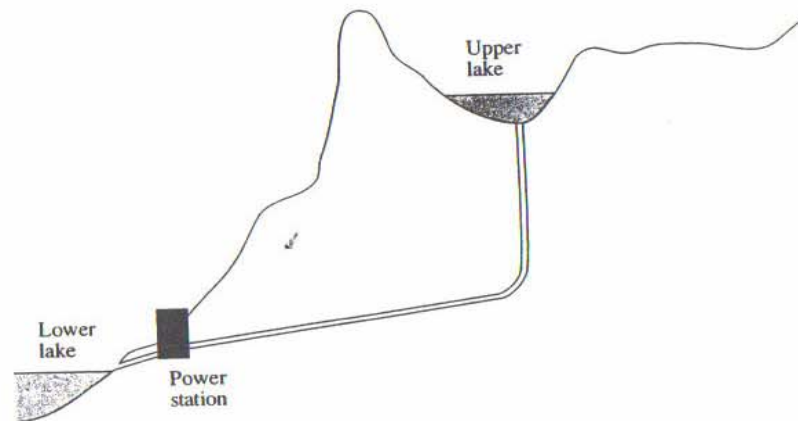


# Energy Resources, Work, Power & Efficiency

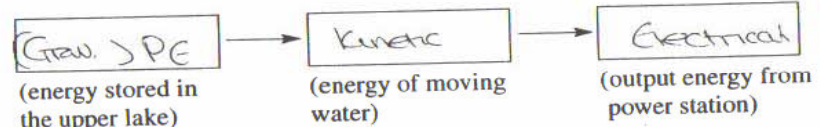
83

- 4 In Scotland hydroelectric power makes a significant contribution as a source of electricity.

①



- (a) Complete the boxes below to show the energy changes taking place in a hydroelectric power station.



[2]

- (b) The useful output power from a hydroelectric system is 300 MW. Calculate the energy (in MJ) produced in **one minute**. Show clearly your working out.

$$\begin{aligned}
 E &= P \times t \text{ ①} \\
 &= 60 \times 300 \text{ ①} \\
 &= 18000 \text{ MJ}
 \end{aligned}$$

Energy produced =  $\frac{18000}{1}$  MJ [3]

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Turn over

7 Three engines are being compared in a test.

Engine	Power rating
A	25 kW
B	0.5 MW
C	150 kW

All engines are given 5 MJ of work to do.

(a) Which engine will do the work in the **minimum** time?

B [1]

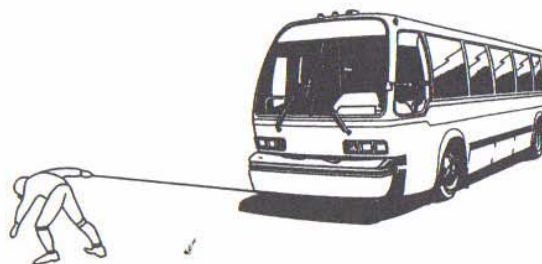
(b) Explain your answer to part (a).

$P = \frac{W}{t}$  or  $W = Pt$  ①  
 Greatest power  $\Rightarrow$  shortest time. ①  
 \_\_\_\_\_ [2]

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Marks	Remark

2 In the World's Strongest Man competition, competitors pull a bus along a horizontal road.

③



A competitor pulls the bus with a steady force of 2000 N.

(a) Calculate the work done in moving the bus 20 m.  
 Show clearly your working out.

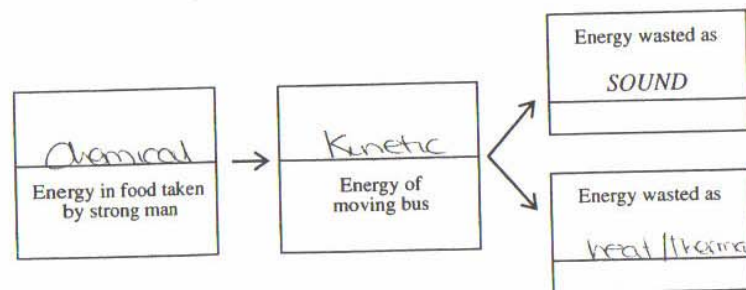
$$W = F \times d \quad \text{①}$$

$$= 2000 \times 20 \quad \text{①}$$

$$= 40000 \text{ J}$$

Work done = 40000 J [3]

(b) What energy changes take place as the strong man moves the bus?



[2]

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