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**COMBINED SCIENCE**

**5129/21**

Paper 2 Theory

**October/November 2017**

MARK SCHEME

Maximum Mark: 100

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**Published**

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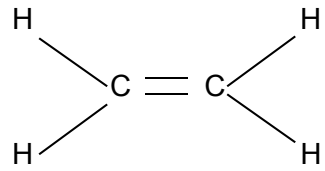
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This document consists of **10** printed pages.

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

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

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>	<b>4</b>
9(b)	lighted splint ; burns with a 'pop' ;	<b>2</b>

Question	Answer	Marks
10(a)(i)	5 (dm <sup>3</sup> per min) 32 (dm <sup>3</sup> 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 <b>one</b> from <ul style="list-style-type: none"> <li>• fitness ;</li> <li>• age ;</li> <li>• sex ;</li> <li>• strength of heart ;</li> <li>• body size / weight ;</li> <li>• illness;</li> </ul>	1

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

Question	Answer	Marks
12	proton number ; 14      16 ; Neutrons ; 2, 8, 4 ;	<b>4</b>

Question	Answer	Marks
13	<b>D ; C ;</b> <b>A ;</b> <b>B ;</b>	<b>4</b>

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

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 <b>three</b> from <ul style="list-style-type: none"> <li>• magnetic field in coil X is produced (as switch is closed) ;</li> <li>• magnetic field changes when switch is closed / links / cuts coil Y ;</li> <li>• e.m.f induced ;</li> <li>• e.m.f induced / reading <b>only</b> when field changes ;</li> </ul>	3
16(b)	smaller e.m.f. ; smaller <b>change</b> 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 ; <b>or</b> 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 <b>three</b> from <ul style="list-style-type: none"> <li>• alpha emission ;</li> <li>• helium nucleus emitted ;</li> <li>• from nucleus (of Am) ;</li> <li>• to produce a different element ;</li> </ul>	3
19(b)(ii)	Ionisation ;	1
19(b)(iii)	$V = IR$ or $V = 1.0 \times 10^{-11} \times 4.5 \times 10^7$ ; $4.5 \times 10^{-4}$ ; V ;	3

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

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