

Cambridge IGCSE™

COMBINED SCIENCE**0653/43**

Paper 4 Theory (Extended)

October/November 2025**MARK SCHEME**Maximum Mark: 80

Published

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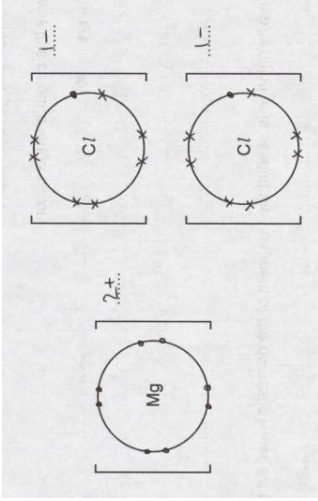
Cambridge International is publishing the mark schemes for the October/November 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

Question	Answer	Marks
1(a)(i)	D ; C ; B ;	3
1(a)(ii)	colon ; rectum ;	2
1(b)(i)	P ;	1
1(b)(ii)	enzyme will denature (at pH 7) ; <u>active site</u> changes shape ; (active site) no longer complementary to substrate / substrate no longer fits active site / enzyme-substrate complexes cannot form ;	3
1(c)	fats AND oils; fatty acids AND glycerol ;	2

Question	Answer	Marks
2(a)(i)	producer ;	1
2(a)(ii)	decomposer ;	1
2(a)(iii)	millipede ;	1
2(b)(i)	loss of water vapour from leaves ;	1
2(b)(ii)	increasing wind speed increases transpiration/rate / ora ;	1

Question	Answer	Marks
2(c)	any four from: water leaves the cells ; references to osmosis ; cytoplasm/vacuole shrinks or cell membrane pulled away from the cell wall or cytoplasm pulled away from cell wall ; turgor pressure decreases ; cells are plasmolysed ; cells have a high(er) water potential or (external/sugar) solution has low(er) water potential ;	4

Question	Answer	Marks
3(a)	as (virus) protein coat ; (bacterial cell) plasmid ;	2
3(b)	any two from: skin ; hairs in the nose ; mucus ; stomach acid ; white blood cells / antibodies ; AVP ;	2
3(c)	substance (taken into the body) that modifies/affects (chemical) reactions in the body ;	1
3(d)	cause the body to make <u>antibodies</u> ; provide <u>active</u> immunity ;	2

Question	Answer	Marks
4(a)	$\text{MgCO}_3 + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ correct formulae ; correct balancing ;	2
4(b)(i)	2.0 ;	1
4(b)(ii)	smaller the pieces the faster the reaction / ora ; (smaller pieces) surface area higher / greater exposure to acid with smaller pieces/powder ; (so) more collisions per second / more frequent collision / more (chance of) successful collisions ;	3
4(c)	8 dot electrons on outer shell of magnesium ion ; 7 X electrons on outer shell of both chloride ions and 1 dot electron ; correct charges on all ions ; 	3

Question	Answer	Marks
5(a)(i)	diatomic ;	1
5(a)(ii)	bromine – red-brown and liquid ; astatine – <u>black</u> and solid ;	2

Question	Answer	Marks
5(b)	colour change: (from colourless) to brown ; explanation: any two from: chlorine is more reactive than iodine ; chlorine displaces iodine ; iodine forms ;	3
5(c)(i)	to kill microbes/pathogens/bacteria ;	1
5(c)(ii)	sedimentation / filtration / addition/use of carbon ;	1

Question	Answer	Marks
6(a)(i)	C_5H_{10} ;	1
6(a)(ii)	$ \begin{array}{ccccccc} & & H & & H & & H \\ & & & & & & \\ H & - & C & = & C & - & C & - & C & - & H \\ & & & & & & & & \\ & H & & & H & & H & & H \end{array} $;	1
6(a)(iii)	any two from (family of similar compounds with) similar chemical properties ; trend in physical properties ; same general formula ;	2

Question	Answer	Marks
6(a)(iv)	<i>lines to:</i> reacts with hydrogen in the presence of a nickel catalyst ; reacts with steam in the presence of an acid catalyst ;	2
6(b)(i)	(g) and (s) ;	1
6(b)(ii)	incomplete ;	1
6(b)(iii)	respiratory problems / named respiratory disorder / cancer ;	1

Question	Answer	Marks
7(a)	$(12.0 - 9.6 =) 2.4 \text{ (V)}$;	1
7(b)	$(I) = V \div R$ or $9.6 \div 6.0$; 1.6 (A) ;	2
7(c)	M1 (unit conversion, 2 minutes) = 120 or $2 \times 60 \text{ (s)}$; M2 (total current = $0.80 + 1.6$) = 2.4 ; M3 (Q) = $I \times t$ / 2.4×120 ; M4 290; M5 independent mark: C / coulomb(s) ;	5

Question	Answer	Marks
8(a)	$W = mg$ / 2.9×9.8 ; 28 (N) ;	2

Question	Answer	Marks
8(b)	$F = ma / 2.9 \times 2.5 / 7.25 ;$ $L = F + W / (L =) 28.42 + 7.25 / (L =) 35.67 ;$ 36 (N) ;	3
8(c)(i)	useful energy output = efficiency $\times$ total energy input / $0.66 \times 150 ;$ 99 (J) ;	2
8(c)(ii)	$\Delta E_p = mg\Delta h$ or $99 = 2.9 \times 9.8 \times h$ or $99 = 28.42 \times h$ or $h = \frac{99}{2.9 \times 9.8} ;$ 3.5 (m) ;	2

Question	Answer	Marks
9(a)(i)	conduction / radiation	1
9(a)(ii)	idea that warm air is less dense or cold air is more dense ; warm air rises AND cold air falls ;	2

Question	Answer	Marks
9(a)(iii)	(air) particles collide with the walls ; particle collisions (with walls) are more frequent (as temperature increases) or particles collide with greater, speed or kinetic energy or force ; idea that more force per unit area = increased pressure ;	3
9(b)	vibration(s) ; parallel ;	2
9(c)	any two from: (Universe) expanded/started from a (single) point ; (point had) high density and temperature ; (Universe began) 13.8 billion years ago ;	2