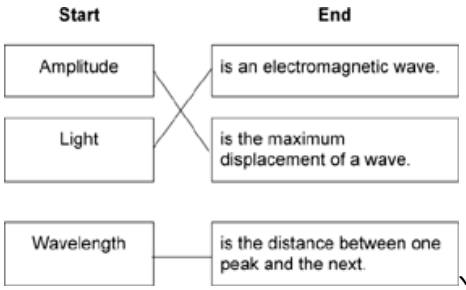
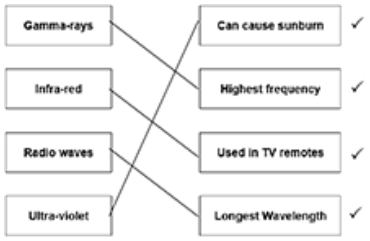
Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1			 ✓✓	2 (2 × AO 1.1)	All 3 correct for 2 marks Any 1 or 2 correct for 1 mark **Examiner's Comments** The majority of candidates knew that light is an electromagnetic wave. A minority of candidates were confused with the definitions for amplitude and wavelength.
			Total	**2**	
2			C	1 (AO 1.1)	**Examiner's Comments** This question, testing a basic understanding of the frequency and wavelength of electromagnetic waves, appeared to be challenging. All the options were regularly chosen. For this type of question, candidates should be encouraged to read each response and eliminate the options one by one. For example, A is incorrect because the speed of electromagnetic waves in air is constant for all electromagnetic waves; D is incorrect, since amplitude is independent of frequency (or wavelength). Thus, the candidate is left with a choice of B or C. This then becomes a test of understanding of the wave equation.
			Total	**1**	
3			Speed of light is (much) higher than speed of sound **/ AW** ✓	1 (AO1.1)	**Examiner's Comments** The majority of the candidates were able to state that the speed of light is (much) faster than the speed of sound. This question required a comparison.
			Total	**1**	

4	a			3 (3 × AO1.1)	Award 2 marks for 2 or 3 correct Award 1 mark for 1 correct **Examiner's Comments** The majority of the candidates attempted this question. A large number of candidates correctly identified ultraviolet with causing sunburn. Common misunderstandings included linking gamma rays having the longest wavelength instead of the highest frequency and radio waves being used in TV remotes.
	b	i	X-rays ✓	1 (AO1.1)	**Examiner's Comments** A variety of responses were written by candidates.
		ii	**Any two from**: It has the highest frequency / energy / shortest wavelength ✓ It is ionising (radiation) ✓ It can cause cancer / damage cells / kill cells ✓	2 (2 × AO1.1)	**ALLOW** these marks if answer to 16(b)(i) is incorrect. **IGNORE** harmful **IGNORE** radiation sickness **Examiner's Comments** For this type of question, candidates should identify detailed reasons. For example, "it will cause damage" did not gain marks.
			Total	**6**	