

- 18 The energy conversions inside a power station burning fossil fuel can be simplified as shown.

chemical energy  $W \rightarrow$  thermal energy  $X \rightarrow$  electrical energy  $Y$

Which expression gives the efficiency of the power station?

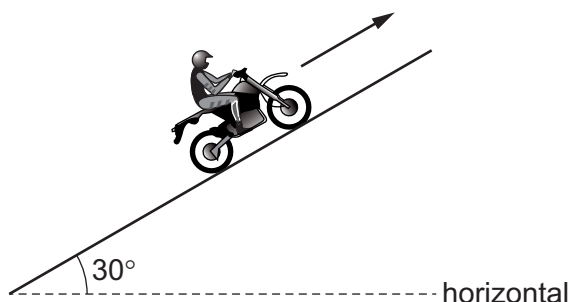
- A  $\frac{Y}{W}$       B  $\frac{Y}{(W + X)}$       C  $\frac{Y}{X}$       D  $\frac{Y}{(W + X + Y)}$

- 19 Car X is travelling at half the speed of car Y. Car X has twice the mass of car Y.

Which statement is correct?

- A Car X has half the kinetic energy of car Y.  
B Car X has one quarter of the kinetic energy of car Y.  
C Car X has twice the kinetic energy of car Y.  
D The two cars have the same kinetic energy.

- 20 The total weight of a motorbike and rider is 1800 N. The motorbike travels in a straight line at constant speed up a hill at an angle of  $30^\circ$  to the horizontal.



The useful output power of the motorbike is 36 000 W. The total resistive force due to air resistance and friction on the motorbike and rider is 2400 N.

What is the speed of the motorbike?

- A  $8.6 \text{ ms}^{-1}$       B  $11 \text{ ms}^{-1}$       C  $15 \text{ ms}^{-1}$       D  $24 \text{ ms}^{-1}$