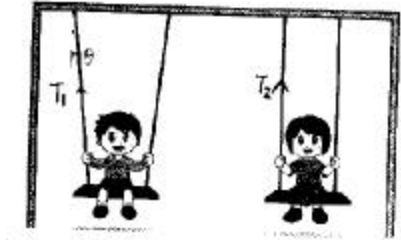
12. The swing with the boy is more likely to break.

For the swing with the boy, $2 T_1 \cos\theta = mg$	For the swing with the girl, $2 T_2 = mg$
--	--

$$2 T_1 \cos\theta = 2 T_2$$

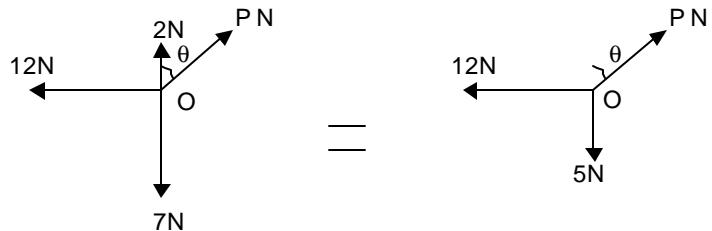
$$T_1 > T_2$$

As the tension  $T_1$  is bigger, it is more likely to break.

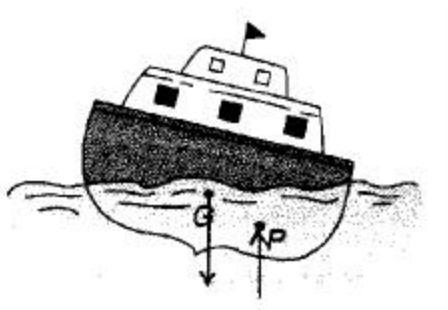


13.  $\tan q = \frac{12}{5} \Rightarrow q = 67.4^\circ$

$$P = \sqrt{12^2 + 5^2} = 13\text{N}$$



14. (1) Net force = 0  
 (2) Moments of all forces about the center of mass is zero.
16. The line of action of the weight falls within the base of the tower.
17. There exist a restoring anticlockwise moment to right the boat as shown.



18. (a) (1) Net force = 0.  
 (2) Net moment about any point = 0.
- (b) (i)  $W = mg = 1600\text{N}$   
 (ii)  $W \cos 65^\circ = 2T$   
 $T = 338\text{N}$
- (c) Work done =  $T(3 \times 2) = 338.1(6) = 2029\text{J}$

