



PHYSICAL SCIENCE

0652/22

Paper 2 Core Theory

October/November 2016

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.

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Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0652	22

Question	Answer	Marks
1(a)	BC ; CD ;	2
1(b)	D ;	1
1(c)	evidence that $s = \text{area under the graph}$ (accept use of vt for this mark) ; attempt to measure triangle ; $= 40 \pm 2.5 \text{ (m/s)}$;	3
1(d)(i)	change (per unit time) in the speed ;	1
1(d)(ii)	steady change / change in speed of 9.8 m/s ; each second ;	2

Question	Answer	Marks
2(a)(i)	CH_2 / one carbon and 2 hydrogen atoms ;	1
2(a)(ii)	same general formula / same functional group / gradation of or similar physical properties ;	1
2(a)(iii)	$\text{C}_4\text{H}_9\text{OH}$;	1
2(b)	$ \begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H} - \text{C} - \text{C} - \text{OH} \\ \quad \\ \text{H} \quad \text{H} \end{array} $	1

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0652	22

Question	Answer	Marks
2(c)(i)	condenser ;	1
2(c)(ii)	cool vapour / liquid / remove energy released as vapour condenses ;	1
2(c)(iii)	ethanol ; lowest boiling point ;	1
2(c)(v)	goes up / increases / OWTTE ;	1

Question	Answer	Marks
3(a)	A small cross centred on the plumbline ;	1
3(b)	sheet swings back to its original position ; the weight provides a restoring <u>moment</u> / force ;	2
3(c)	Suspend the plate (and plumbline) from the second hole ; mark the position of the plumbline (this mark can be awarded in either in 1st or 2nd hanging) ; centre of mass is at the intersection of the two lines ;	3

Question	Answer	Marks
4(a)	magnesium + water / steam → magnesium oxide + hydrogen ;	1
4(b)(i)	reaction which gives out (heat) energy ;	1
4(b)(ii)	energy needed to break bonds / mention of activation energy / energy needed to start the reaction ;	1
4(c)	light / burning splint / flame ; pops / popping sound / explodes ; (Use of a glowing splint gets no marks)	2

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0652	22

Question	Answer	Marks
4(d)	no reaction/no change/nothing ; copper is unreactive/less reactive than magnesium or hydrogen/ low in reactivity series/OWTTE ;	2

Question	Answer	Marks
5(a)	Wavelength correctly marked ;	1
5(b)	amplitude ; frequency ; hertz ; refraction ;	4
5(c)	At least 1 wave clearly reflected towards the left and upwards ; angle of incidence = angle of reflection ; 3 (or more) wavefronts drawn and wavelength constant = to incident wavelength ;	3

Question	Answer	Marks
6(a)(i)	any two from – malleable or ductile ; conduct <u>heat</u> ;	2
6(a)(ii)	Any two from – solution of a salt ; molten salt ; graphite ; semiconductor ; (accept electrolyte for 1 mark as an alternative to solution of a salt or a molten salt)	max 2

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0652	22

Question	Answer	Marks
6(b)(i)	copper ;	1
6(b)(ii)	colour / melting point / boiling point / density / hardness / expansivity ;	1
6(c)(i)	zinc sulfate ;	1
6(c)(ii)	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$;;	2

Question	Answer	Marks
7(a)(i)	0.4 (A) ;	1
7(a)(ii)	<u>Use of</u> $V = I R$; $\rightarrow R_{total} = 9 / 0.4 = 22.5 (\Omega)$;	2
7(a)(iii)	Indication that the other two resistor values are added ($10.5 + 7.5$) ; $\rightarrow R = 4.5 (\Omega)$;	2
7(b)(i)	2 A circled ;	1
7(b)(ii)	4.5 Ω circled ;	1

Question	Answer	Marks
8(a)(i)	Na^+ ; 10 ; 17 ;	3
8(a)(ii)	Full outer shell / 8 electrons in outer shell / noble gas structure ;	1
8(a)(iii)	argon ;	1

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0652	22

Question	Answer	Marks
8(b)(i)	3 hydrogen atoms ; lone pair between nitrogen and each hydrogen ;	2
8(b)(ii)	3 before H ₂ AND 2 before NH ₃ ;	1
8(c)	78 OR 79 ;	1

Question	Answer	Marks
9(a)	There is a current ; the iron rod is magnetised ; steel bar is attracted to the iron rod / moves towards the iron rod / the spring is compressed ;	3
9(b)(i)	iron is easily (magnetised and) <u>demagnetised</u> / temporary magnet ;	1
9(b)(ii)	to push rod B back into the wall ;	1

Question	Answer	Marks
10(a)	bromine formed / bromine displaced ; iodine formed / iodine displaced ;	2
10(b)	chlorine is less reactive than fluorine ; chlorine is more reactive than bromine and iodine ;	2
10(c)	no reaction / no change / nothing / remains colourless ;	1
10(d)	have 7 electrons in their outer shell ;	1

Page 7	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0652	22

Question	Answer	Marks
11(a)(i)	47 ;	1
11(a)(ii)	64 ;	1
11(b)(i)	top line: 111 ; bottom line: 48 ;	2
11(b)(ii)	cadmium / Cd ;	1