

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

Question Number	Answer	Additional guidance	Mark
	single straight line in upper right quadrant (1) direction change towards the normal (1)	ignore arrow direction conditional on first mark point	(2)

Q2.

Question number	Answer	Mark
	An answer that provides a description by making reference to: <ul style="list-style-type: none"> • transverse waves have oscillations perpendicular to direction of travel of the wave (1) • whereas longitudinal waves have oscillations in the same direction as the direction of travel of the wave (1) 	(2)

Q3.

Question Number	Answer	Additional guidance	Mark
	<p>A description including <u>particles</u> (at end) vibrate (more) (about fixed positions) (1)</p> <p>cause neighbouring particles to vibrate (more) (1)</p>	<p>allow atoms / ions / molecules for particles</p> <p>vibrations passed along OR reference to longitudinal waves / compressions and rarefactions</p>	(2)

Q4.

Question number	Indicative content	Mark
	<p>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.</p> <p>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.</p> <p style="text-align: center;">AO1 (6 marks)</p> <ul style="list-style-type: none"> • point A reaches the glass block before point B • A moves into the glass block and slows down • as light travels more slowly in glass than in air • B is still in air so is travelling faster than A • this causes part of the wavefront to change direction/refract • by the time B reaches the block it will have travelled further than A • therefore, the whole wavefront changes direction/refracts towards the normal • at the other face, A exits first so the process is reversed • the wavefront changes direction again so it is parallel to its original direction/refracts away from the normal 	(6)

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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)

Q5.

Question number	Answer	Additional guidance	Mark
(i)	<p>er</p> <p>(1)</p>	any similar distance labelled wavelength / λ between the equivalent of 2 consecutive compressions	(1)

Question number	Answer	Additional guidance	Mark
(ii)	<p>description including any two from:</p> <p>particles vibrate / oscillate/ move backwards and forwards (1)</p> <p>along a radius/ parallel to direction of travel/ energy transfer (1)</p> <p>about mean /fixed positions (1)</p>	<p>allow air for particles</p> <p>in same direction as wave</p> <p>allow one mark for 'sound is a longitudinal wave' if no other mark awarded</p>	(2)

Q6.

Question	Answer	Additional guidance	Mark
(i)	<p>An explanation linking</p> <p>UVC/it has the smallest wavelength / highest frequency/ highest energy/most ionising (1)</p> <p>(it doesn't cause harm to people because) 100% absorbed by the Earth's atmosphere/no UVC reaches the Earth's surface/people (1)</p>	<p>allow shortest wavelength</p> <p>allow smaller for smallest / higher for highest / more for most</p>	<p>2</p> <p>A03.2</p>

Question	Answer	Additional guidance	Mark
(ii)	<p>wavelength 280(nm) (1)</p> <p>substitution and rearrangement (1)</p> $f = \frac{3.0 \times 10^8}{280 (\times 10^{-9})}$ <p>evaluation (1)</p> $1.07 \times 10^{15} \text{ (Hz)}$	<p>allow 2.8 to any power of ten</p> <p>accept numbers that round up to 1.1×10^{15} (Hz)</p> <p>award 2 marks for values that round up to 1.1 to any other power of ten</p> <p>if no other mark scored allow substitution and rearrangement using an incorrect</p>	<p>3</p> <p>AO2.1</p>
		<p>wavelength for 1 mark</p> <p>award full marks for correct answer without working</p>	