

# **Cambridge International Examinations**

Cambridge International General Certificate of Secondary Education

PHYSICAL SCIENCE 0652/03

Paper 3 Theory (Core)

MARK SCHEME

Maximum Mark: 80

**Specimen** 



For examination from 2019

## **Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

#### **GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

#### **GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always whole marks (not half marks, or other fractions).

#### **GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

#### **GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

#### **GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

## **GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

### mark scheme abbreviations

**UCLES** 

; separates marking points

/ alternative responses for the same marking point

not do not allow

allow accept the response

ignore mark as if this material was not present

error carried forward

avp any valid point

ora or reverse argument

owtte or words to that effect

underline actual word given must be used by candidate (grammatical variants excepted)

() the word/phrase in brackets is not required but sets the context

max indicates the maximum number of marks

any [number] from: accept the [number] of valid responses

note: additional marking guidance

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© UCL	Question	Answer	Marks	Guidance
XES 2016 Page	1(a)	Award 1 mark for each advantage/disadvantage.  Max 3 for three advantages or three disadvantages.  valid advantage/disadvantage; valid advantage/disadvantage; valid advantage/disadvantage; valid advantage/disadvantage; valid advantage/disadvantage;	4	allow e.g.  advantages: low running costs/cheap electricity; low carbon generation; renewable energy; can be used as alternative power source; can sell excess energy back to the grid;  disadvantages: set up cost/time to recoup cost of turbine; whether location/noise will cause; nuisance to neighbours; visual impact; relies on a suitable amount of wind; ora avp
4 of 8	1(b)	solar (photovoltaic) cell ;	1	allow: solar panels/farm ;

Question	Answer	Marks	Guidance
2(a)	Any two from: oxygen used up (by combustion); (oxygen) is 21% of air; forms carbon dioxide which dissolves (in the water); lower pressure;	2	max 2
2(b)	nitrogen;	1	
2(c)	carbon monoxide formed; poisonous/toxic/prevents haemoglobin in blood carrying oxygen;	2	

Question	Answer	Marks	Guidance
3(a)(i)	15 (m/s);	1	
3(a)(ii)	0 (m/s);	1	

© UC	Question	Answer	Marks	Guidance
LES 2	3(b)	constant speed/(it has a speed of) 30 m/s;	1	
2016	3(c)	area of triangle/area under graph/appropriate equation of motion ; $\frac{1}{2}\times30\times5~;$ 75 (m) ;	3	allow: for 1 mark, $30 \times 5/= 150$ seen
	3(d)	speed = distance/time in any form, letters, words, numbers ; $750 \div 30$ ; $25 \text{ (m/s)}$ ;	3	allow: for 2 marks, 750 ÷ 30 allow: for 3 marks, 25 m/s ignore: incorrect working

Question	Answer	Marks	Guidance
4	6, 6, 6 ;	2	
	6, 6, 8 ;		

p.	Question	Answer	Marks	Guidance
age 5	5(a)	wavelength correctly marked;	1	
of 8	5(b)(i)	reflection;	1	
	5(b)(ii)	3 (or more) wavefronts drawn; wavefront direction so angle of incidence = angle of reflection (by eye); wavelength constant and equal to incident wave train;	3	

	Question	Answer	Marks	Guidance
	6(a)	aqueous sodium hydroxide/ammonia; with sodium hydroxide: (light) blue precipitate <b>and</b> insoluble in excess; <b>or</b> with ammonia: (light) blue precipitate <b>and</b> soluble in excess giving a dark blue solution;	2	
Turn over	6(b)(i)	Any three from: boil/evaporate; some of the water evaporates/evaporate to $\frac{1}{4}$ or $\frac{1}{3}$ volume; (crystallise and) filter/pour off liquid/wash; leave to dry/dry with filter paper;	3	max 3

Question	Answer	Marks	Guidance
6(b)(ii)	copper sulfate ;	1	

© Question	Answer	Marks	Guidance
₩ 6(b)(ii)	copper sulfate ;	1	
2016	Anouse	Marka	Cuidanas
Question	Answer	Marks	Guidance
7(a)	gamma (radiation) ; infra-red ;	2	
7(b)	S written at left end of spectrum ;	1	
7(c)	cooking/communication; medical (diagnosis)/(airport) security;	2	allow: other relevant uses

	Question	Answer	Marks	Guidance
Page	8(a)	Any two from: effervescence/fizzes/bubbles; floats; moves on the surface;	2	max 2 ignore: gas/hydrogen formed allow: sodium gets smaller
e 6 of	8(b)	potassium/rubidium/caesium/francium and lithium;	1	not: elements outside Group I
00	8(c)	magnesium/aluminium; silicon/phosphorus/sulfur/chlorine/argon;	2	
	8(d)	(2,)8 for sodium/Na; (2,8,)8 for chlorine/C $l$ ; charges on ions: in words or symbols (Na <sup>+</sup> or Na <sup>1+</sup> and C $l$ <sup>-</sup> or C $l$ <sup>1-</sup> );	3	note: if in words must be chloride NOT chlorine

Question	Answer	Marks	Guidance
9(a)(i)	350 $(\Omega)$ ;	1	
9(a)(ii)	<pre>I = V/R( in any form); 0.034 to at least 2 sig. figs; A or mA as appropriate;</pre>	3	allow: 12/their (a)(i) allow: 12/350 ecf throughout
9(a)(iii)	candidate's (a)(ii) $\times$ 200 or proportion or potential divider calculation ; 6.9 (V) to at least 2 sig. figs ;	2	

© UC	Question	Answer	Marks	Guidance
LES 2	9(a)(iv)	reference to variable resistor/ variable power supply;	1	ignore: change the voltage/power supply
2016	9(b)	brighter; p.d./voltage (across lamp) is greater;	2	

Ques	stion	Answer	Marks	Guidance
10(	(a)	Any two from: diamond: covalent (molecule); giant structure/macromolecule;  Any two from: chlorine: (simple) molecule; covalent; diatomic;	4	max 4
¬   10(	(b)	$C_6Cl_{12}$ ;	1	
o	c)(i)	chlorine: green/yellow-green/light green; bromine: red-brown; density: value between 1.6(0)–4.9(0) (g per dm³);	3	
10(c	c)(ii)	increases;	1	
10(d	(i)(b	KBr;	1	
10(d	(ii)(k	2(KI) and 2KBr;	1	note: both balancing numbers <b>and</b> KBr formula are needed
10(d)	I)(iii)	chlorine is more reactive than bromine/ora/owtte;	1	not: chloride is more reactive than bromide ignore: reference to group

	Question	Answer	Marks	Guidance
٦	11(a)(i)	only half-life ticked ;	1	
Turn ove	11(a)(ii)	nucleus ; neutron ;	2	

Question	Answer	Marks	Guidance
11(b)(i)	Any two from: reference to ionising radiation; (radiation) damages cells/DNA/body tissue; (causing) cancer/mutation/radiation sickness/damage to offspring;	2	max 2 allow: burns
11(b)(ii)	Any two different examples from: use of gloves; use of face masks; tweezers/tongs; lead/concrete; radiation badge; maintain distance; minimise exposure time;	2	max 2 allow: valid examples ignore: safety goggles

	Question	Answer	Marks	Guidance
Page 8 of 8	12(a)	H H H H H H H H H H H H H H H H H H H	3	
	12(b)	bromine/bromine water; no change with saturated/owtte; decolourises with unsaturated/owtte;	3	not: goes clear
	12(c)	(addition) polymerisation ;	1	