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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1: Marks must be awarded in line with: • the specific content of the mark scheme or the generic level descriptors for the question • the specific skills defined in the mark scheme or in the generic level descriptors for the question • the standard of response required by a candidate as exemplified by the standardisation scripts.
GENERIC MARKING PRINCIPLE 2: Marks awarded are always **whole marks** (not half marks, or other fractions).
GENERIC MARKING PRINCIPLE 3: Marks must be awarded **positively**: • marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate • marks are awarded when candidates clearly demonstrate what they know and can do • marks are not deducted for errors • marks are not deducted for omissions • answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.
GENERIC MARKING PRINCIPLE 4: Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	'List rule' guidance For questions that require ***n*** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards ***n***. • Incorrect responses should not be awarded credit but will still count towards ***n***. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first ***n*** responses may be ignored even if they include incorrect science.

6	Calculation specific guidance
	Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.
	For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.
	For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.
	Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.
7	Guidance for chemical equations
	Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.
	State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Question	Answer	Marks
1(a)	part A - waterproof / transparent ; cell B - contain lots of chloroplasts / located near the upper surface of leaf / elongated **or** column-shaped, to pack together more tightly ; cell C - open and close stomata ;	**3**
1(b)(i)	as distance of light source increases, the number of bubbles / the volume of oxygen, decreases **or** rate of photosynthesis decreases ; **and** *any two* from: light <u>intensity</u> decreases with distance from light source light provides <u>energy</u> for photosynthesis oxygen is a product of photosynthesis ; ;	**3**
1(b)(ii)	*any two* from: *increase in the rate of photosynthesis – no mark:* increase in kinetic energy more effective collisions / more frequent collisions more enzyme-substrate complexes form ; ;	**2**
1(c)	source – part of the plants that release, <u>sucrose / amino acids</u> ; sink – part of plants that, use / store, <u>sucrose / amino acids</u> ;	**2**
1(d)	<table><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table>;	**1**

Question	Answer	Marks
2(a)	concentrated sugar solution has lower <u>water</u> potential than the surroundings) / ORA ; <u>water</u> moves from a region of higher <u>water</u> potential to a region of lower <u>water</u> potential ;	2
2(b)(i)	movement of particles, from a region of lower concentration to a region of higher concentration / against a concentration gradient ; using energy from respiration ;	2
2(b)(ii)	oxygen required for aerobic respiration ; respiration releases energy ; *idea of* <u>energy</u> required to move ions, against concentration gradient / *idea of* <u>energy</u> required for active transport ;	3
2(b)(iii)	synthesis of amino acids / protein / DNA ;	1
2(c)(i)	pulmonary artery ;	1
2(c)(ii)	any *two* from: large surface area many capillaries / good blood supply thin surface good ventilation AVP ; ;	2

Question	Answer	Marks
3(a)(i)	any *two* from: faster less energy required no need to rely on, (named) pollinators / wind / insects no need to produce, flowers / scent only requires one parent more likelihood of success due to lack of random fertilisation genetically identical if has desirable features ; ;	2

Question	Answer	Marks
3(a)(ii)	fusion ; zygote ;	2
3(b)(i)	A - captures pollen / AW ; B- produces / makes / releases / AW, pollen ;	2
3(b)(ii)	not hanging down / enclosed within the flower or petals ;	1
3(c)(i)	leaf cell - 30 ; ovule- 15 ;	2
3(c)(ii)	meiosis ;	1

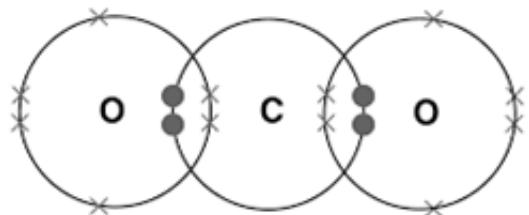| Question	Answer	Marks
4(a)	*any **two** from:* ions (named) nutrients urea hormones carbon dioxide AVP ; ;	2

4(b)	A - lymphocyte ;
	   antibody production ;
	
	B- phagocyte ;
	   engulfing pathogens / phagocytosis ;
		4

4(c)	clot blood ; prevent entry of pathogens ;	2

Question	Answer	Marks
5(a)	(aluminium has) 3 occupied electron shells ;	1
5(b)	(aluminium atom) loses electrons ; (aluminium atom) loses 3 electrons ;	2
5(c)(i)	strong / owtte ; oppositely / owtte ;	2
5(c)(ii)	Generally insoluble in water ☐ Good electrical conductivity when solid ☐ High melting point ☑ ;	1
5(d)	*element* contains only one type of atom / *idea that* all the atoms have the same number of protons **or** same atomic number ; *compound* substance made of two or more different elements (chemically joined) ;	2
5(e)	same number of protons / same atomic number / both have 17 protons / both have an atomic number of 17 ; different numbers of neutrons / ^{37}Cl has 20 neutrons but ^{35}Cl has 18 neutrons / different mass number / ^{37}Cl has a mass number of 37 but ^{35}Cl has a mass number of 35 ;	2

Question	Answer	Marks
6(a)	$Mg + 2HCl \rightarrow MgCl_2 + H_2$; ;	2
6(b)(i)	(student) 3 ;	1

Question	Answer	Marks
6(b)(ii)	(student) 4 ;	1
6(c)	*any **three** from:* molecules have lower (average) energy / molecules are moving slower fewer molecules with activation energy frequency of collision of molecules is, lower / fewer, collisions per second less successful collisions ; ; ;	3
6(d)	A - Activation energy ; B - Enthalpy change; C - Products ;	3

Question	Answer	Marks
7(a)	homologous series ;	1
7(b)(i)	orange / red-brown, bromine water ; is decolourised / turns colourless ;	2
7(b)(ii)	addition ;	1
7(c)	M_r of C_4H_8 = 56 **and** M_r of C_4H_{10} = 58 ; Mass of C_4H_{10} = $\dfrac{58}{56} \times 1.68$; = 1.74 (kg) ;	3
7(d)	; ;	2

Question	Answer	Marks
8(a)	arrow from Cu^{2+} to cathode **and** arrow from SO_4^{2-} to anode ;	1
8(b)(i)	oxygen ;	1
8(b)(ii)	fizzing / bubbling / effervescence ;	1
8(c)	$Cu^{2+} + 2e^- \rightarrow Cu$; ;	2
8(d)	1: (graphite) conducts electricity ; 2: (graphite) is inert ; (graphite has) delocalised electrons **OR** because outer shell electrons are used in bonding ;	3
8(e)	 ; ;	2
8(f)	(methane has) weak intermolecular forces ;	1

Question	Answer	Marks
9(a)	acceleration ; weight ;	2
9(b)(i)	constant <u>speed</u> ; (constant) deceleration ;	2
9(b)(ii)	evidence of $a = \Delta v / \Delta t$ or $a = 20 / 40$ or gradient ; 0.50 ; m / s^2 or $m \, s^{-2}$;	3

Question	Answer	Marks
9(c)(i)	chemical ; increases ;	**2**
9(c)(ii)	chemical and thermal **and** amount of energy in the chemical energy store decreases / amount of energy increases in the thermal energy store of surroundings ;	**1**

Question	Answer	Marks
10(a)(i)	current-carrying wire / coil, is in a magnetic field ; that interacts with the magnetic field of magnets ;	**2**
10(a)(ii)	forces act in opposite directions ; *idea of* forces not along the same line / or creating a moment ;	**2**
10(a)(iii)	reverses the direction of the current in the coil ; every half turn ;	**2**
10(b)(i)	soft-iron core ;	**1**
10(b)(ii)	evidence of $V_p / V_s = N_p / N_s$ **or** $230 / V_s = 2500 / 400$; 37 (V) ;	**2**
10(b)(iii)	evidence of $I_p V_p = I_s V_s$ **or** $Ip \times 230 = 1.6 \times 37$; 0.26 (A) ;	**2**
10(b)(iv)	100% efficient ;	**1**

Question	Answer	Marks
11(a)(i)	beta with 0, –1; (top row 90) ^{90}Y ; (bottom row 39) $_{39}Y$;	3
11(a)(ii)	0.4 (mg) ;	1
11(a)(iii)	*any **three** from:* minimise exposure time maximise distance use shielding radiation detection badge ; ; ;	3
11(b)	evidence of $v=2\pi r / T$ **or** $2 \times \pi \times 3.84 \times 10^8$ **or** $(27.3 \times 24 \times 3600)$; 1020 (m / s) ;	2

Question	Answer	Marks
12(a)(i)	gases **and** solid ;	1
12(a)(ii)	*any **three** from:* vibrations (vibrations) parallel to direction of energy transfer in a series of compressions and rarefactions AVP ; ; ;	3
12(a)(iii)	20–20 000 Hz ;	1
12(b)(i)	detecting fake bank notes ; (AVP)	1

Question	Answer	Marks
12(b)(ii)	damage to skin cells / damage to eyes / (skin) cancer / cell mutation ;	1
12(c)	evidence of $v = f\lambda$ or $3 \times 10^8 = 2.2 \times 10^{12} \times \lambda$; 1.4×10^{-4} (m) ;	2