Pearson

Mark Scheme (Results)

January 2018

Pearson Edexcel GCSE
In Physics (5PH1H)
Paper 01

edexcel

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January 2018
Publications Code 5PH1H_01_1801_MS

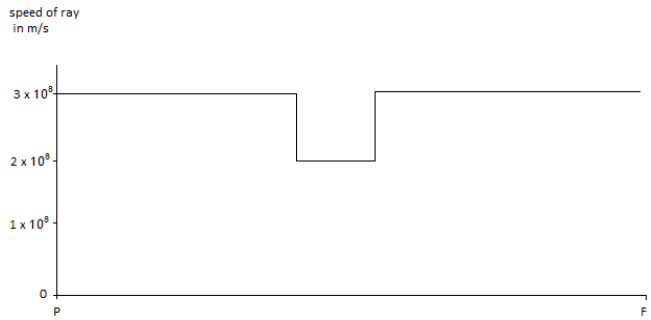
General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question Number	Answer	Acceptable answers	Mark
1ai	**A** 2 cm		**(1)**

Question Number	Answer	Acceptable answers	Mark
1aii	wavelength from graph 20 (m) (1) rearrangement (1) $f = v/\lambda$ evaluation (1) 1.5 (Hz)	 f = 30/20 scores 2 marks 30/10 or ecf from mp1 award for ecf award full marks for correct answer without working	**(3)**

Question Number	Answer	Acceptable answers	Mark
1bi	distance (1) between lens and focal point (1)	how far	**(2)**

Question Number	Answer	Acceptable answers	Mark
1bii		horizontal line shown before and decreasing speed when enters lens (1) goes up to horizontal line after the lens at original height (1)	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)	A black		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	An explanation linking any two logically ordered pairs from temperature rises {initially/in the morning} (1) (because) the hose absorbs energy (1) reaches a {constant/maximum} temperature (1) (when) absorption rate = emitted rate (1) temperature falls in afternoon as energy {emitted/ radiated} (1) more energy emitted (than absorbed) (1)	 (initially) heats up because sunlight/heat is absorbed at a greater rate than heat is emitted starts to cool (when) emitted rate is greater than absorption rate idea of absorbing and emitting simultaneously scores 2	**(4)**

Question Number	Answer	Acceptable answers	Mark
2(c)	9000 (J) absorbed by the heater (1) (efficiency = useful energy out /total energy in) substitution (1) 9000/15 000 (x100) evaluation (1) 60 (%) or 0.6	 award full marks for correct answer without working award 2 marks if working shows 6000 used to give answer 40%	**(3)**

Question Number	Answer	Acceptable answers	Mark
3a	gravitational pull (1)	accept gravity gravitational do not award if energy or potential is mentioned do not award if anti-gravity	**(1)**

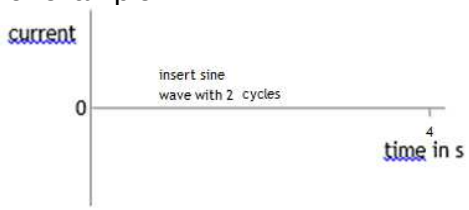
Question Number	Answer	Acceptable answers	Mark
3b	An explanation linking Earth is always (roughly) at centre of Moon's orbit (1) Earth and Jupiter are sometimes at {same side / opposite sides} of orbit (around Sun) (1)	 Moon's orbit is (nearly) circular Earth and Jupiter orbit the Sun at different speeds/radii the two points can be scored by a suitably labelled diagram Moon orbits Earth and Jupiter orbits Sun = 1 mark if no other scored	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	Moon orbits Earth (1)	Moon's orbit is circular planets' orbits are circular accept named planet accept correct order for relative orbital radii of named planets all planets are orbiting a central body	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	any two from Sun placed at centre (1) Earth placed where Sun is (1) Moon moved to new Earth position (1) idea of ellipses (1) add more planets / moons / asteroids /comets etc (1)	 scale of orbits/planet's size allow orbits should be ***slightly*** oval swap Sun and Moon scores 2 marks	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)(iii)	Explanation linking three from telescope to enlarge (objects looked at) (1) saw moons (1) orbiting Jupiter (1) (meant that) not everything orbited the Earth (1)	 the Earth was not at the centre of everything / the Solar System condone Sun at centre (of Solar System)	 **(3)**

Question Number	Answer	Acceptable answers	Mark
4a	**C** energy		**(1)**

Question Number	Answer	Acceptable answers	Mark
4b	line above and below 0 line (1) two cycles shown (dop) (1) for example  	more than one cycle shown	**(2)**

Question Number	Answer	Acceptable answers	Mark
4c	(only) 40% of {energy / power} supplied (1) is put to intended use (1)	ORA ie 60% of {energy / power} supplied is wasted	**(2)**

Question Number	Answer	Acceptable answers	Mark
4di	substitution (1) 15 x 180 evaluation (1) 2700 unit (1) J / joule(s)	15 x 3 allow full marks for answer of 7.5×10^{-4} kWh Joules, jewels award full marks for correct answer without working	**(3)**

Question Number	Answer	Acceptable answers	Mark
4dii	(3minutes =) 0.05 (hours) (1) substitution (1) (15/1000) x 0.05 x 20 evaluation (1) 0.015	allow ecf from 4di if the unit given there is kWh award 1 for any power x any time x 20	**(3)**

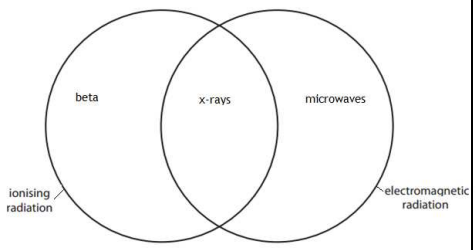
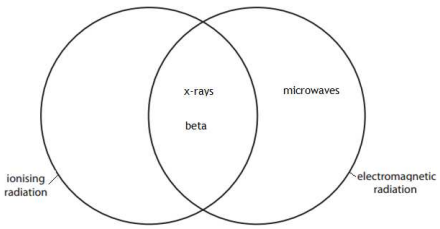
Question Number	Answer	Acceptable answers	Mark
5a	D longitudinal and transverse | longitudinal only		**(1)**

Question Number	Answer	Acceptable answers	Mark
5b	rearrangement (1) time = distance ÷ speed substitution (1) time = $5.8 \times 10^6 \div 12\,000$ evaluation (1) 480 (s)	allow substitution and rearrangement in either order ignore POT errors until evaluation allow 483 and anything which rounds to 480 award full marks for correct answer without working	**(3)**

Question Number	Answer	Acceptable answers	Mark
5c	A description which includes the following variation in amplitude between earthquakes (1) e.g. at a given distance, amplitude is greater for strength 5 variation in amplitude with distance (1) e.g. for a given earthquake, amplitude decreases with distance	strength 5 is always higher than strength 3 / strength 3 approaches 0 before strength 5	**(2)**

Question Number		Indicative Content	Mark
QWC	***5(d)**	An explanation including some of the following points • sonar is ultrasound • travels through water at the speed of sound (1500 m/s) • signal travels through the water • strikes other submarine • signal reflected by other submarine • reflected signal detected on the first submarine • time between emission and detection measured • either time halved and distance between submarines calculated /or distance wave travelled calculated and halved to give distance between submarines • calculation done using x = v x t A labelled diagram can be awarded to a maximum of level 2, 4 marks If conflict, go with words.	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation e.g. A sonar wave (ultrasound pulse) (goes across and) is reflected AND timed. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation e.g. An ultrasound signal (travels through the water and) is reflected AND timed {{AND distance found by halving {the total time or the total distance} OR linking to either the speed equation or the speed of the wave.}} • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation e.g An ultrasound signal is emitted and reflected. The time is measured AND distance found by halving {the total time or the total distance} AND linking to either the speed equation or the speed of the wave • spelling, punctuation and grammar are used with few errors	

Question Number	Answer	Acceptable answers	Mark
6a	**A** infrared radiation		**(1)**

Question Number	Answer	Acceptable answers	Mark
6b	 1 mark for beta in correct region as shown 1 mark for both x-rays AND microwaves in correct regions as shown	 Scores 1 mark for x-rays AND microwaves in correct regions	**(2)**

Question Number	Answer	Acceptable answers	Mark
6c	An explanation linking three from: ground based telescopes restricted (mainly) to visible spectrum (1) (stars emit) wavelengths from the whole spectrum (1) the atmosphere absorbs some of the wavelengths (1) (and so) does not reach Earth's surface (1)	cannot be seen by day in visible light light pollution clouds etc **ignore** unqualified '(air) pollution'	**(3)**

Question Number		Indicative Content	Mark
QWC	***6(d)**	• Herschel – IR Ritter – UV • production of spectrum • using prism • (Herschel) took temperature at different colours • found increased towards red end • thermometer beyond red • was hottest • (Ritter) used sensitive (silver chloride) paper at different colours • found blackened quick towards violet • paper beyond violet • blackened quickest • invisible rays were not suspected beforehand at either end A labelled diagram can score up to level 2, 3 marks. If conflict, go with words.	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• a limited explanation including linking of names and regions of e-m spectrum OR a description of any one experiment OR linking the results of one experiment and the conclusion it produced • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy	
2	**3 - 4**	• a simple explanation including linking of names and regions of e-m spectrum AND {a description of any one experiment OR linking the results of one experiment and the conclusion it produced} • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy	
3	**5 - 6**	• a detailed explanation including a description of any one experiment, linking the results of that experiment to the conclusion it produced AND some detail about the second experiment • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors	

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