



2012 Physics

Intermediate 1

Finalised Marking Instructions

© Scottish Qualifications Authority 2012

The information in this publication may be reproduced to support SQA qualifications only on a non-commercial basis. If it is to be used for any other purposes written permission must be obtained from the External Print Team, Centre Services, Dalkeith.

Where the publication includes materials from sources other than SQA (secondary copyright), this material should only be reproduced for the purposes of examination or assessment. If it needs to be reproduced for any other purpose it is the centre's responsibility to obtain the necessary copyright clearance. SQA's External Print Team, Centre Services, at Dalkeith may be able to direct you to the secondary sources.

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments. This publication must not be reproduced for commercial or trade purposes.

Physics – Marking Issues

The current in a resistor is 1.5 amperes when the potential difference across it is 7.5 volts. Calculate the resistance of the resistor.

	Answers	Mark + Comment	Issue
1.	$V=IR$ $7.5=1.5R$ $R=5.0 \Omega$	(½) (½) (1)	Ideal answer
2.	5.0 Ω	(2) Correct answer	GMI 1
3.	5.0	(1½) Unit missing	GMI 2 (a)
4.	4.0 Ω	(0) No evidence/wrong answer	GMI 1
5.	_____ Ω	(0) No final answer	GMI 1
6.	$R = \frac{V}{I} = \frac{7.5}{1.5} = 4.0 \Omega$	(1½) Arithmetic error	GMI 7
7.	$R = \frac{V}{I} = 4.0 \Omega$	(½) Formula only	GMI 4 and 1
8.	$R = \frac{V}{I} = \text{_____} \Omega$	(½) Formula only	GMI 4 and 1
9.	$R = \frac{V}{I} = \frac{7.5}{1.5} = \text{_____} \Omega$	(1) Formula + subs/No final answer	GMI 4 and 1
10.	$R = \frac{V}{I} = \frac{7.5}{1.5} = 4.0$	(1) Formula + substitution	GMI 2 (a) an
11.	$R = \frac{V}{I} = \frac{1.5}{7.5} = 5.0 \Omega$	(½) Formula but wrong substitution	GMI 5
12.	$R = \frac{V}{I} = \frac{7.5}{1.5} = 5.0 \Omega$	(½) Formula but wrong substitution	GMI 5
13.	$R = \frac{I}{V} = \frac{7.5}{1.5} = 5.0 \Omega$	(0) Wrong formula	GMI 5
14.	$V = IR \quad 7.5 = 1.5 \times R \quad R = 0.2 \Omega$	(1½) Arithmetic error	GMI 7
15.	$V = IR$ $R = \frac{I}{V} = \frac{1.5}{7.5} = 0.2 \Omega$	(½) Formula only	GMI 20

Int 1 Marking Scheme 2012

1	B
2	C
3	D
4	D
5	C
6	E
7	E
8	C
9	B
10	B
11	D
12	B
13	E
14	C
15	E
16	E
17	B
18	E
19	D
20	C

Sample Answer and Mark Allocation			Notes	Inner Margin	Outer Margin
21.	(a)	Radio 1 Higher 1		2	6
	(b)	(i) At least two rays reflected to meet at the aerial	1 or 0 Waves do not need to continue to the reflector Any rays passing through/going outwards is WP – 0 marks	1	
		(ii) More energy/waves/signal is received by the aerial/receiver Reflects/focus signal back to one point	Not bounces Not concentrates waves to the middle.	1	
	(c)	(i) X – aerial Y – (loud)speaker	1 1	2	

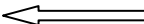
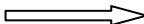
Sample Answer and Mark Allocation		Notes	Inner Margin	Outer Margin
22.	(a) Any suitable eg wireless can move around when using portable can be used outside (or a specific location)	Not because it is mobile Not can be used wherever you are	1	6
	(b) (i) diagram completed to show total internal reflection – no more than 4 reflections i must approximately = r	Ray cannot leave fibre at the edge. Ray does not need to emerge but should go to the end of the fibre at least.	1	
	(ii) Slower signal speed OR cables harder to join together takes signal longer more difficult to repair		1	
	(c) Optical fibre	Answer circled/underlined is OK	1	
	(d) Speed = distance / time = 9 / 0.025 = 360 metres per second	standard 2 marks not mps no secs in physics	2	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
23. (a) parallel		1	7
(b) Ignition switch AND S1	1 or 0	1	
(c) (i) Current = power / voltage = 21/12 = 1.75 amperes	standard 2 marks accept amps accept 1.8 amperes but not 1.7	2	
(ii) (Total sidelight) = 1.6 (amperes) ½ (Total headlight) = 3.5 (amperes) ½ (Total current) = 5.1 amperes 1 1 st two lines are independent of each other. However the 2 nd line must agree with c (i).	OR 1 side + 1 head = 2.55 (1) 2 × 2.55 = 5.1 amperes (1)	2	
(iii) 10 amperes must be consistent with c (ii)		1	

Sample Answer and Mark Allocation			Notes	Inner Margin	Outer Margin
24.	(a)	Diagram completed to show the rays diverging	Ignore anything inside lens	1	3
	(b)	(i) Long sight Far sight Hyperopia	Sighted is OK Do not accept 'long' on its own	1	
		(ii) Convex OR converging	There is no carry forward from part (i)	1	

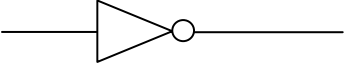
Sample Answer and Mark Allocation				Notes	Inner Margin	Outer Margin
25.	(a)	(i)	Infra red/IR/thermal	Not microwave	1	8
		(ii)	Thermistor	Answer circled/underlined is OK	1	
	(b)	(i)	Photographic film/plate Geiger counter/tube/scintillation counter	Not photographic paper Not 'film' on its own Not 'x ray machine' Not aerial	1	
		(ii)	X-rays can damage living tissue Cause (skin) cancer Can burn the skin Kill/damage cells	Not damage the body Not damage bones	1	
	(c)	(i)	It can pass/ be detected out of the body		1	
		(ii)	(A) Technetium (99)	Not 6 hours	1	
			(B) long enough to make measurements but does not remain active for a long time	Justification of why each of the others cannot be used is OK	1	
	(d)		200 000 (hertz)	Answer circled/underlined is OK	1	

Sample Answer and Mark Allocation				Notes	Inner Margin	Outer Margin
26.	(a)	(i)	light travels faster than sound	1 or 0	1	8
		(ii)	measure the distance with the trundle wheel 1 Measure the time <u>between</u> seeing the balloon burst and hearing the bang with the timer 1 Speed = distance / time 1 $v = d/t$ OR $s = D/t$ are OK	Independent marks	3	
		(iii)	Reaction time It takes time to press the timer	Watch for two reasons given – one right, one wrong – cancel each other out – 0 marks	1	
	(b)	(i)	It must vibrate It must be hit		1	
		(ii)	(A) It is quieter Sound level decreases Lower volume Lower amplitude/ energy Vibrations are weaker	Not lower height	1	
			(B) The amplitude is less	If part A is lower amplitude cannot accept again for B – look for explanations to do with the height of the trace	1	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
27. (a) Weight = mass \times 10 = 10 500 \times 10 = 105 000 newtons	Standard 2 marks	2	8
(b) Friction Engine force (air/wind) resistance Drag Thrust <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	Push/pull is wrong Numbers are wrong Marks are independent	2	
(c) (i) It slows it down Stops it Decelerate Accelerate	Slows it down at a steady speed – wrong Not brakes	1	
(ii) It increases the friction/air resistance/drag on the car Makes it less aerodynamic Produces an unbalanced force		1	
(d) Average speed = distance / time = 1710 / 5 = 342 metres per second	Standard 2 marks Not mps 340 m/s is correct	2	

Sample Answer and Mark Allocation			Notes	Inner Margin	Outer Margin
28.	(a)	20 (metres per second) The higher/bigger speed The second one	Ignore mps since units not required	1	6
	(b)	(i) Unbalanced		1	
		(ii) The speed changes If the forces were balanced the speed would not change The shape of the car has changed	Not the car stops	1	
	(c)	(i) Old		1	
		(ii) Old		1	
		(iii) Streamlining Decrease the mass More aerodynamic/lower to ground Use a lighter material/make the car lighter	Not 'smaller' Not a spoiler Not tyres	1	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
29. (a) Loudspeaker	Writing the answer in the box is OK	1	4
(b) Gain = output voltage / input voltage = $4/0.01$ = 400	Standard 2 marks Deduct ½ for unit if given	2	
(c) It increases/gets bigger/higher pitch/higher More waves per second	Watch for 'louder' – this is a wrong answer Not 'more waves' on its own	1	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin																				
30. (a) 	Must have the circle/connecting wires Symbol drawn is the only acceptable answer	1	4																				
(b) AND	Correct symbol for AND gate is correct answer	1																					
(c) <table border="1" data-bbox="357 763 868 1003" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	A	B	C	D	0	0	1	0	0	1	1	1	1	0	0	0	1	1	0	0	1 for each column Vertical 'dotted line' between columns C and D. If (b) is 'OR' then allow a carry forward for column D only (1,1,0,1) OR allow the correct answer (can be obtained from the stem).	2	
A	B	C	D																				
0	0	1	0																				
0	1	1	1																				
1	0	0	0																				
1	1	0	0																				

[END OF MARKING INSTRUCTIONS]