Mark Scheme (Results)

Pearson Edexcel

Additional Sample Assessment Materials GCSE 9-1 Combined Science
Paper 6: Physics 1SC0/2PH

First examination 2018

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Summer 2018

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.

Pearson Edexcel Leve1 / Level 2 GCSE (9-1) in Physics

1SC_1PH Mark Scheme

Question number	Answer	Additional guidance	Mark
1 (a)	An answer that combines the following points of understanding to provide a logical description: named force (acting at a distance) (1) situation (1)	 e.g. magnetic force between two (magnetic) poles	**(2)**

Question number	Answer	Additional guidance	Mark
1 (b)(i)	rearrangement of work = force × distance to give distance = work ÷ force (1) substitution and evaluation (1) 18 (m)	 seeing 2700 ÷ 150 Award full marks for correct answer without working	**(2)**

Question number	Answer	Mark
1 (b)(ii)	2700 (J)	**(1)**

Question number	Answer	Additional guidance	Mark
1 (b)(iii)	rearrangement of $KE = ½ mv^2$ $v = \sqrt{(2 \times KE \div m)}$ (1) substitution and evaluation (1) 19 (m/s)	 $v = \sqrt{(2 \times 2700 \div 15)}$ $v^2 = (2 \times 2700 \div 15)$ allow answers that round to 19 award full marks for correct answer without working allow alternative route using $v^2 - u^2 = 2ax$ for full marks	**(2)**

Question number	Answer	Additional guidance	Mark
1 (c)	An answer that combines points of interpretation/evaluation to provide a logical description: efficiency increases (at first) (1) to maximum efficiency (for mass of about 25 kg) (1)	 e.g. decreases for larger masses	**(2)**

(Total for Question 1 = 9 marks)

Question number	Answer	Additional guidance	Mark
2 (a)	substitution into P = V × I (1) 2600 = 230 × I rearrangement (1) I = P ÷ V evaluation (1) 11 (A)	Substitution and re-arrangement in either order I = 2600 ÷ 230 for 2 marks allow answers that round to 11 award full marks for correct answer without working allow I = 2.6 ÷ 230 for 1 mark allow 0.011 (A) for 2 marks max if no other marks scored, award 1 mark for 2.6 kW = 2600 W	**(3)**

Question number	Answer	Mark
2 (b)(i)	either power = (current)^2 × resistance OR $P = I^2 \times R$	**(1)**

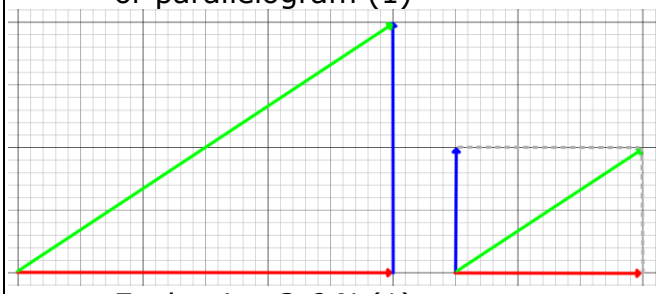
Question number	Answer	Additional guidance	Mark
2 (b)(ii)	substitution into $P = I^2 \times R$ (1) $55 = 4.4^2 \times R$ rearrangement (1) $R = P \div I^2$ evaluation (1) 2.8 (Ω)	Substitution and re-arrangement in either order $R = 55 \div 4.4^2$ for 2 marks allow answers that round to 2.8 award full marks for correct answer without working allow alternative route $V = P \div I = 55 \div 4.4$ then $R = V \div I = 12.5 \div 4.4$	**(3)**

(Total for Question 2 = 7 marks)

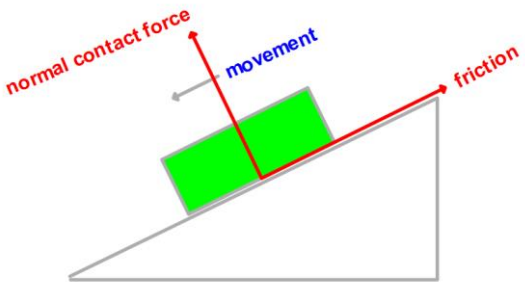
Question number	Answer	Mark
3(a)	An answer that combines points of interpretation/evaluation to provide a logical description: Use of lubrication / oil (1) To reduce friction (between parts) (1)	**(2)**

Question number	Answer	Mark
3(b)	C a javelin moves through the air after leaving an athlete's hand	**(1)**

Question number	Answer	Mark
3(c)	An explanation identifying the fact that the forces shown are acting on two different bodies / they are not acting on the same body (1)	**(1)**

Question number	Answer	Additional guidance	Mark
3(d)(ii)	• drawing shows a completed triangle or parallelogram (1)  • Evaluation 3.6 N (1)	±0.2 N may be calculated using Pythagoras theorem	(2)

Question number	Answer	Mark
3(d)(i)	• two vector arrows at rights angles representing the forces (1) • two vector arrows in proportion (1) examples: 	(2)

Question number	Answer	Additional guidance	Mark
3(e)	• An arrow showing the 'normal contact force' - from between the two surfaces, acting upwards (1) • An arrow showing the 'friction' force – from between the two surfaces (1) • Both forces in the correct directions, as shown (1) 	generally upwards / away from the surface can be to the left or to the right they do not need to start from the same point	**(3)**

(Total for Question 3 = 11 marks)

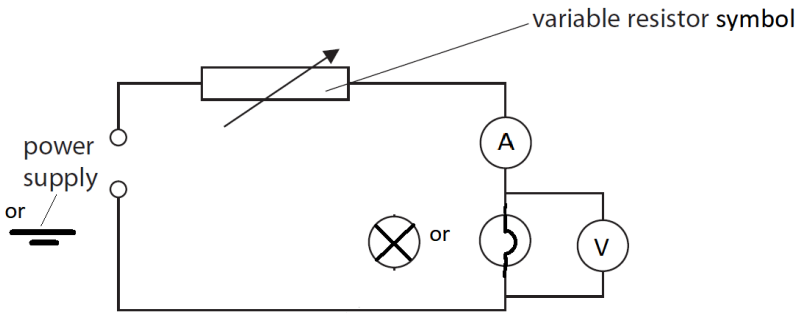
Question number	Answer	Additional guidance	Mark
4(a)(i)	Substitution: Density = mass/ volume (1) = 28 x10^{-3}/ 3.6 x 10^{-6} (1) Evaluation = 7777 kg / m^3 (1)	 (recalled / used) ignore any power of ten (pot) error here do not penalise any sf errors (7.77 etc. would get 2 marks: losing the pot mark in the evaluation)	**(3)**

Question number	Answer	Additional guidance	Mark
4(a) (ii)	(Use $\Delta Q = m \times c \times \Delta \theta$) substitution thermal energy gained = 0.028 x 510 x 80 (1) evaluation = 1100 (J) (1)	 ignore any pot error here 1142 (J)	**(2)**

Question number	Answer	Mark
4a(iii)	An explanation that combines identification – knowledge (2 marks) and reasoning / justification (1 mark) Solid state → particles vibrate (1) → about fixed positions (1) Liquid state → particles move randomly / freely (1)	**(3)**

Question number	Answer	Additional guidance	Mark
4b	An answer that combines **any four** of the following points of understanding to provide a logical description: • chooses either thermocouple or infra-red thermometer (1) • molten steel is poured into a crucible (1) • a stopwatch is started (1) • the crucible + contents are allowed to cool down (in the room) (1) • temperatures are taken at regular intervals (e.g. every minute) (1)	 any interval with steel – every 10 minutes etc.	**(4)**

(Total for Question 4 = 12 marks)

Question number	Answer	Mark
5(a)	 ammeter with correct symbol, in series with the lamp (1) voltmeter with correct symbol, in parallel with the lamp (1) valid method of changing the potential difference (1)	(3)

Question number	Answer	Mark
5(b)	P (ohmic) resistor/wire (1) Q (filament) lamp (1) R (semiconducting) diode (1)	(3)

Question number	Answer	Mark
5(c)	An answer that makes reference to: Identification – knowledge (1 mark) and reasoning / justification – knowledge (2 marks) • to begin with (there is) no current as V increases, then, after a certain voltage, the current rises • sharply / with an increasing gradient • associated with a decreasing resistance	(3)

(Total for Question 5 = 9 marks)

Question number	Answer	Additional guidance	Mark
6(a)(i)	Recall GPE = m x g x Δh (1) Substitution = 400 x 9.8 x 1.5 (1) Evaluation = 5900 (J) (1) (which is nearly 6000 J)	 accept 5880 (J)	**(3)**

Question number	Answer	Additional guidance	Mark
6(a)(ii)	An explanation that combines identification – knowledge (1 mark) and reasoning (1 mark) • energy is dissipated/scattered (1) • into the surroundings (1)	 energy from a loss of ball's PE / its gain in KE ends up as (kinetic) energy of molecules (of ball / wall / air)	**(2)**

Question number	Answer	Mark
6(a)(iii)	B velocity	**(1)**

Question number	Indicative content	Mark
6(b)	Answers will be credited according to the 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 of the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. **A03 (6 marks)** · the varying height shows a varying gravitational potential energy(gpe) during the swings · when the height is a maximum the gpe is a maximum-at top of swing · when the height is a minimum the gpe is a minimum-at bottom of swing · kinetic energy varies during swing · kinetic energy maximum at bottom of swing · kinetic energy minimum at top of swing · (continuous) interchange of KE and gpe · total amount of energy is constant during one swing · over a number of swings max KE and max PE decreases · energy is dissipated/'lost' to surroundings · because of air resistance / friction · amplitude/size of swings decrease (as energy 'lost' to surroundings) ignore references to momentum	**(6)**

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Deconstructs scientific information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. • Judgements are supported by limited evidence. (AO3)
Level 2	3-4	• Deconstructs scientific information and provides some logical connections between scientific concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently. • Judgements are supported by evidence occasionally. (AO3)
Level 3	5-6	• Deconstructs scientific information and provide logical connections between scientific concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently. • Judgements are supported by evidence throughout. (AO3)

(Total for Question 6 = 12 marks)