

Efficiency and Reducing Unwanted Energy 3 MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any two from: <ul style="list-style-type: none"> black is a good emitter of (infrared radiation) large surface (area) matt surfaces are better emitters (than shiny surfaces) 	accept heat for radiation ignore reference to absorbing radiation accept matt surfaces are good emitters ignore reference to good conductor	2
b)	90 % or 0.9(0)	efficiency = $\frac{\text{useful energy out} (\times 100\%)}{\text{total energy in}}$ allow 1 mark for correct substitution ie 13.5/15 provided no subsequent step shown an answer of 90 scores 1 mark an answer of 90 / 0.90 with a unit scores 1 mark	2
c)	(producing) light	allow (producing) sound	1
d)	any two from: <ul style="list-style-type: none"> wood is renewable (using wood) conserves fossil fuels wood is carbon neutral 	accept wood grows again / quickly accept wood can be replanted accept doesn't use fossil fuels accept a description cheaper / saves money is insufficient	2
Total marks			7

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	kinetic (energy)	allow gravitational potential (energy) / gpe movement is insufficient	1

a)ii)	dissipates into the surroundings	allow warms up the surroundings / air / motor accept lost to the surroundings accept lost as heat ignore reference to sound it is lost is insufficient	1
b)	energy (required) increases with load further amplification eg increases slowly at first (or up to 4 / 5 N), then increases rapidly	accept positive correlation do not accept (directly) proportional simply quoting figures is insufficient an answer that only describes the shape of the line gains no marks	1 1
Total marks			4

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	0.6 or 60 %	allow 1 mark for correct substitution ie 720/1200 provided no subsequent step shown an answer of 0.6 / 60 with a unit gains 1 mark only an answer of 60 gains 1 mark only	2
a)ii)	heat	allow thermal	1
b)	K smallest amount of wasted energy or largest amount of useful energy	reason only scores if K is chosen reasons must be comparative accept waste arrow is narrowest accept useful arrow is widest waste arrow is smallest is insufficient	1 1
Total marks			5

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	7.6	allow 1 mark for correct substitution and / or transformation ie $0.95 = \frac{x}{8}$ 0.95×8.0	2
b)	any two from <ul style="list-style-type: none">• transferred to the surroundings / air / atmosphere• becomes spread out• shared between (many) molecules• (wasted as) heat / sound		2
Total marks			4

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	electrical kinetic sound	correct order only	1 1 1
a)ii)	transferred into surroundings / atmosphere	accept warms the surroundings allow released into the environment becomes heat or sound is insufficient	1
b)	0.7/70%	an answer of 70 without % or with the wrong unit or 0.7 with a unit gains 1 mark	2
Total marks			6