

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

| Question Number | Answer | Mark |
|-----------------|---|------|
| (i) | <p>The only correct answer is C 20 m/s</p> <p>A is not correct because 0.2 m/s is too slow</p> <p>B is not correct because 2 m/s is too slow</p> <p>D is not correct because 200 m/s is too fast</p> | (1) |

| Question Number | Answer | Additional guidance | Mark |
|-----------------|---|--|------|
| (ii) | <p>recall (1)</p> $(\Delta GPE) = m \times g \times \Delta h$ <p>substitution (1)</p> $(\Delta GPE =) 75 \times 10 \times 20$ <p>evaluation (1)</p> <p>15 000 (J)</p> | <p>NO PoT error</p> <p>NO ecf from wrong equation</p> <p>mgh or $m \times g \times h$</p> <p>75 x 10 x 20 scores the first 2 marks</p> <p>accept 14700 (J) from using $g = 9.8$ (N/kg)</p> <p>award full marks for the correct answer without working</p> | (3) |

Q2.

| | Answer | Acceptable answers | Mark |
|----------|--|--|------|
| (a)(i) | An explanation linking <ul style="list-style-type: none"> 60 % of total/electrical/input/output energy (is used/transferred) (1) into/is kinetic/useful energy (1) If no other marks scored accept: 60% (of the energy produced by the motor) is useful/40% is wasted for 1 mark | Accept reverse argument ie 40 % of total/electrical/input/output energy (is/transferred) into/lost as/thermal (heat)/waste energy | (2) |
| (a)(ii) | <input checked="" type="checkbox"/> B energy | | (1) |
| (a)(iii) | substitution 20×15 (1) evaluation 300 (J) (1) If no other mark scored award 1 mark for correct transposition ie $E = P \times t$ Ignore any unit given by candidate | Power of 10 error maximum of 1 mark eg 300 000 (J) gains 1 mark Give full marks for correct answer, no working | (2) |
| (a)(iv) | substitution $18 \div 24 (\times 100)$ (1) evaluation 0.75 or 75% (1) Ignore any unit given by candidate | Power of 10 error maximum of 1 mark give full marks for correct answer, no working | (2) |
| (b) | <input checked="" type="checkbox"/> B conservation of energy | | (1) |

Q3.

| Question Number | Answer | Additional guidance | Mark |
|-----------------|---|---|---------------|
| (i) | substitution (1) ($\Delta GPE =$) $65 \times 10 \times 200$ evaluation (1) $1.3 \times 10^5 / 130\ 000$ (J) | allow substitution mark with 65000 (g) allow 1 mark for answers that round to 1.3 with any other power of ten do not allow 13000 award full marks for the correct answer without working | (2) AO 2 1 |
| Question Number | Answer | Additional guidance | Mark |
| (ii) | substitution (1) (KE) $\frac{1}{2} \times 65 \times 36^2$ squaring (1) 36^2 (=1296) (completing) evaluation (1) $42\ 120 / 4.2(1) \times 10^4$ (J) | using 36 \rightarrow 1170 (J) OR $36 \times 2 \rightarrow 2340$ (J) scores 2 marks (apply power of ten error as well if occurring e.g. 117000 (J) gets 1 mark) award full marks for the correct answer without working allow 2 marks for answers that round to 4.2 with any other power of ten omitting $\frac{1}{2}$ gives 84240(J) scores 2 marks | (3) AO 2 1 |