

**Heat Energy- Specific Heat Capacity and Latent Heat Past Paper Answers**  
**AQA Physics GCSE -Higher**

1.

stion	answers	extra information	mark
(a)	(matt) black is a good <u>emitter</u> of infrared / radiation	accept heat for infrared / radiation ignore reference to good absorber attracts heat negates this marking point	1
	to give maximum (rate of) energy transfer (to surroundings)	accept temperature (of coolant) falls fast(er)  accept black emits more radiation for 1 mark  black emits most radiation / black is the best emitter of radiation for 2 marks	1
(b)	the fins increase the surface area	accept heat for energy	1
	so increasing the (rate of) energy transfer <b>or</b> so more fins greater (rate of) energy transfer		1
(c)	114 000	allow 1 mark for correct temperature change, ie 15 (°C) <b>or</b> allow 2 marks for correct substitution, ie $2 \times 3800 \times 15$  answers of 851 200 <b>or</b> 737 200 gain 2 marks <b>or</b> substitution $2 \times 3800 \times 112$ <b>or</b> $2 \times 3800 \times 97$ gains 1 mark  an answer of 114 kJ gains 3 marks	3

question	answers	extra information	mark
(d)	increases the efficiency		1
	less (input) energy is wasted <b>or</b> more (input) energy is usefully used	accept some of the energy that would have been wasted is (usefully) used accept heat for energy	1
<b>total</b>			<b>9</b>

2.

question	answers	extra information	mark
(a)	any <b>two</b> from: <ul style="list-style-type: none"> <li>black is a good emitter of (infrared radiation)</li> <li>large surface (area)</li> <li>mat surfaces are better emitters (than shiny surfaces)</li> </ul>	accept heat for radiation  ignore reference to absorbing radiation  accept mat surfaces are good emitters  ignore reference to good conductor	2
(b)	90 % or 0.9(0)	efficiency = $\frac{\text{useful energy out}}{\text{total energy in}} (\times 100\%)$  allow <b>1</b> mark for correct substitution  ie $\frac{13.5}{15}$  provided no subsequent step shown  an answer of 90 scores <b>1</b> mark  an answer of 90 / 0.90 with a unit scores <b>1</b> mark	2
(c)	(producing) light	allow (producing) sound	1





4.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
(a)	no particles (in a vacuum)	both energy transfer methods needed for the mark	1	AO1 1.1.3a
	(so) no / reduced conduction and no / reduced convection		1	
b)(i)	78 (°C)	allow <b>2</b> marks for correct temperature change ie 22 °C  allow <b>1</b> mark for correct substitution ie $46\,200 = 0.5 \times 4200 \times \theta$  or $\frac{46200}{0.5 \times 4200} = \theta$	3	AO2 1.1.4d
c)(ii)	6.4 (W)	allow <b>2</b> marks for an answer that rounds to 6.4  allow <b>1</b> mark for correct substitution ie $46\,200 = P \times 7200$  an answer of 23 000 or 23 100 or 385 gains 1 mark	2	AO2 1.3.1c
<b>Total</b>			<b>7</b>	

5.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	wood / charcoal / peat	allow named solid dried plant material or animal product do not accept seashells	1	AO1 1.4.1a
5(b)	380 (°C)	allow 1 mark for correct substitution ie $8.36 \times 10^7 = 250 \times 880 \times \theta$	2	AO2 1.1.4d
5(c)	(white is a) poor emitter of IR radiation	allow heat for IR ignore white is a good reflector only or poor absorber	1	AO1 AO2 1.1.4d 1.1.3c
	(curved surface) has a small surface area (to volume ratio)		1	
	(high specific heat capacity means) large amount of energy needed to transfer to surroundings before temperature decreases (significantly)		1	
	(low U-value means) concrete is a poor conductor or a (good) insulator		1	
<b>Total</b>			<b>7</b>	

6.

stion	answers	extra information	mark
(a)	because black is a good absorber of radiation	allow therefore the temperature of the water rises faster	1
	therefore there will be a faster transfer of energy		1
(b)	16 800 000	allow 1 mark for substitution into correct equation ie $100 \times 4200 \times 40$	2