



Cambridge IGCSE™

COMBINED SCIENCE**0653/43**

Paper 4 Theory (Extended)

May/June 2022**MARK SCHEME**Maximum Mark: 80

Published

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This document consists of **11** printed pages.

Question	Answer	Marks								
1(a)(i)	<table border="1"> <thead> <tr> <th>letter</th><th>function</th></tr> </thead> <tbody> <tr> <td>C ;</td><td>(digests protein and uses hydrochloric acid to kill bacteria)</td></tr> <tr> <td>A ;</td><td>(ingestion)</td></tr> <tr> <td>(B)</td><td>(secretes the enzyme) amylase ;</td></tr> </tbody> </table>	letter	function	C ;	(digests protein and uses hydrochloric acid to kill bacteria)	A ;	(ingestion)	(B)	(secretes the enzyme) amylase ;	3
letter	function									
C ;	(digests protein and uses hydrochloric acid to kill bacteria)									
A ;	(ingestion)									
(B)	(secretes the enzyme) amylase ;									
1(a)(ii)	label line to large intestine labelled L ;	1								
1(b)	digestion of protein ; to form amino acids ;	2								
1(c)	<i>any two from:</i> arteries have a thicker (muscle) wall / ORA ; arteries have a smaller centre / ORA ; only veins have valves ;	2								
1(d)	blockage ; genetic ;	2								

Question	Answer	Marks
2(a)	value between melting point of sodium and rubidium ;	1
2(b)	reacts, quickly / slower than sodium, (to give hydrogen and an alkaline solution) ;	1
2(c)(i)	green/yellow to purple/blue ;	1
2(c)(ii)	sodium hydroxide ;	1
2(d)(i)	(all their atoms have) one electron in the outer shell ;	1

Question	Answer	Marks
2(d)(ii)	potassium has (one) more shell than sodium ;	1
2(e)(i)	higher higher lower ;	1
2(e)(ii)	method: oil / grease / paint explanation: keeps out oxygen / water ;	1

Question	Answer	Marks
3(a)(i)	$W = mg$ (<i>in any form</i>) OR ($m =$) $75 \div 10$; $= 7.5$ (kg) ;	2
3(a)(ii)	$\Delta PE = mg\Delta h$ OR $W \times \text{distance}$ (<i>in any form</i>) OR $= 75 \times 1.2$; $= 90$ (J) ;	2
3(a)(iii)	pressure = force $\div$ area (<i>in any form</i>) ; pascals is N / m^2 so area of 400 cm^2 is 0.04 m^2 ; ($p = 75 \div 0.04 =$) 1875 OR 1880 (Pa) ;	3
3(b)	<i>will cool bucket A more effectively</i> : conduction AND reason: because metal is a good conductor / shiny metal is not a good radiator ; <i>will cool bucket B more effectively</i> : radiation AND reason: dull black is good radiator / plastic is not a good conductor ;	2

Question	Answer	Marks
4(a)(i)	P – larynx ; Q – bronchus ;	2
4(a)(ii)	<i>any two from:</i> large surface area ; thin surface ; good blood supply ; good ventilation ;	2
4(b)(i)	<i>any three from:</i> (volume of oxygen taken in increases because,) more energy required ; increased contraction of muscles ; muscles require more oxygen ; (oxygen required) for respiration / respiration (rate) increases ;	3
4(b)(ii)	decrease in rate (of breathing) ; decrease in depth (of breathing) ;	2
4(c)	nicotine ;	1

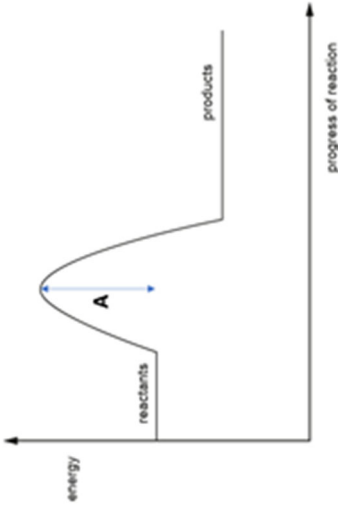
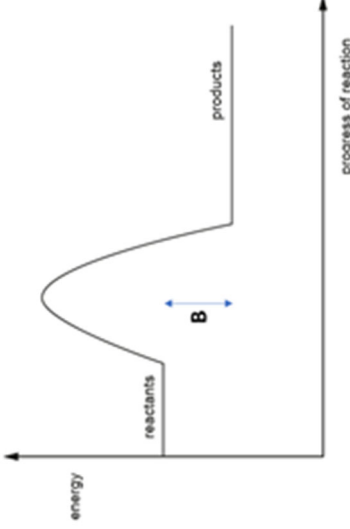
Question	Answer	Marks
5(a)	(carbon-carbon) double bond ;	1
5(b)	<u>cracking</u> ;	1
5(c)(i)	poly(ethene) / polyethene ;	1
5(c)(ii)	addition ;	1

Question	Answer	Marks
5(d)(i)	(anhydrous) cobalt(II) chloride ; from blue to pink ; OR (anhydrous) copper(II) sulfate ; from white to blue ;	2
5(d)(ii)	condensation / condenses ;	1
5(d)(iii)	carbon dioxide ;	1

Question	Answer	Marks
6(a)(i)	0 (° C) ;	1
6(a)(ii)	thermal ; temperature ;	2
6(b)	weaker forces between molecules in liquid than in solid ; molecules able to move around in liquid / not able to move around in solid ;	2
6(c)(i)	(time = distance / speed =) 1900 / 330 = 5.76 s (= 5.8 s) ;	1
6(c)(ii)	speed of light 3×10^8 m/s (greater than 330 m/s for sound) ; light travels faster than sound OR A ;	2
6(c)(iii)	(takes less time) so (sound) travelled at a higher speed (than 330 m/s) ; (sound) travelled through ice ;	2

Question	Answer	Marks
7(a)	shrimp ;	1
7(b)	<i>any four from:</i> increased growth of, producers / pond weed / plants ; blocks light / reduced photosynthesis (of plants below surface) ; death of, producers / pond weed / plants ; decomposition of, producers / pond weed / plants ; increased (aerobic) respiration by decomposers / bacteria / microorganisms ; reduction in oxygen levels ; AVP ;	4
7(c)	plants take in carbon dioxide ; reference to photosynthesis ;	2

Question	Answer	Marks
8(a)	carbon dioxide ;	1
8(b)	CaCl ₂ ;	1
8(c)(i)	increases rate / higher rate / faster ;	1
8(c)(ii)	3 and 4 OR 1 and 5 ; need to keep concentration same / 3 and 4 both have concentration of 0.5 / 1 and 5 both have concentration of 1.0 ;	2

Question	Answer	Marks
8(c)(iii)	4 has a lower concentration than 1 / lower concentration has a lower rate ORA ; particles are further apart in 4 / fewer particles per unit volume ORA ; collisions less frequent in 4 / fewer successful collisions in 4 ORA ;	3
8(d)(i)	arrow A starts and ends in the correct place ; e.g. 	1
8(d)(ii)	arrow B starts and ends in the correct place ; 	1

