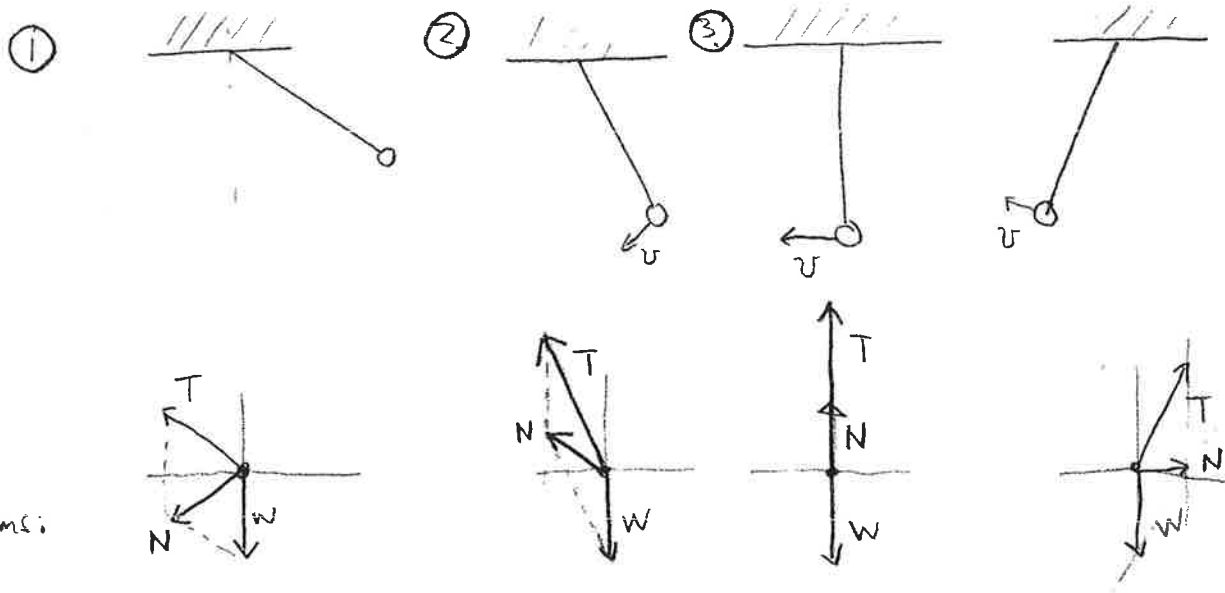


## Ex 23.2 (Free body diagrams & pendulums)

For a pendulum in motion:



Free  
body  
diagrams:

Shown are the tension ( $T$ ) the weight ( $W$ ) and the net force ( $N$ ).

The weight is always the same, and downward.

The tension is always directed along the string. It is largest when the pendulum is at the bottom of its swing, case ③.

The net force is always changing direction. In case ③ it is directly upward, providing the centripetal acceleration keeping the pendulum in orbit. In cases ① & ② it has a component which is speeding up the ball. In case ④ it has a component slowing it down.