

Energy, Work and Power

Mark Scheme 5

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| Level | IGCSE |
| Subject | Physics |
| ExamBoard | CIE |
| Topic | General Physics |
| Sub-Topic | Energy, Work and Power |
| Paper Type | (Extended) Theory Paper |
| Booklet | Mark Scheme 5 |

Time Allowed: 46 minutes

Score: /38

Percentage: /100

- 1 (a) two processes from:
 vapour rising
 condensation
 rain falling
 water falling from lake / through pipes
 water turns turbine / generator
 electricity generated. max B2
- energy changes:
 PE to KE matched to a process B1
 KE to electricity energy for turbine / power station B1
- (b) (i) (PE =) mgh OR $2 \times 10^5 \times 10 \times 120$ allow $g = 9.8$ or 9.81 C1
 $2.4 \times 10^8 \text{ J}$ A
- (ii) (KE of water =) $\frac{1}{2}mv^2$ OR $\frac{1}{2} \times 2 \times 10^5 \times 14^2$ C1
 $1.96 \times 10^7 \text{ J}$ OR $2.0 \times 10^7 \text{ J}$ A [8]
- 2 (a) $\Delta h = 0.068 \text{ m}$ C1
use of mgh C1
 0.054 J/Nm A1 [3]
- (b) $\frac{1}{2}mv^2 =$ candidate's (a) C1
 1.2 m/s ecf from (a) A1 [2]
- (c) (i) use of distance \div time C1
 $= 1.1 \text{ m/s}$ A1
- (ii) air or wind resistance / friction / heat / thermal energy B1
 OR correct mention of experimental error e.g. width of cylinder [3]

- 3 (a) (i) use of $a = \Delta v/t$ in any form
23.3 m/s² ignore sign C1
A1 [2]
- (b) (i) 336 000 J B [1]
- (ii) use of power \times time
= 180 000 J C1
A [2]
- (iii) 54% OR 0.54
ecf from (i) and (ii) B1 [1]
accept (= 180 000/840 000) 21% OR 0.21
- (c) anything sensible for a moving vehicle, e.g. flywheel / capacitor / battery M1
appropriate change for this device, for example:
flywheel: speed or kinetic energy
capacitor: voltage or charge or electrical energy
battery: voltage or charge or electrical or chemical energy A1 [2]
- 4 (a) (i) mgh in any form OR $2.0 \times 10 \times 4.8$ C1
96 J A1
- (ii) GPE \rightarrow KE (+ heat and/or sound)
 \rightarrow heat and/or sound
-1 e.e.o.o. B2
- (b) force \times distance/time OR $520 \times 3/5$ C1
312 W A1
- (ii) 2600 W ecf (i) B1 [7]

- 5 (a) $\frac{1}{2}mv^2$ OR $\frac{1}{2} \times 900 \times 30^2$ C1
405 000 J A1
- (b) force x distance OR 2000 x 30 C1
60 000 J OR 60 kJ A1
- (c) 60 000 W OR 60 000 J/s OR 60kW OR 60 kJ/s ecf from (b) B1
- (d) chemical B1
- (e) idea of energy loss / heat / sound / inefficiency / energy used within car / possibility of increase in P.E. Ignore work done against against friction B1 [7]