Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 5_ Light And Electromagnetic Spectrum

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

Mark Schemes

Q1.

Question number	Indicative content	Mark
*	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive, and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. AO1 1 **(6 marks)** **alpha** • a particle (not a wave) • made up of 4 particles • helium nucleus • has a positive charge • when emitted by a nucleus, atomic number goes down by 2 • mass number goes down by 4 **beta** • a particle (not a wave) • made up of 1 particle • electron (or positron) • has a negative charge • when emitted, atomic number goes up by 1 • mass number does not change Ignore references to range, penetration, ionisation.	**(6)** **AO1**

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Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3-4	• Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5-6	• Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

Level	**Mark**	**Additional Guidance**	**General additional guidance – the decision within levels** e.g. - At each level, as well as content, the scientific coherency of what is stated will help place the answer at the top, or the bottom, of that level.
	0	No rewardable material.	
Level 1	1–2	Additional guidance isolated facts	Possible candidate responses A beta particle is an electron. An alpha particle is a helium nucleus
Level 2	3–4	Additional guidance effect of alpha and beta decay or nature and effect of alpha or beta	Possible candidate responses A beta particle is an electron. When emitted the mass number doesn't change but atomic number goes up by one
Level 3	5–6	Additional guidance detailed comparison that includes nature of alpha and nature of beta and effect of either alpha or beta OR effect of alpha and beta and nature of either alpha or beta	Possible candidate responses Alpha particle is a helium nucleus AND A beta particle is an electron. When emitted the mass number doesn't change but atomic number goes up by one

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Q2.

Question number	Indicative content	Mark
	Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive, and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. AO1 **Comparison** X–rays: high frequency / short wavelength / ionising / high energy Radio waves: low frequency / long wavelength / not ionising / low energy **X ray are used** • in medical diagnosis, to find broken bones, damage to lungs • radiotherapy • treatment of cancer • airport security • revealing counterfeit art **X-rays are emitted when electrons change energy levels because** • electrons in lower energy levels can absorb energy • the electrons move to higher energy levels • when the electrons return to a lower energy level • the electrons lose energy as radiation. • the electrons need to lose a large amount of energy • (so that) they emit x-ray radiation of high energy/frequency	**(6)** **AO1**

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	Radio waves are used • broadcasting television • broadcasting radio • communications • satellite transmissions • mobile phones • radar	
	Radio-waves are emitted when • electrons oscillate in electrical circuits **oscillations are** • current (flow of electrons) that continually change direction • current flows up and down in a (transmitting) aerial • alternating current (AC) • this generates radio waves in the air around the aerial • the frequency of the radio waves corresponds to the oscillation frequency **N.B. No credit is given for:** **Electrons within an atom go through energy changes** **OR** **Radio waves are produced in electrons in circuits** **These phrases are in the stem of the question**	

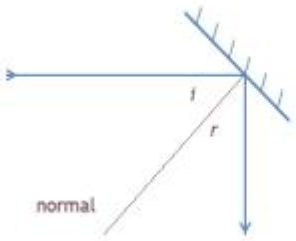
Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific, enquiry, techniques and procedures lacks detail. (AO1) Presents a description which is not logically ordered and with significant gaps. (AO1)
Level 2	3–4	Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas, enquiry, techniques and procedures is not fully detailed and/or developed. (AO1) Presents a description of the procedure that has a structure which is mostly clear, coherent and logical with minor steps missing. (AO1)
Level 3	5–6	Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas, enquiry, techniques and procedures is detailed and fully developed. (AO1) Presents a description that has a well-developed structure which is clear, coherent and logical. (AO1)

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Level	Mark	Additional Guidance	General additional guidance – the decisions within levels
	0	No rewardable material	
Level 1	1-2	Additional guidance Elements of physics present i.e. isolated knowledge of principles, **two** unconnected statements	Possible candidate response any use of X rays any use of radio waves any comparison electrons are around the nucleus a current is electrons (moving) electrons oscillate
Level 2	3-4	Additional guidance Some knowledge of principles with limited detail on use and a comparison or process	Possible candidate response any use of x-rays and of radio waves with limited detail and one of: a comparison or electrons lose energy to emit X-rays or electrons oscillate in circuits
Level 3	5-6	Additional guidance Detailed knowledge of principles on use with logical connections made about one process	Possible candidate response Use of X-rays and of radio waves with detail and one of: electrons lose energy to change to lower energy level and emit energy as X–rays or electrons oscillate in circuit and currents move up and down in aerials to generate radio waves

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Q3.

Question number	Answer	Additional guidance	Mark
(i)	• normal drawn correctly (1) • angles of incidence and reflection shown correctly (1)		**(2)**

Question number	Answer	Additional guidance	Mark
(ii)	The critical angle must be less than 45° (1)		**(1)**

Question number	Answer	Acceptable answer	Mark
iii)	A reason which links • Total internal reflection in the prism(s) (1) • No light is scattered (1)	No light is lost / no multiple reflections	**(2)**

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