

Cambridge IGCSE™

COMBINED SCIENCE**0653/42**

Paper 4 Theory (Extended)

February/March 2026

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	E ; D ;	2
1(b)	B, E, D ;	1
1(c)(i)	kill microorganisms ;	1
1(c)(ii)	active site ; starch ; complexes ; denaturation ;	4
1(c)(iii)	high temperature ;	1

Question	Answer	Marks
2(a)(i)	stigma hangs outside, flower / petals ; feathery / AW, stigma ;	2
2(a)(ii)	ovule ;	1
2(a)(iii)	first / at the beginning ;	1
2(b)(i)	$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 ; ;$	2

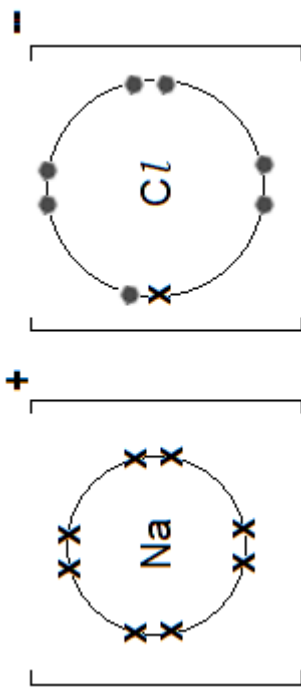
Question	Answer	Marks
2(b)(ii)	<i>any three from:</i> <i>idea of protection / monitoring of species (/ the area where they grow) ;</i> <i>idea of protecting species through legislation ;</i> <i>reference to examples of education (qualified) ;</i> <i>(preserving seeds in) seed banks ;</i> <i>AVP ;</i>	3

Question	Answer	Marks
3(a)(i)	$(8.0 \div 3.5 =) 2.3$;	1
3(a)(ii)	Aorta carries blood at high pressure / must maintain high blood flow rate ; Vena cava carries blood at low pressure blood / has reduced resistance to blood flow / reduced blood flow rate;	2
3(b)(i)	haemoglobin ;	1
3(b)(ii)	by diffusion ; the idea that diffusion occurs from high concentration to low concentration / down a concentration gradient ; <i>and then one of</i> ref to (partially) permeable membrane ; due to random movement (of particles / molecules) ; idea of net movement (of particles / molecules) ;	3

Question	Answer	Marks
3(b)(iii)	any two from: thin cell membrane (of RBC) ; increased temperature ; increased concentration gradient ; large surface area (of RBC) ;	2

Question	Answer				Marks												
4(a)(i)	cathode ;				1												
4(a)(ii)	<table><tr><td></td><td>name of product</td><td>formula of product</td><td>appearance of product</td></tr><tr><td>negative electrode</td><td>magnesium</td><td>Mg</td><td>grey liquid / solid</td></tr><tr><td>positive electrode</td><td>chlorine</td><td>Cl₂</td><td>(pale) yellow-green gas</td></tr></table> 6 answers correct = 2 ; ; 3–5 correct = 1 ;					name of product	formula of product	appearance of product	negative electrode	magnesium	Mg	grey liquid / solid	positive electrode	chlorine	Cl ₂	(pale) yellow-green gas	2
	name of product	formula of product	appearance of product														
negative electrode	magnesium	Mg	grey liquid / solid														
positive electrode	chlorine	Cl ₂	(pale) yellow-green gas														
4(a)(iii)	dissolved (in water) / made into an (aqueous) solution / use it aqueous ;				1												
4(b)(i)	products labelled and higher than reactants and a (rounded) maximum shown ; <i>E_a</i> correctly labelled ; overall energy change labelled and upward arrow only ;				3												
4(b)(ii)	minimum energy (required / that colliding particles / the collision must have) ; for a reaction to occur ;				2												

Question	Answer	Marks
4(b)(iii)	more energy used breaking bonds than released making bonds ;	1

Question	Answer				Marks
5(a)(i)		aqueous sodium iodide	aqueous sodium bromide	aqueous sodium chloride	3
	chlorine water	brown (solution) ;	orange / yellow / orange-yellow / red-brown (solution) ;	colourless solution / (very) pale green (solution) ;	
5(a)(ii)	displacement ;				1
5(b)	$\text{Br}_2 + 2\text{NaI} \rightarrow 2\text{NaBr} + \text{I}_2$;;				2
5(c)	8 × electrons on outer shell of sodium ion ; 7 dot electrons on outer shell of fluoride ion and 1 × electron ; correct charges on both ions ; 				3

Question	Answer	Marks												
6(a)(i)	C ₅ H ₁₂ ;	1												
6(a)(ii)	alkanes ;	1												
6(a)(iii)	<table><tr><th>statement</th><th>true</th></tr><tr><td>It forms air pollutants during combustion.</td><td>✓</td></tr><tr><td>It contains covalent bonds.</td><td>✓</td></tr><tr><td>It is generally unreactive.</td><td>✓</td></tr><tr><td>It is a saturated hydrocarbon.</td><td>✓</td></tr><tr><td>It reacts with hydrogen in the presence of a nickel catalyst.</td><td></td></tr></table> 5 rows correct = 3 marks 4 rows correct = 2 marks 3 rows correct = 1 mark	statement	true	It forms air pollutants during combustion.	✓	It contains covalent bonds.	✓	It is generally unreactive.	✓	It is a saturated hydrocarbon.	✓	It reacts with hydrogen in the presence of a nickel catalyst.		3
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6(b)	process: cracking ; conditions: high temperature and catalyst ;	2												

Question	Answer	Marks
7(a)	planet J AND greater gravitational force (on J) ; the distance is smaller / it is closer (to Sun / star) ;	2
7(b)	red giant ; white dwarf ;	2

Question	Answer	Marks
7(c)	hot gases are less dense ORA ; less dense / hot gases, rise (towards exterior) ORA ;	2
7(d)	student B AND mass is the same everywhere ; idea that, weight also depends on gravitational field strength and this is also constant ;	2

Question	Answer	Marks
8(a)	evidence of $v = s \div t / 40 \div 5.0$; 8.0 (m/s) ;	2
8(b)	evidence of $E = \frac{1}{2} mv^2 / \sqrt{[2 \times 61\,000 \div 850]}$; 12 (m/s) ;	2
8(c)(i)	 ;	1
8(c)(ii)	speed of light = 3.0×10^8 (m/s) ; $v = f \lambda$ in any form / $3.0 \times 10^8 \div 4.0 \times 10^{14}$; 7.5×10^{-7} (m) ;	3
8(c)(iii)	in a transverse wave, the direction of vibration is at right angles to the direction of propagation ; for a longitudinal wave, the direction of vibration is parallel to the direction of propagation ;	2

Question	Answer	Marks
9(a)(i)	evidence of $E = P \times t / 30 \times 1.5$; 45 (kWh) ;	2
9(a)(ii)	unit conversion, 30 000 W OR 5400 s ; evidence of $P = IV$; $I = 30\,000 \div 120 = 250$ (A) ; evidence of $Q = It / 250 \times 5400$; $1\,350\,000 / 1.35 \times 10^6$ (C) ;	5
9(b)	evidence that resistance is inversely proportional to cross-sectional area ; (cross-sectional area of Z = $12 \div 5 =$) 2.4 cm ² ;	2

Paper 6

