


P2.2.1 Mark Scheme

Forces and energy

Mark scheme

1. (a) $W = 65 \times 10$ 4
 (allow a maximum of 3 marks if candidate uses $g=9.8\text{N / Kg}$ (as ecf))
 gains 1 mark
 but $W = 650$ (N) (allow use of $\text{p.e.} = m \times g \times h$)
 gains 2 marks
 but PE change = 650×1.25 or $65 \times 10 \times 1.25$
 gains 3 marks
 but PE change = 812.5 (J) (allow 813J or 812J)
 gains 4 marks
- (b) k.e. = p.e. gains 1 mark 3
 but $(\text{speed})^2 = 812.5 \times 2 / 65$ or $812.5 = \frac{1}{2} \times 65 \times (\text{speed})^2$ ecf
 gains 2 marks
 but speed = 5 (m/s) (allow 4.99 → 5.002)
 (if answer = 25mls check working: $812.5 = \frac{1}{2} m \times v$ gains 1 mark for KE=PE)
 (but if $812.5 = \frac{1}{2}m \times v^2 = \frac{1}{2} \times 65 \times v^2$ or $v^2 = \frac{2 \times 812.5}{65}$ gains 2 marks)
 25, with no working shown gains 0 marks
 gains 3 marks
- [7]
2. (a) (i) work (done) = force (applied) x distance (moved) 1
 accept $W = F \times s$ or $W = F \times d$
 accept  provided subsequent method is correct
- (ii) 240 000 2
 allow 1 mark for correct substitution or correct use of 1200 (N)
 joules 1
 accept J
 do not accept j / Nm
- (b) 800 (watts) 2
 accept 0.8 kW
 accept their (a)(ii) ÷ 300 correctly evaluated for 2 marks
 allow 1 mark for correct substitution
 (a)(ii) ÷ 5 correctly evaluated for 1 mark

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- (c) (i) any **one** from: 1
- needs to raise the chair / lift
 - lifting more than one chair
allow lifting more than 2 people implication of a heavier weight
 - energy transfer to the surroundings correctly qualified
accept loss for transfer
*do **not** accept motor inefficient*
*do **not** accept motor gets hot*
*do **not** accept friction unless the location is specified as external to the motor*
- (ii) electrical 1
accept electric
- potential
***both** answers required for the mark*

[8]