Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

Cambridge IGCSE

PHYSICAL SCIENCE **0652/31**

Paper 3 Core Theory **October/November 2018**

MARK SCHEME

Maximum Mark: 80

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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.

Question	Answer	Marks
1(a)(i)	recognition that starting point is 5 cm **OR** finishing point is 85 (cm) ; 80 (cm) ;	**2**
1(a)(ii)	(speed =) distance / time **OR** 80 / 3.2 ; 25 (cm / s) ;	**2**
1(b)	straight horizontal line ; speed clearly 25 cm / s ;	**2**

Question	Answer	Marks
2(a)	*any two from:* • high melting points • high densities • form coloured compounds • act as catalysts ;;	**2**
2(b)	*any two suitable transition elements examples:* e.g. copper / gold ;;	**2**
2(c)	iron ;	**1**
2(d)	iron ;	**1**

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Question	Answer	Marks
3(a)(i)	(energy of) position / gravitational potential energy ;	1
3(a)(ii)	(energy of) movement / kinetic ; thermal ;	2
3(b)(i)	(moment =) force × distance **OR** 4(.0) × 350 ; 1400 (Nm) ;	2
3(b)(ii)	turning effect (about that point) ;	1

Question	Answer	Marks
4(a)	one electron in outer shell / alkali metal / similar properties to rest of group ;	1
4(b)	11: atomic or proton number ; 23: atomic mass / nucleon number ;	2
4(c)(i)	sodium chloride ;	1
4(c)(ii)	$2Na + Cl_2 \rightarrow 2NaCl$ species ; balancing ;	2
4(d)	K^+ I^- symbols correct ; charges correct ;	2

Question	Answer	Marks
5(a)(i)	35(°C) ;	1
5(a)(ii)	(the liquid) expands (with rising temperature) ;	1
5(b)	melting (point) or boiling (point) (of water) ;	1
5(c)	• *any two from:* liquid changes to vapour / gas • without change in temperature / temperature stays at 100 • bubbles (of vapour) in the liquid ;;	2

Question	Answer	Marks
6(a)	energy given out ;	1
6(b)(i)	(1) 3 2 3 ;	1
6(b)(ii)	carbon dioxide **OR** water ;	1
6(c)	*any two from*: • (limited supply of oxygen means) incomplete combustion • produces carbon monoxide or CO • (CO gas is) toxic / poisonous ;;	2
6(d)	hydrogen ;	1

Question	Answer	Marks
7(a)(i), (ii)	correct vertical arrow showing amplitude ; correct horizontal arrow showing wavelength ;	**2**
7(b)(i)	3 wavefronts drawn changing or having changed direction on entering shallow water ; deflected to travel towards the bottom right hand corner ; wavelengths constant in shallow water / shorter wavelength in shallow region ;	**3**
7(b)(ii)	refraction ;	**1**

Question	Answer	Marks
8(a)	C_3H_8 ;	**1**
8(b)	58 ;	**1**
8(c)(i)	ethene: $$\begin{array}{ccc} H & & H \\ | & & | \\ C & = & C \\ | & & | \\ H & & H \end{array}$$;	**1**
	ethane: $$\begin{array}{ccccccc} & H & & H & \\ & | & & | & \\ H & - & C & - & C & - & H \\ & | & & | & \\ & H & & H & \end{array}$$;	**1**
8(c)(ii)	*reagent*: bromine / bromine water ; *ethene*: decolourised / turns colourless ; *ethane*: no change / no reaction / remains brown or yellow ;	**3**

Question	Answer	Marks
9(a)(i)	ultra-violet ;	**1**
9(a)(ii)	radio ;	**1**
9(b)	stays the same ;	**1**
9(c)	infra-red ;	**1**

Question	Answer	Marks
10(a)	sand / grit / mud / solids ;	**1**
10(b)(i)	chlorine ;	**1**
10(b)(ii)	kills or removes germs / bacteria / microorganisms ;	**1**
10(c)(i)	white ; (to) blue ;	**2**
10(c)(ii)	heat ;	**1**

Question	Answer	Marks
11(a)	<u>variable</u> resistor ;	**1**
11(b)(i)	1.6 (A) ;	**1**
11(b)(ii)	$V = I\,R$ **OR** $4.0 = 1.6 \times R$ **OR** $(R =) V \div I$ **OR** $4.0 \div 1.6$ $(R =) 2.5$; ohm or Ω ;	**3**
11(c)	current increases ; each resistor provides an alternative pathway / current through each resistor is added OWTTE / less resistance ;	**2**

Question	Answer	Marks
12(a)	saucepan has smaller surface area / powder has larger surface area ; larger surface area reaction faster ;	2
12(b)(i)	flour mill / coal mine ;	1
12(b)(ii)	sensible suggestion such as no naked flame / spray water to keep down dust / no metal grinding equipment to prevent sparks, etc. ;	1
12(c)(i)	air / atmosphere ;	1
12(c)(ii)	*any two from:* • catalyst / iron • high temperature • high pressure ;;	2

Question	Answer	Marks
13(a)(i), (ii), (iii)	53 ; 78 ; 53 ;	3
13(b)(i)	a (fast moving) electron ;	1
13(b)(ii)	protons increase by 1 ; neutrons decrease by 1 ;	2