Power

The rate of energy consumed

$$\text{Power} = \boxed{\frac{\Delta E}{t}} \longrightarrow \text{Change in Energy} \quad \longrightarrow J/s \qquad \text{or} \quad P = \frac{\Delta W}{t}$$

15g

15m

This object falls over a distance of 15m in 6s what is the Power?
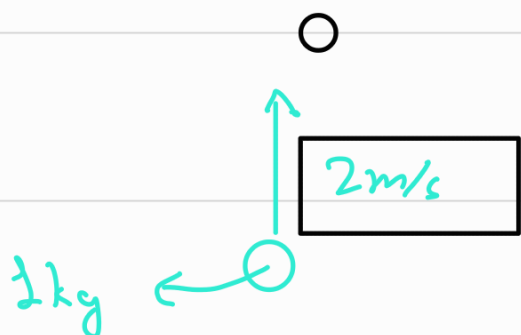
$$P.E = mgh$$

$$= \left(\frac{15g}{1000}\right)(9.8)(15)$$

$$= 2.205J$$

$$\frac{\Delta E}{t} = \frac{2.205}{6} = \boxed{0.3675 J/s}$$

What is the conversion of
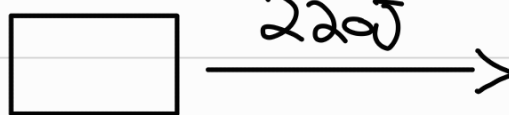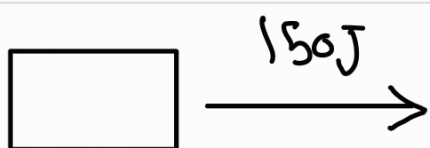energy? $P.E \rightarrow K.E$

2m/s

1kg

For it to reach maximum
height it took 10s,
What is the power of the
ball?

$$Power = \frac{\Delta E}{t} = \frac{\frac{1}{2}mv^2}{t} \rightarrow K.E$$

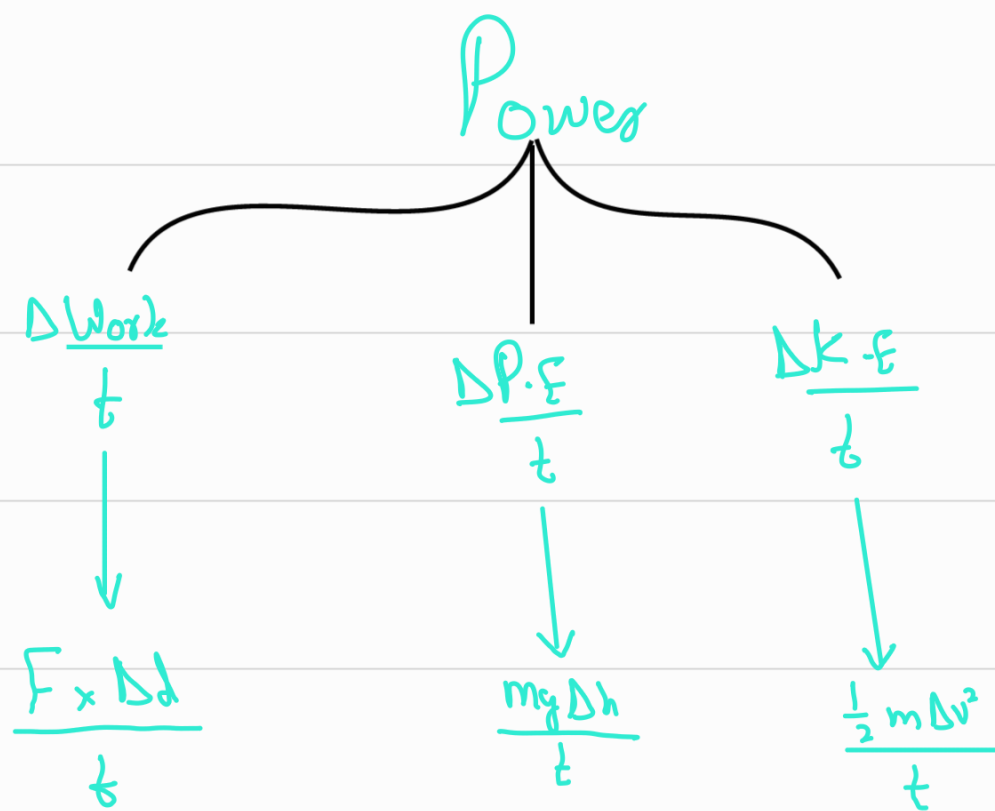$$\frac{\frac{1}{2}(1kg)(2)^2}{10s} = \boxed{0.2 J/s}$$

150J

220J

$$P = \frac{\Delta E}{t}$$

This change happened in 2s,
Power?

$$P = \frac{\Delta E}{t} = \frac{220-150}{2s} = \boxed{35 J/s}$$

Power

$$\frac{\Delta Work}{t} \qquad \frac{\Delta P.E}{t} \qquad \frac{\Delta K.E}{t}$$

$$\frac{F \times \Delta d}{t} \qquad \frac{mg\,\Delta h}{t} \qquad \frac{\frac{1}{2}m\,\Delta v^2}{t}$$
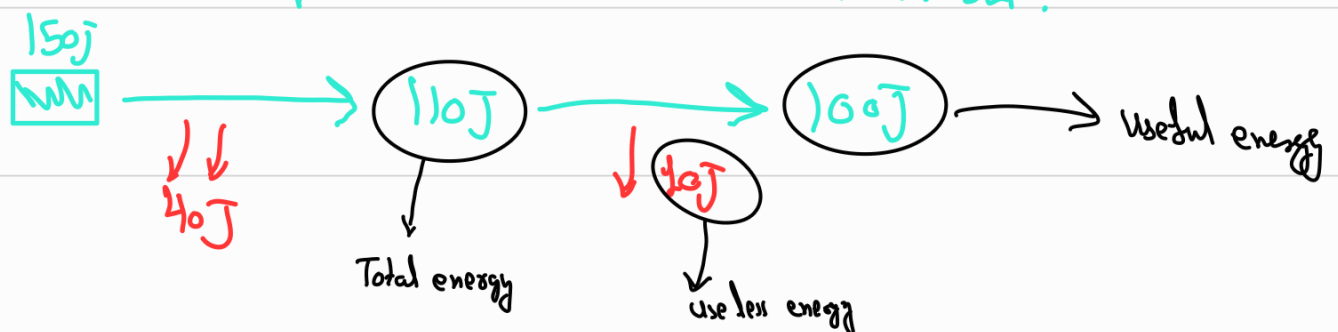
Efficiency

A motor is 98% efficient

or B motor is 30% efficient

Which motor is better & why?

→ It means that motor A, only loses 2% of it's power to the environment.

150j
[150J] ⟶ (110J) ⟶ (100J) ⟶ Useful energy

40J

Total energy

10J
Use less enegy

$$\text{Eff \%} = \frac{\text{Useful energy}}{\text{Total energy}} \times 100$$

$$= \frac{100 \text{ J}}{110 \text{ J}} \times 100 =$$