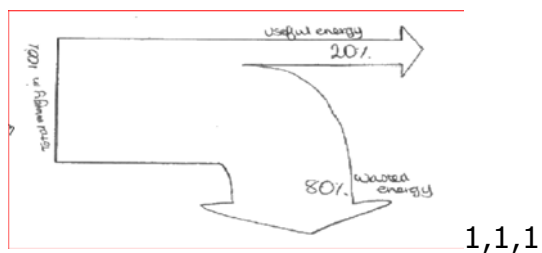
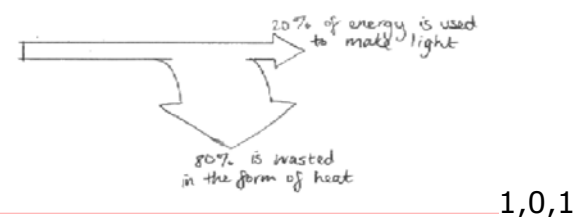
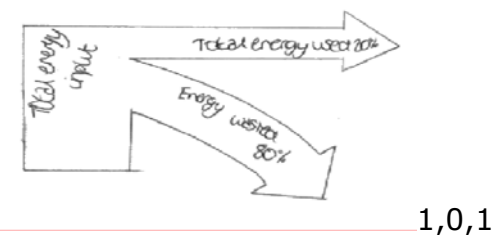


Question number	Answer	Notes	Marks
2 a i	B kettle		1
ii	A food mixer		1
b	any one from MP1 total energy always has the same value; MP2 energy cannot be created or destroyed; MP3 energy input = energy output ;	Allow student speak with two distinct ideas on energy e.g. none is lost or gained none is lost just transferred	1
c i	Both of: MP1 . is 20% of the energy input ; MP2 . (20%) is transferred usefully / as light; OR both of: MP3 . 80% of the energy input ; MP4 . (80%) is wasted / transferred as heat;	allow energy used for energy input 20% (or 80%) is not enough for the mark, 'energy input' or 'energy used' must be mentioned allow for 1 mark, a definition of efficiency condone power for energy	1 1
ii	Sankey diagram giving – MP1. One input and ONLY two outputs; MP2. Roughly correct proportions; MP3. Two correct labels; e.g.	independent marks allow <ul style="list-style-type: none"> output arrows in either direction both output arrows in same direction 2 from <ul style="list-style-type: none"> input/electrical/total, useful/light, wasted/heat/thermal ignore % on labels sound	1 1 1



there must not be a size difference between input and outputs, even if the light is $\sim 1/4$ of heat

i.e. 100 units in and 100 units out



(Total for Question 2 = 8 marks)

iii	Substitution and rearrangement; Calculation ; $\frac{12}{0.05 \times 1.6}$ 150 (m)	POT error loses 1 mark e.g. 0.15 (m) gets 1 mark	2
e	any Two from: <ul style="list-style-type: none"> • Value of g lower(on the Moon)/RA; • lack of air resistance (on the Moon)/RA; • Time of flight greater; 	ignore <ul style="list-style-type: none"> • 'no gravity' allow <ul style="list-style-type: none"> • less gravity • drag for air resistance 	2

(Total for Question 10 = 15 marks)

Question number	Answer	Notes	Marks
12 a	MP1. series circuit containing lamp and some form of power supply; MP2. ammeter in series with lamp; MP3. voltmeter in parallel across lamp; MP4. variable resistor in series OR use of variable power supply;	incorrect symbols or substantial gaps = -1 ONCE allow either symbol for lamp ignore other components e.g. switch	4
b i	idea that gradient changes; e.g. voltage increases more rapidly than the current	look for a rate change expressed in student terms Accept <ul style="list-style-type: none"> line is curved not a straight line V is not proportional to I 	1
ii	MP1. Lamp heats up; MP2. Greater chance of electron collisions; MP3. (hence) resistance increases;	do not award marks for a description of the shape of the graph	3

(Total for question 12 = 8 marks)