



**2014 Physics**

**Intermediate 1**

**Finalised Marking Instructions**

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## **Part One: General Marking Principles for Physics Intermediate 1**

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

- (a) Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.
- (b) Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

### **GENERAL MARKING ADVICE: Physics Intermediate 1**

The marking schemes are written to assist in determining the “minimal acceptable answer” rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates’ evidence, and apply to marking both end of unit assessments and course assessments.

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.

	<b>Answers</b>	<b>Mark + Comment</b>	<b>Issue</b>
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) and 7
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.	$V = IR$ $7.5 = 1.5 \times R$ $R = 0.2 \Omega$	(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

**Part Two: Marking Instructions for each Question**

**Section A**

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

**Section B**

<b>Sample Answer and Mark Allocation</b>	<b>Notes</b>	<b>Inner Margin</b>	<b>Outer Margin</b>
<b>21. (a)</b> Aerial /antenna		<b>1</b>	<b>7</b>
<b>(b) (i)</b> more waves  lower amplitude	Zig zags ok 'Back in time' trace max 1 mark  All lower but not consistent is OK	<b>2•</b>	
<b>(b) (ii)</b> tuner  amplifier  hertz  300 000 000	½ each	<b>2</b>	
<b>(c)</b> V gain = output / input  = 3/0.01  = 300 (times)	standard 2 marks	<b>2</b>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<p>22. (a) period of 24 hours</p> <p><b>OR</b></p> <p>always appears above the same point on the earth</p>	<p>36 000 km above the surface of the earth (1)</p> <p>Same speed as Earth (0)</p> <p>Stationary above same point on Earth (1)</p>	<p>1</p>	<p>4</p>
<p>(b) (i) signals focus at the aerial</p>	<p>Lines are passably straight.</p> <p>If they use arrows must be in correct direction.</p> <p>Need at least two of the lines reflected.</p> <p>Must reflect from the dish.</p> <p>1 or 0</p>	<p>1•</p>	
<p>(b) (ii) (A) weaker</p> <p>(B) some of the signal is not reflected back to the aerial/ misses the aerial</p>	<p>Not as strong (1) Not as much (0) Signal will be less (0)</p> <p>bouncing is incorrect receiving surface area is less (1) more signal misses reflector (1) Answer must be about the reflector.</p>	<p>1•</p> <p>1+</p>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
23. (a) double insulated	Does not have an earth wire (1)	1	5
(b) (i) $I = P/V$ $I = 1380 / 230$ $I = 6 \text{ A}$	Standard 2 marks Amps is OK	2•	
(b) (ii) 10 A	Or consistent with (i)	1•	
(c) water reduces resistance	Water conducts (0) Greater <b>risk</b> of electric shock or electrocution (1) Higher conductivity (1)	1+	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<b>24. (a) (i)</b> correct symbol ( $\frac{1}{2}$ ) correct position ( $\frac{1}{2}$ )		<b>1</b>	<b>6</b>
<b>(a) (ii)</b> 12 V	– $\frac{1}{2}$ missing unit	<b>1</b>	
<b>(a) (iii)</b> 3A	– $\frac{1}{2}$ missing unit	<b>1•</b>	
<b>(b)</b> stays on as no break in circuit	Connected in parallel ( <b>1</b> ) There is a complete circuit ( <b>1</b> ) Different branch ( <b>1</b> )	<b>1+</b>	
<b>(c) (i)</b> connect a conductor across the probes  <b>OR</b>  short the probes	Connect the probes <b>together (1)</b>	<b>1</b>	
<b>(c) (ii)</b> lamp is broken  <b>OR</b>  battery is flat  <b>OR</b>  broken wire	Lamp is blown ( <b>1</b> )  Voltage is too low ( <b>1</b> )  Lamp is shorted ( <b>1</b> )  Fault in wire ( <b>1</b> )  Loose wire ( <b>1</b> )	<b>1+</b>	



Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<p><b>25. (a) (i)</b> any suitable description of a tracer eg injected into patient and then <b>detected</b> outside body.</p> <p>½ for adding to system ½ for detecting</p> <p>Industrial or medical use.</p>	<p>Must be a tracer.</p>	<p><b>1</b></p>	<p><b>6</b></p>
<p><b>(a) (ii)</b> 10 minutes = 600 (s) <b>(1)</b></p> <p>No of counts = <math>\frac{6000}{600} = 10</math> <b>(1)</b></p>	<p>1 for converting to seconds 1 for division</p> <p>Independent marks</p>	<p><b>2+</b></p>	
<p><b>(b) (i)</b> to warn of a danger to <b>health</b></p>	<p>X-rays can damage cells <b>(1)</b> Dangerous (on its own) <b>(0)</b></p>	<p><b>1</b></p>	
<p><b>(b) (ii)</b> any suitable eg checking welds, airport scanners, checking baggage</p>	<p>Must be industrial not medical</p>	<p><b>1</b></p>	
<p><b>(c)</b> (TV is higher than radio)</p> <p>(visible must be) higher (than TV) <b>(1)</b></p>		<p><b>1+</b></p>	

<b>Sample Answer and Mark Allocation</b>	<b>Notes</b>	<b>Inner Margin</b>	<b>Outer Margin</b>
<b>26. (a) (i)</b> infra red , IR, heat		<b>1</b>	<b>4</b>
<b>(a) (ii)</b> the temperature of the tissue will decrease	Answer must include a reference to drop in temperature	<b>1•</b>	
<b>(b)</b> any suitable eg treatment of muscle injuries, detect dental infection	<b>or</b> consistent with (a) (ii) Must be medical	<b>1</b>	
<b>(c)</b> ultra violet, UV, UVA		<b>1</b>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<b>27. (a)</b> vibrate (½)  energy (½)		<b>1</b>	<b>4</b>
<b>(b) (i)</b> glass		<b>1•</b>	
<b>(b) (ii)</b> sound level reduced the most  <b>OR</b>  Lowest sound level	Lowest number ( <b>0</b> )  Lowest number of decibels ( <b>1</b> )	<b>1+</b>	
<b>(c)</b> 6		<b>1+</b>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<p><b>28. (a) (i)</b> distance between two pupils (<math>\frac{1}{2}</math>)</p> <p>time taken for sound to travel (between lowering the flag and hearing the horn). (<math>\frac{1}{2}</math>)</p>	<p>Symbols are OK</p>	<p><b>1•</b></p>	<p><b>3</b></p>
<p><b>(a) (ii)</b> (speed =) distance/time (<b>1</b>)</p>	<p>Symbols are OK</p>	<p><b>1•</b></p>	
<p><b>(b)</b> reaction time</p>	<p>Answer should imply reaction time</p> <p>Not precise enough when measuring the time (<b>1</b>)</p>	<p><b>1+</b></p>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<p>29. (a)    <b>increase</b> the angle</p> <p style="text-align: center;"><b>OR</b></p> <p>          higher</p>		<b>1+</b>	<b>6</b>
<p>(b)    average speed = distance /time = <math>7/2</math>           = 3.5 metres per second</p>	Standard 2 marks	<b>2</b>	
<p>(c)    friction</p>		<b>1</b>	
<p>(d) (i) increasing the speed increases the           range</p>		<b>1+</b>	
<p>(d) (ii) 12 metres</p>	<p>Accept any value between 8 and 16 m</p> <p>–½ missing unit</p>	<b>1+</b>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<b>30. (a)</b> forces (½) balanced (½) streamlined (½) direction (½)		<b>2</b>	<b>4</b>
<b>(b) (i)</b> Fair Lady		<b>1•</b>	
<b>(b) (ii)</b> Takes less time (to reach maximum speed)	Quicker ( <b>0</b> ) Quicker time ( <b>1</b> ) Must make a comparison	<b>1+</b>	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
31. (a) sound to electrical	Not electricity	1	6
(b) (i) AND gate 1		1	
(b) (ii) 0 0 0 1	Or consistent with (b) (i)  1 or 0	1•	
(c) resistance = voltage / current = 6/0.05 = 120 ohms	Standard 2 marks	2•	
(d) we hear our own voice (by vibrations) in bones and air (½) we hear a recording (by vibrations) in air only. (½)		1•	

Sample Answer and Mark Allocation	Notes	Inner Margin	Outer Margin
<b>32. (a)</b> input – LDR , microphone output – LED, motor	½ each correct answer	<b>2</b>	<b>5</b>
<b>(b) (i)</b> LDR		<b>1</b>	
<b>(b) (ii)</b> the OR gate has an output of 1 when either input is 1	1 or 0	<b>1+</b>	
<b>(c)</b> $(120 - 20) = 100$ (ohms)		<b>1+</b>	

[END OF MARKING INSTRUCTIONS]