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PHYSICAL SCIENCE **0652/22**

Paper 2 Core Theory **October/November 2016**

MARK SCHEME

Maximum Mark: 80

Published

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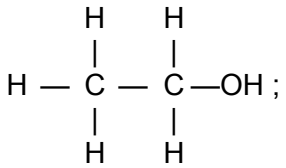
Question	Answer	Marks
1(a)	BC ; CD ;	**2**
1(b)	D ;	**1**
1(c)	evidence that s = area under the graph (accept use of *vt* for this mark) ; attempt to measure triangle ; = 40 +/– 2.5 (m/s) ;	**3**
1(d)(i)	change (per unit time) in the speed ;	**1**
1(d)(ii)	steady change/change in speed of 9.8 m/s ; each 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)	C_4H_9OH ;	**1**
2(b)		**1**

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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 moment / 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

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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 heat ;	**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**

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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)	$2H_2 + O_2 \rightarrow 2H_2O$;;	2

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

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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) demagnetised / 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**

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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**

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