Name: _____

Foundation Waves

Mark Scheme

Date:

Time:

Total marks available:

Total marks achieved: _____

Mark Scheme

Q1.

	Answer	Acceptable answers	Mark
	2100/500 = 4.2 (1) 4.2 × 150 = 630 (million km) (1) Accept ratios as speed is constant 150/500 = distance to Jupiter/2100 OR Distance to Jupiter = (150/500) × 2100 Either for 1 mark	Power of 10 error maximum of 1 mark (speed of light) about 150 000 000 ÷ 500 = 300 000 (km/s) (1) (distance to Jupiter)= 300 000 × 2100 = 630 000 000 km (1) / = 630 (million km) An answer with no calculation of 630 (million km) gains 2 marks If an answer of 630 million/ 630 000 000 is given with correct working award both marks	**(2)**

Q2.

Question Number	Answer	Additional guidance	Mark
(i)	recall speed = $\frac{\text{distance}}{\text{time}}$	accept any correct rearrangement or use of s, d and t may use v for speed and x for distance ignore use of triangles	**(1)** AO 1 1

Question Number	Answer	Additional guidance	Mark
(ii)	substitution (1) (speed) = $\frac{220}{0.7(0)}$ evaluation (1) 310 (m/s)	allow ecf from part (i) for this mark only allow any numbers that round to 310 e.g. 314 award full marks for the correct answer without working	**(2)** AO 2 1

Q3.

	Answer	Acceptable answers	Mark
(i)	(number of waves =) 5 (1)		**(1)**
(ii)	**Either** 60 ÷ 5 (1) **or** 60 ÷ (their answer to 2(b)(i)) (1)	12 (cm) **or** ecf from number of waves	**(1)**

Q4.

	Answer	Acceptable answers	Mark
	Substitution 1.7 × 8 (1) Evaluation 14 (cm/s) (1)	 13.6 (cm/s) give full marks for correct answer, no working Power of 10 error max. 1 mark.	**(2)**

Q5.

Question Number	Answer	Additional guidance	Mark
	recall and substitution (1) (v =) 0.25 x 1.5 evaluation (1) 0.38 (m/s)	 accept 0.375 or 0.37 (m/s) accept 37.5, 37 or 38 for 1 mark only award full marks for the correct answer without working	**(2)**

Q6.

Question Number	Answer	Acceptable answers	Mark
(i)	**X** amplitude (1) **Y** wavelength (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
(ii)	**A**  (1)		**(1)**

Q7.

	Answer	Acceptable answers	Mark
	Substitution into correct equation(1) v = 15 × 125 Evaluation (1) 1875 Unit (1) m/s	Power of 10 error max 1 mark for numerical answer 2 marks for correct numerical answer even with no working shown ms^{-1} **not** mps 1.875 km/s or 6750 km/h gain 3 marks	**(3)**

		If numerical answer incorrect, accept any correctly-written unit of speed: eg **k**m/s or km/hr or miles per hour / mph	

Q8.

	Answer	**Acceptable answers**	**Mark**
(i)	5 (cm) (1) 8 (cm) (1)	+5 -5 0.08 m 80 mm	**(2)**
(ii)	B		**(1)**

Q9.

Question Number	**Answer**	**Additional guidance**	**Mark**
(i)	evidence of use of scale on horizontal distance axis only (1) 12 (cm) (1)	may be seen on the diagram range 11.5 to 12.5 (cm) award full marks for the correct answer without working 6 (cm) or 30(cm) scores 1 mark (evidence of use)	**(2)**

Question Number	Answer	Additional guidance	Mark
(ii)	a description to include: moves up and down (1) at right angles / normal / perpendicular to (direction of) wave/travel (1)	independent marking points vertical (oscillations) not in the (direction of) wave / travel accept 'transverse wave' for 2nd MP	(2)

Q10.

Question Number	Answer	Additional guidance	Mark
	substitution (1) $\frac{3.0 (\times 10^{8})}{5.8 (\times 10^{-7})}$ evaluation (1) 5.2×10^{14} unit (1) Hz	 answers that round to 5.2×10^{14} award 2 marks for a correct answer without working allow 1 mark for answers that round to 5.2 to any power of ten independent mark accept hz or s^{-1} or per sec(ond) or hertz accept kHz, MHz etc with correct power (10^{11} kHz, 10^{8} MHz)	(3) AO 2 1

Q11.

Question Number	Answer	Acceptable answers	Mark
(a)	**A** longitudinal : yes		**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)	An explanation linking any two of: 1. A cause or description of earthquakes (1) 2. why timing of earthquake is uncertain / complex (1) 3. we cannot see {what is happening deep inside the Earth / where the plates are rubbing} (1)	The release of {energy / pressure/friction force} (in Earth's surface) (caused when tectonic) plates slide past each other any idea of relative movement of plates e.g. move over each other, collide (movement of plates is) {sudden / random / jerky} it is too difficult to {work out / measure} when release of energy will happen "it is difficult to measure when the plates will collide" = 2 marks	**(2)**

Q12.

Question Number	Answer	Additional guidance	Mark
	a description to include: • longitudinal – (vibrations) parallel to (direction of travel) (1) • transverse – (vibrations) at right angles to (direction of travel) (1) • (connection between) direction of travel with (direction of) vibrations (1)	 back and forth (oscillations)/ compressions or rarefactions up and down (oscillations)	**(3)** AO 1 1

Q13.

	Answer	Acceptable answers	Mark
(i)	Substitution v = 1920/6.0 (1) Evaluation (1) 320 (m/s)	 300 (m/s) give full marks for correct answer, no working (2) Power of 10 error max. 1 mark.	**(2)**
(ii)	Suggestions including the following: • recognition of any difference in speed / velocity (1) • correct difference in speed (1)	e.g. sound travels faster / quicker than light (1) c>v / v<c / c>320 (m/s) Light travels (much) faster (2) RA **Ignore**'sound takes longer' or other references to time.	**(2)**