
COMBINED SCIENCE**5129/21**

Paper 2 Theory

October/November 2017

MARK SCHEME

Maximum Mark: 100

Published

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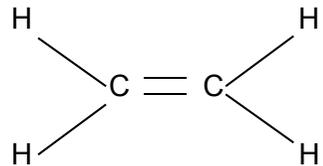
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Question	Answer	Marks
1(a)	$W = fd$ or $50 \times 10 \times 2.4$; 1200 ;	2
1(b)	$P = W/t$ or $1200 \div 0.8$ 1500 ;	2

Question	Answer	Marks
2	<u>amino acids</u> ; <u>kidneys</u> ; <u>glycogen</u> ; <u>hormones</u> ;	4

Question	Answer	Marks
3(a)(i)	44 ;	1
3(a)(ii)	88 ; 36 ; 2.2 ;	3
3(b)		1

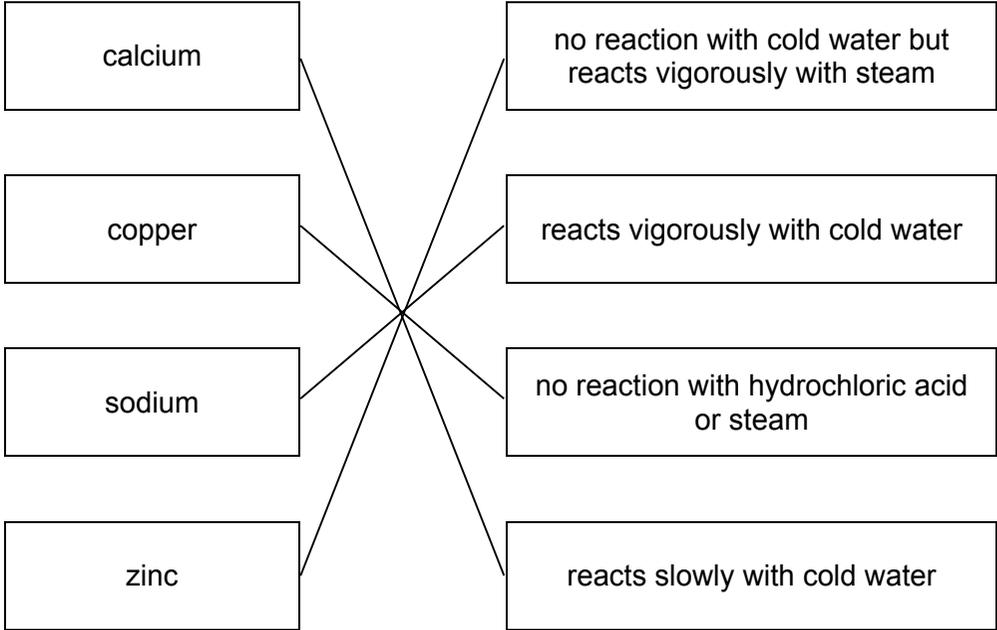
Question	Answer	Marks
4	16 ;	3

Question	Answer			Marks
5	point	aerobic resp	anaerobic resp	4
	oxygen used	✓	×	
	glucose used	✓	✓	
	carbon dioxide produced	✓	×	
	lactic acid produced	×	✓	

Question	Answer	Marks
6(a)(i)	450 ; 200 ;	2
6(a)(ii)	Iron ;	1
6(a)(iii)	3 2 ;	1
6(b)		2
6(c)	making fertilisers ;	1

Question	Answer	Marks
7(a)(i)	any one from <ul style="list-style-type: none"> • infra-red ; • visible light ; • UV ; • X-ray ; • gamma ; 	1
7(a)(ii)	3×10^8 (m/s) ;	1
7(b)	$v = f\lambda$ or $3 \times 10^8 = 2.4 \times 10^9 \times \text{wavelength}$; $0.125 / 1.25 \times 10^{-1}$;	2
7(c)	normal perpendicular to top surface of metal ; reflected ray ;	2

Question	Answer	Marks
8(a)	line (labelled N) ending on any part of the nucleus ;	1
8(b)(i)	contains haemoglobin ; to carry oxygen ;	2
8(b)(ii)	any two from <ul style="list-style-type: none"> • mesophyll cell has a cell wall (but WBC does not) ; • mesophyll cell contains chloroplasts (but WBC does not) ; • mesophyll cell has large (sap) vacuole (but WBC does not) ; • mesophyll cell has a spherical nucleus, whereas WBC has a lobed nucleus ; 	2

Question	Answer	Marks
9(a)	 <p>calcium</p> <p>no reaction with cold water but reacts vigorously with steam</p> <p>copper</p> <p>reacts vigorously with cold water</p> <p>sodium</p> <p>no reaction with hydrochloric acid or steam</p> <p>zinc</p> <p>reacts slowly with cold water</p>	4
9(b)	lighted splint ; burns with a 'pop' ;	2

Question	Answer	Marks
10(a)(i)	5 (dm ³ per min) 32 (dm ³ per min) ;	1
10(a)(ii)	32 – 5 = 27 ;	1
10(a)(iii)	$27/5 \times 100 = 540\%$;	1
10(b)	heart pumps faster ; heart pumps more blood per beat ;	2
10(c)	any one from <ul style="list-style-type: none"> • fitness ; • age ; • sex ; • strength of heart ; • body size / weight ; • illness; 	1

Question	Answer	Marks
11	any three from <ul style="list-style-type: none"> • electrons / <u>negative</u> charges ; • move / transfer / loss of electrons ; • opposite charge induced in glass ; • opposite charges attract ; 	3

Question	Answer	Marks
12	proton number ; 14 16 ; Neutrons ; 2, 8, 4 ;	4

Question	Answer	Marks
13	D ; C ; A ; B ;	4

Question	Answer	Marks
14(a)	H = testa / seed coat ; J = radicle ; K = cotyledon ;	3
14(b)	seed surrounded by water ;	1
	any one from <ul style="list-style-type: none"> • prevents oxygen reaching seed ; • oxygen needed for germination ; • seed cannot respire without oxygen ; 	1

Question	Answer	Marks
15(a)	condenser ;	1
15(b)	burette ;	1
15(c)	beaker ;	1
15(d)	burette / pipette ;	1

Question	Answer	Marks
16(a)	any three from <ul style="list-style-type: none"> • magnetic field in coil X is produced (as switch is closed) ; • magnetic field changes when switch is closed / links / cuts coil Y ; • e.m.f induced ; • e.m.f induced / reading only when field changes ; 	3
16(b)	smaller e.m.f. ; smaller change in magnetic field ;	2

Question	Answer	Marks
17(a)	line going from flies to spiders with arrow pointing to spiders ; line going from spiders to blue tits with arrow pointing to blue tits ;	2
17(b)	(oak) tree;	1
17(c)	number of blue tits would decrease ; as owls would eat more blue tits ; or number of blue tits would increase ; as there are more caterpillars to eat (as not eaten by wood-peckers) ;	2

Question	Answer	Marks
18	sulfur contains <u>one type</u> of atom ; water contains two <u>different</u> atoms ; chemically combined ;	3

Question	Answer	Marks
19(a)	element / atom ;	1
	nucleon / mass ; proton / atomic ;	1
19(b)(i)	any three from <ul style="list-style-type: none"> • alpha emission ; • helium nucleus emitted ; • from nucleus (of Am) ; • to produce a different element ; 	3
19(b)(ii)	Ionisation ;	1
19(b)(iii)	$V = IR$ or $V = 1.0 \times 10^{-11} \times 4.5 \times 10^7$; 4.5×10^{-4} ; V ;	3

Question	Answer	Marks
20(a)	L = stomach ; R = colon ;	2
20(b)	any two from <ul style="list-style-type: none">• peristalsis ;• (circular/ileum) muscles contract behind the food ;• wave (of contraction) passes along ileum ;• muscles in front of food relax ;	2

Question	Answer	Marks
21(a)	methane ;	1
21(b)	fractional distillation ;	1
21(c)	exothermic ;	1
21(d)	compound / molecule containing of carbon and hydrogen only ;	1