

Question Number	Answer	Mark
11(a)	<ul style="list-style-type: none"> Use of Power = $\frac{\text{energy}}{\text{time}}$ (1) $P = 72 \text{ (kW)}$ (1) <p><u>Example of calculation</u></p> $P = \frac{32 \times 10^6 \text{ J l}^{-1} \times 65 \text{ l}}{8 \text{ h} \times 3600 \text{ s}} = 72.2 \text{ kW}$	2
11(b)	<ul style="list-style-type: none"> Use of $\Delta W = F\Delta s$ (1) Use of power = $\frac{\text{energy}}{\text{time}}$ (1) Average power output of engine = 53 (kW) (1) <p><u>Example of calculation</u></p> $W = 2.1 \times 10^3 \text{ N} \times 730 \times 10^3 \text{ m} = 1.53 \times 10^6 \text{ J}$ $P = \frac{2100 \text{ N} \times 730 \times 10^3 \text{ m}}{8 \text{ h} \times 3600 \text{ s}} = 53.2 \text{ kW}$	3
11(c)	<ul style="list-style-type: none"> Use of efficiency = $\frac{\text{useful power output}}{\text{total power input}}$ (1) Efficiency = 0.74 or 74 % (ECF from (a) and (b)) (1) <p><u>Example of calculation</u></p> $E = \frac{53.2 \times 10^3 \text{ W}}{72.2 \times 10^3 \text{ W}} = 0.74$	2
Total for question 11		7