

Mark Scheme (Results)

Summer 2012

GCSE Physics
5PH1F/01

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Question Number	Answer	Acceptable answers	Mark
1(a)	A 23 000 Hz		(1)

Question Number	Answer	Acceptable answers	Mark
1(b)	Any one from the following points <ul style="list-style-type: none"> sonar / ranging (1) (medical) scanning(1) medical treatment (1) animal communication (1) cleaning(1) 	Accept foetal/tumours shattering kidney stones /destroying cancer cells dog whistles	(1)

Question Number	Answer	Acceptable answers	Mark
1(c)	An explanation linking the following points <ul style="list-style-type: none"> a reference to frequency/pitch/hearing range (1) (frequency/pitch) is high(er) for cats RA (1) <p>[The points must be linked for the second mark]</p>	Accept Hz Cat detects high(er) frequency/pitch for 2 mark ignore incorrect value of frequency for ultrasound if a comparison made (tested in 1a) cat can hear >20000 Hz (2) humans cannot hear > 20000 Hz / ORA (2) amplitude too low / too quiet is 1 mark only if no other marks awarded	(2)

Question Number	Answer	Acceptable answers	Mark
1(d)(i)	substitution (1) 340×0.047 evaluation (1) 16 (m)	15.9(8) (m) give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark
1(d)(ii)	Any two from the following points <ul style="list-style-type: none"> Idea of speed (1) correct difference identified e.g. sound slower RA (1) 	It/ infrared/light/em waves travel(s) faster/quicker scores 2 marks Ignore references to time	(2)

Question Number	Answer	Acceptable answers	Mark
2(a)	A all the time		(1)

Question Number	Answer	Mark												
2(b)	<table border="1"> <thead> <tr> <th>radiation</th><th>type</th><th>transfer</th></tr> </thead> <tbody> <tr> <td>alpha</td><td>particle</td><td>energy</td></tr> <tr> <td>beta</td><td>particle (1)</td><td>energy</td></tr> <tr> <td>gamma</td><td>wave (1)</td><td>energy (1)</td></tr> </tbody> </table> <p>2 words in 1 box scores 0 for that box</p>	radiation	type	transfer	alpha	particle	energy	beta	particle (1)	energy	gamma	wave (1)	energy (1)	(3)
radiation	type	transfer												
alpha	particle	energy												
beta	particle (1)	energy												
gamma	wave (1)	energy (1)												

Question Number	Answer	Acceptable answers	Mark
2(c)	<p>Any two from the following points</p> <ul style="list-style-type: none"> sterilising food (1) sterilising medical equipment(1) detection of cancer(1) treatment of cancer(1) 	<p>cleaning water</p> <p>PET scan gamma camera</p> <p>Radiotherapy</p> <p>Industrial uses eg Measuring thickness Tracers (Gamma) telescopes</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(d)	<p>A description including the following points</p> <ul style="list-style-type: none"> travel at the same speed (1) in a vacuum/space (1) 		(2)

Question Number	Answer	Acceptable answers	Mark
3 (a)	B		(1)

Question Number	Answer	Acceptable answers	Mark
3b(i)	<p>A description including three of the following points</p> <ul style="list-style-type: none"> • reflection (of light) at (either) mirror (1) • (the curved mirror) focuses the light (1) • (mirror) inverts (1) • (lens / eyepiece) magnifies image (1) • image is formed where the light rays cross (1) 	<p>Bounces for reflects</p> <p>flips it over/turns over</p> <p>lens/eyepiece refracts light</p> <p>Image is real(1)</p> <p>Accept for 1 mark if no other mark awarded: (Telescope) reflects <u>and</u> refracts light (1)</p>	(3)

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	<p>An explanation including two from</p> <ul style="list-style-type: none"> • collects more light (1) • produces a magnified/bigger image (1) • shows more detail (1) • shows stars the naked eye is unable to see (1) • can observe stars day and night (1) 	<p>brighter</p> <p>looks closer/zooms in</p> <p>makes it clearer/better</p> <p>see further/more (stars)</p>	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	transverse (wave)	mechanical	(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	C move up and down a bigger distance		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(iii)	substitution (1) 4 x 0.5 evaluation (1) 2 (m/s)	give full marks for correct answer, no working Accept power of ten error for 1 mark eg. 0.2, 20, 200, 2000	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)	C energy transferred per second		(1)

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	substitution (1) 0.25 x 230 evaluation (1) 58 (W)	accept 57 to 58, and 60 (W) give full marks for correct answer, no working	(2)

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	A description including the following points <ul style="list-style-type: none"> • (rate) of flow (1) • (of) charge (1) 	per second/flows/flowing electrons/ions/coulombs/C IGNORE electricity/amps/A	(2)

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	(current) it is reduced	gets smaller/ decreases/ slows down/ drops/ lower	(1)

Question Number	Answer	Acceptable answers	Mark
4(c)(ii)	<p>conversion of watts to kilowatts (1)</p> <p>substitution (1) $0.0005 \times 48 \times 26$</p> <p>evaluation (1) $0.62(4)(p)$</p> <p>Note: $0.0005 \times 48 \times 26$ scores 2 (conversion and substitution marks)</p>	<p>This is a 'show that' so marks are only awarded if working is shown.</p> <p>For no conversion of power but otherwise correct, $0.5 \times 48 \times 26$ (1)</p> <p>624 (p) (1)</p> <p>Any other power of ten error in power or cost seen in substitution 1 mark maximum</p> <p>Answers with no working get zero marks.</p>	(3)

Question Number	Answer	Acceptable answers	Mark
4(c)(iii)	<p>Any one of the following points</p> <ul style="list-style-type: none"> ideas of energy conservation (1) ideas of atmospheric polluting effects (1) ideas of possible dangers (1) reduces life of parts (TV) (1) 	<p>wastes energy (if left on) RA (NOT wastes electricity)</p> <p>CO₂/ SO₂ production/global warming/acid rain/greenhouse gases</p> <p>fire hazards/overheating /safer(when off)</p> <p>Ignore ozone layer references</p>	(1)

Question Number	Answer	Acceptable answers	Mark
5(a)	B elastic potential energy		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	0.3(J) (1)	0.5-0.2 (J)	(1)

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	substitution (1) $0.2 \div 0.5$ evaluation (1) 0.4 / $40(\%)$ / $\frac{2}{5}$	Give full marks for correct answer with no working	(2)

Question Number	Answer	Acceptable answers	Mark
5(b)(iii)	Any two of the following <ul style="list-style-type: none"> • thermal/heat (1) • (idea that energy is) dissipated/spreads out (1) • to the surroundings (1) 	Ignore transferred to Atmosphere/air Accept makes surroundings warmer (2) Ignore lost	(2)

Question Number		Mark
QWC	<p>*5(c) A description including some of the following points</p> <p>Forms of energy</p> <ul style="list-style-type: none"> • gravitational potential energy • kinetic energy • elastic potential energy • heat(thermal) and sound <p>Location of energy</p> <ul style="list-style-type: none"> • gravitational potential energy of mass as it rises • kinetic energy of mass as it moves • Elastic potential energy stored in spring • Heat/sound dissipated to surroundings <p>Linked ideas</p> <ul style="list-style-type: none"> • As the pendulum falls, gravitational potential energy changes to kinetic energy. • the kinetic energy from the pendulum ends up as heat, warming the surroundings. • the elastic potential energy in the clockspring becomes kinetic energy of the pendulum to keep the pendulum swinging. 	(6)
Level	0 no rewardable material	
1	<p>1-2</p> <ul style="list-style-type: none"> • a limited description including the name of one form of energy that is involved in the pendulum swing eg. the pendulum has kinetic energy. • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	<p>3-4</p> <ul style="list-style-type: none"> • a simple description of the pendulum swing indicating where the energy can be found OR a simple transfer eg. When the pendulum is moving it has kinetic energy / the pendulum is high at the side of the swing so it has gravitational potential energy / As the pendulum swings it loses heat to the air / kinetic energy changes to potential energy / KE to PE. • 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	<p>5 - 6</p> <ul style="list-style-type: none"> • a detailed description of an energy transfer indicating where the energy can be found and where the transfer takes place eg. as the pendulum swings to and fro, gravitational potential energy changes to kinetic energy / kinetic energy is dissipated as heat and sound to the surroundings • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors 	

Question Number	Answer	Acceptable answers	Mark
6(a)(i)	D Universe		(1)

Question Number	Answer	Acceptable answers	Mark
6(a)(ii)	Milky Way		(1)

Question Number	Answer	Acceptable answers	Mark
6(b)(i)	A description including: <ul style="list-style-type: none"> • change in wavelength / frequency (1) • Correct change(s) (1) 	wavelength increases (2) frequency decreases (2)	(2)

Question Number	Answer	Acceptable answers	Mark
6(b)(ii)	An explanation linking two of the following points <ul style="list-style-type: none"> • red shift (1) • universe expanding (1) • (cosmic) microwave (background)(radiation) (1) 	Accept initials (eg CMB)	(2)

Question Number		Mark
QWC	<p>*6(c) A description including some of the following points</p> <p>Life cycle of a star similar of mass similar to that of our sun</p> <p>a. nebula / stellar nursery</p> <ul style="list-style-type: none"> clouds of dust and gas pulled together or collapsed by gravitational forces <p>b. Our sun / main sequence</p> <ul style="list-style-type: none"> stable state hydrogen being converted to helium, nuclear fusion huge amounts of heat and light produced continues for many millions of years <p>c. red giant</p> <ul style="list-style-type: none"> hydrogen runs out star expands star gets colder uses up all its helium outward forces decrease <p>d. white dwarf</p> <ul style="list-style-type: none"> eventually collapses due to own gravity becomes much smaller and very dense <p>e. Sequence:</p> <ul style="list-style-type: none"> Nebula / stellar nursery (Protostar) Star (main sequence) Red Giant White Dwarf (Black Dwarf) <p>ignore references to planetary nebula)</p> <p>Credit is given for correctly labelled diagrams.</p>	(6)
Level	0 no rewardable material	
1	1-2	<ul style="list-style-type: none"> a limited description including naming one of the stages (star alone is insufficient) e.g. A star can be a red giant the answer communicates ideas using simple language and uses limited scientific terminology spelling, punctuation and grammar are used with limited accuracy
2	3-4	<ul style="list-style-type: none"> a simple description including two consecutive stages in the correct sequence OR a description of one of the stages e.g. a nebula forms a (main sequence) star / Nebulae are clouds of dust and gas 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	<ul style="list-style-type: none"> a detailed description including naming three consecutive stages in the correct order AND a description of one stage e.g. A nebula is a cloud of gas and dust that forms a star which then becomes a red giant. 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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