Mark Scheme (Results)

Summer 2023

Pearson Edexcel International GCSE
In Single Science Award (4SS0)
Paper 1P

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	Notes	Marks
1	(a)		D (stopwatch and ruler); A is incorrect because an ammeter measures current, which is not required to measure velocity B is incorrect because a balance measures mass, which is not required to measure velocity C is incorrect because an ammeter measures current, which is not required to measure velocity		1
	(b)	(i)	D (acceleration = change in velocity ÷ time taken); A is incorrect because this is an incorrect rearrangement of the formula B is incorrect because this is an incorrect rearrangement of the formula C is incorrect because this is an incorrect rearrangement of the formula		1
		(ii)	0 / zero;		1
		(iii)	idea or statement that distance = area (under line); area = ½ × 2.0 × 8.0; evaluation; e.g. distance = area under line area = 0.5 × 2.0 × 8.0 (distance =) 8.0 (m)	e.g. ½ × b × h seen in working 8(.0) × 2(.0) = 16 scores 0 allow 8 (m)	3

Total for Question 1 = 6 marks

Question number			Answer	Notes	Marks
2	(a)	(i)	substitution into speed = distance ÷ time; rearrangement; evaluation; e.g. 21 = distance ÷ 0.34 distance = 21 × 0.34 distance = 7.1 (m)	 allow 7.14 (m)	3
		(ii)	use of stopping distance = thinking distance + braking distance; evaluation; e.g. stopping distance = thinking distance + braking distance (stopping distance = 7.1 + 8.2 =) 15 (m)	allow ecf from (i) allow 15.3, 15.34 (m)	2
	(b)	(i)	force = mass × acceleration;	allow standard symbols and rearrangements e.g. a = F ÷ m	1
		(ii)	substitution; rearrangement; evaluation; e.g. 21 000 = 780 × acceleration acceleration = 21 000 ÷ 780 (acceleration =) (−)27 (m/s²)	 -1 for POT error answer of 26 (m/s²) scores 2 marks only allow 26.9... (m/s²)	3

Total for Question 2 = 9 marks

Question number			Answer	Notes	Marks
3	(a)		ammeter and voltmeter symbols correct; ammeter in series with resistor; voltmeter in parallel with resistor;		3
	(b)	(i)	voltage = current × resistance;	allow standard symbols and rearrangements e.g. R = V ÷ I ignore c, C for current	1
		(ii)	substitution; rearrangement; evaluation; correct answer = 130 (Ω) e.g. 0.92 = 7.3 (× 10^{-3}) × resistance resistance = 0.92 ÷ 7.3 (× 10^{-3}) (resistance =) 130 (Ω)	ignore units until evaluation −1 POT error allow 126, 126.0… (Ω)	3

Total for Question 3 = 7 marks

Question number	Answer	Notes	Marks
4 (a)	smoke detectors / radiotherapy / powering spacecraft / static eliminator;	allow fire alarms allow cancer treatment ignore "medical"	1
(b)	any two from: MP1. radiation sickness; MP2. (skin) burns; MP3. damaging/mutating/killing cells; MP4. cancer;	allow radiation poisoning allow DNA for cells	2
(c)	any five from: MP1. use of GM tube (and counter); MP2. idea of measuring count with at least one of the sources; MP3. consideration of background radiation; MP4. idea that count from alpha (source) is decreased by paper (and aluminium and lead); MP5. idea that count from beta (source) is decreased by (mm) of aluminium (and lead); MP6. idea that count from gamma (source) is (only) decreased by lead;	all marking points can be awarded from a clearly labelled diagram allow Geiger counter e.g. measure background count, subtract background radiation etc. allow alpha is stopped by paper allow beta is stopped by aluminium allow gamma is stopped by lead	5

Total for Question 4 = 8 marks

Question number			Answer	Notes	Marks
5	(a)		collision(s) between balloon/walls/container and particles;	ignore idea of collisions between particles allow alternative words for collisions e.g. bounce, hit etc.	3
			(each collision) exerts a force (on the walls); pressure is force on an area;	allow p = F/A	
	(b)	(i)	gas molecules slow down or reduce in KE; idea of **rate of** collisions with walls decreasing;	allow less frequent/often collisions, less collisions per second etc. allow collisions with walls are less hard	3
			idea of lower force (per collision);		
		(ii)	pressure = force ÷ area;	allow standard symbols and rearrangements e.g. F = p × A	1
		(iii)	substitution OR rearrangement; evaluation;		2
			correct answer = 13 000 N e.g. 1200 = force ÷ 11 OR F = p × A (force = 1200 × 11 =) 13 000 (N)	allow 13 200 (N)	
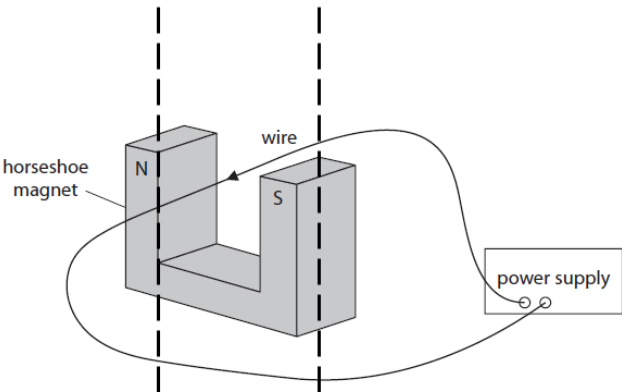
Total for Question 5 = 9 marks

Question number	Answer	Notes	Marks
6 (a)	(nuclear) <u>fusion</u>;	reject fission	1

(b)	(starts as) nebula/cloud (of dust/gas);
	reference to main sequence;
	(finishes as) white dwarf;
	
	PLUS one from the following **in the correct order;**
	  • protostar
	  • red giant
	  • planetary nebula
	
	e.g.
	nebula → protostar → main sequence → red giant → white dwarf and planetary nebula
		ignore red supergiant
		
		3 marks max. if incorrect stages (e.g. supernova, black hole etc.) included
			4

(c)	multiply peak wavelength by surface temperature for more than one star; idea of compare values of the constant;	allow idea of using formula for more than one star	2

Total for Question 6 = 7 marks

Question number			Answer	Notes	Marks
7	(a)	(i)	substitution; evaluation; e.g. GPE = 19 × 10 × 6.3 GPE = 1200 (J)	allow use of g = 9.8, 9.81 -1 for POT error but only from incorrectly converting kg to g 119.7 scores 0 allow 1197, 1170, 1173, 1173.1, 1173.06, 1174, 1174.3, 1174.26, 1174.257 (J)	2
		(ii)	same value as answer to (i);	allow ecf from (i)	1
	(b)		use of weight = mass × g; evaluation; e.g. weight = mass × g (air resistance = 19 × 10 =) 190 (N)	allow use of g = 9.8, 9.81 allow 186, 186.2, 186.4, 186.39 (N)	2
	(c)		A kinetic; B thermal; D by radiation;		3

Total for Question 7 = 8 marks

Question number	Answer	Notes	Marks
8 (a)	reference to opposite poles (of two magnets) facing; idea that poles of two magnets are close together;	can be seen in diagram allow magnets are placed near each other can be awarded from diagram if space between poles is less than width of poles	2
(b) (i)	arrow drawn vertically on the section of wire between the poles; arrow drawn upwards;	by eye acceptable region as defined by the area between the dashed lines by eye arrow can be drawn anywhere on the diagram	2
	wire horseshoe magnet N S power supply		
(ii)	the wire has a magnetic field; the magnetic fields interact;	allow wire is an (electro)magnet allow magnetic fields overlap/interfere ignore cutting/intersecting of fields	2

Total for Question 8 = 6 marks