Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

Question number	Answer	Mark
	An explanation that combines identification via a judgement (2 marks) to reach a conclusion via justification/reasoning (2 marks): • intensity of radiation increases with temperature (1) • the distribution of the emitted wavelengths of radiation is affected by temperature (1) • at low temperatures the intensity of radiation emitted is low and the (range of) emitted wavelengths (of radiation) are high so the lamp appears dull red (1) • at higher temperatures the intensity of the radiation is greater and the (range of) emitted wavelengths (of radiation) are low so the lamp appear to be brighter and less red (1)	**(4)**

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Q2.

	Answer	Additional guidance	Mark
(i)	explanation linking any 2 of: black / P is good absorber / poor reflector (1) white / Q is good reflector poor absorber (1) different colour of surfaces absorb differently (1)	allow any one statement for 2 marks: • black / P **better** absorber • black / P **worse** reflector • white / Q **worse** absorber • white / Q **better** reflector • black / P absorbs (radiation) **and** white / Q reflects (radiation)	**(2)** **AO1**

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	Answer	Additional guidance	Mark
(ii)	explanation linking **four** from: P is absorbing radiation/(thermal) energy (1) P is (also) emitting radiation/(thermal) energy (1) (rate of) emission increases with temperature (1) (temperature constant) when (rate of) emission = (rate of) absorption (1) mention of rate in either mp3 or mp4 (1)	 allow heat in this context temperature of P constant when rate of emission of radiation = (rate of) absorption of radiation scores 4 marks (rate of) absorption of radiation is greater than (rate of) emission of radiation (so temperature increases) scores MP1 and 2	**(4)** **AO1**

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Q3.

	Answer	Additional guidance	Mark
	An explanation linking: Vesta (also) radiates (energy) (1) the same amount of energy that it absorbs (1) in the same time (1)	 allow emits (OWTE)for radiates 'Vesta radiates at the same average power that it absorbs' scores all three MPs 'Vesta radiates energy at the same <u>rate</u> that it absorbs' scores all three MPs	**(3)** **AO1**

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Q4.

	Answer	Mark
(i)	**A** The ray enters along a normal to the edge of the block. **B, C** and **D** are incorrect as these do not explain why the light ray does not change direction.	**(1)** **AO2**

	Answer	Additional guidance	Mark
(ii)	explanation linking: extrapolate / extend the graph/curve (1) (until it reaches) $r = 90^{\circ}$ (1) read corresponding value of i (1)	Allow annotation on graph: extension of line on graph to at least $r = 90^{\circ}$ line down from line to x axis and labelled as critical angle	**(3)** **AO2**

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