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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 descriptors 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)(i)	*single circulatory system* only has one, atria / ventricle ; blood flows through heart only once on one circuit of the body ; heart only has two major blood vessels ; AVP ; **max 2**	**2**
1(a)(ii)	higher blood pressure to body / greater blood flow (to tissues) ; more efficient delivery of oxygen (for respiration) / more efficient removal of excretory / waste products ; or lower blood pressure to lungs ; delicate lung tissues are not damaged ; **max 2**	**2**
1(b)(i)	2 – 1.5 = 0.5 (mm) ;	**1**
1(b)(ii)	(aorta is thicker) so that it doesn't burst / AW ; because blood is under higher pressure ;	**2**
1(c)(i)	*any two from* biconcave shape / large surface area ; contain haemoglobin ; no nucleus ;	**2**
1(c)(ii)	*any two from* white blood cells ; platelets ; plasma ;	**2**

Question	Answer	Marks
2(a)	pencil does not dissolve in the solvent / AW ;	**1**
2(b)	<u>mixture</u> because it contains more than one substance / three substances / <u>pure substances</u> only contain one substance ;	**1**
2(c)	the fruit drink does contain the food colouring X because it, contains a substance / has a spot, with the same R_f value / contains a substance / has a spot which moves the same distance as the, substance / spot, in X ;	**1**
2(d)	(R_f =) 3.3 to 3.7 ÷ 4.0 ; 0.83 to 0.93 ;	**2**
2(e)	concentration = 84 ÷ 534 ; = 0.16 (mol / dm^3) ;	**2**

Question	Answer	Marks
3(a)	speed has magnitude only / velocity has magnitude and direction / velocity has direction / speed does not have direction ;	**1**
3(b)	increase in wind strength increases rate of evaporation / ORA ; (stronger wind) allows more molecules to escape / evaporate into the air above the puddle / ORA ;	**2**
3(c)	the energy / work done (supplied by a source) ; per (unit) charge ;	**2**
3(d)(i)	0.75 (A) ;	**1**

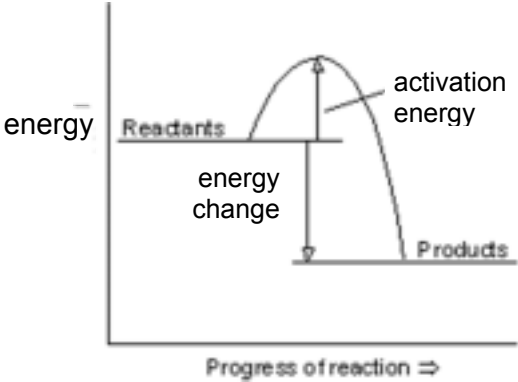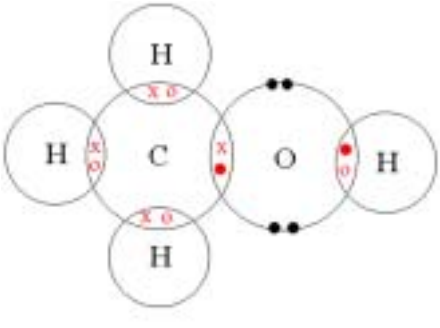| Question	Answer	Marks
3(d)(ii)	if one lamp fails the other will still work ; if one lamp fails still a complete circuit ; OR ref. to full brightness / brighter lamps ; because they each receive the full voltage ;	**2**
3(e)(i)	ref. to total internal reflection / owtte / shown on diagram ; angle of incidence greater than the critical angle ;	**2**
3(e)(ii)	correct diagrams for transverse and longitudinal waves ; vibrations perpendicular to direction of travel for transverse and parallel for longitudinal ;	**2**

Question	Answer	Marks
4(a)	ref to osmosis ; water moves into the grape ; distilled water has a higher water potential / (water moves) from a high to low water potential / down a water potential gradient ;	**3**
4(b)	the water potential was the same ;	**1**
4(c)	*from left to right* turgid, flaccid, plasmolysed ;	**1**
4(d)	*any two from* cell wall ; chloroplast ; (permanent) vacuole ;	**2**

Question	Answer	Marks
5(a)(i)	0.9 (g) ;	1
5(a)(ii)	any one from: same mass / amount of calcium carbonate ; same amount of hydrochloric acid ;	1
5(a)(iii)	M_r of CO_2 = 44 ; moles of CO_2 = 1.2 ÷ 44 = 0.027 ; volume of CO_2 = 0.027 × 24 = 0.65 dm^3 ;	3
5(b)	particles have more kinetic energy / particles move faster ; more collisions per second / greater collision frequency ; more particles have the minimum/activation energy to react;	3
5(c)	any two from: combustion of carbon-containing substances; respiration; (thermal) decomposition of carbonate;	2

Question	Answer	Marks
6(a)(i)	**Q** ;	1
6(a)(ii)	1500 (N) ; constant speed / forces are balanced / resultant is zero ;	2
6(b)	mass = 3500 kg ; force / mass or 4200 / 3500 ; acceleration = 1.2 (m / s^2) ;	3

Question	Answer	Marks
6(c)	larger (surface) area ; (so pressure is less as) P = F / A ;	**2**
6(d)	(work done =) force × distance or 120 × 18 ; = 2160 (J) ;	**2**

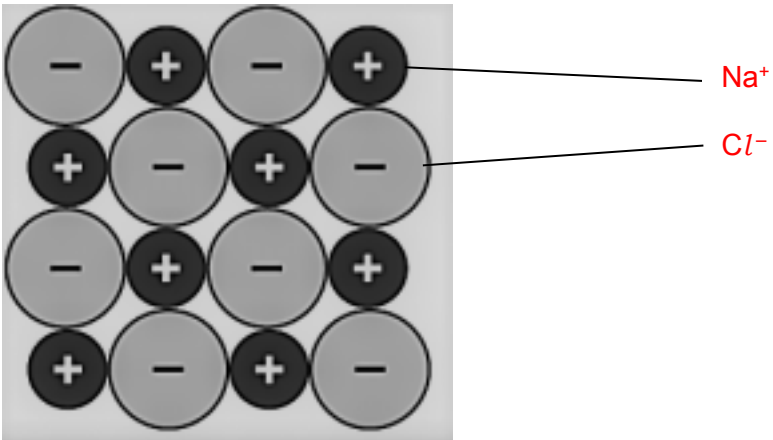| Question	Answer	Marks
7(a)(i)	cacti → insects → scorpions correct organisms ; correct arrows ;	**2**
7(a)(ii)	3 ;	**1**
7(a)(iii)	they eat kangaroo rats which are primary consumers / on 2nd (trophic) level ; they also eat, snakes/large lizards, which are secondary consumers / on 3rd (trophic) level ;	**2**
7(a)(iv)	energy is lost between the trophic levels ; named example of how energy is lost ; not enough energy to sustain a larger population ; **max 2**	**2**
7(b)(i)	environment ; generations ;	**2**
7(b)(ii)	*any three from* humans select the desirable features (instead of nature) ; is a faster process ; results in less variation ; inbreeding is more common ; AVP ; **max 3**	**3**

Question	Answer	Marks
8(a)(i)	$CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$ correct formulae ; correctly balanced ;	2
8(a)(ii)	(reaction in which) energy is given out ;	1
8(a)(iii)		3
8(b)	 ;;	2
8(c)	(methanol) contains an oxygen atom / (methanol) is not just carbon and hydrogen / AW ;	1

Question	Answer	Marks
9(a)(i)	**X** between t > 15 s and t < 16.8 s ;	1
9(a)(ii)	<u>change in speed</u> or <u>5.0</u> or gradient calculation ; time taken 7.0 0.7 (m / s^2) ;	2
9(b)	micrometer screw gauge ;	1
9(c)(i)	$^{90}_{38}\text{Sr} \rightarrow {}^{90}_{39}\text{Y} + {}^{0}_{-1}\beta$ strontium notation correct ; yttrium notation correct ; beta notation correct ;	3
9(c)(ii)	β-particles deflected / gamma rays are not deflected ;	1

Question	Answer	Marks
10(a)	**A** stigma ; **B** anther ;	2
10(b)	<table><tr><td></td><td colspan="2">type of plant</td></tr><tr><td>feature</td><td>insect-pollinated</td><td>wind-pollinated</td></tr><tr><td>relative size</td><td>large</td><td>small</td></tr><tr><td>relative mass</td><td>heavy</td><td>light</td></tr><tr><td>appearance of surface</td><td>spiky</td><td>smooth</td></tr></table>;;;	3

Question	Answer	Marks
10(c)	larger ; brightly coloured ; guidelines ; scent ; AVP ; **max 2**	**2**
10(d)(i)	produce <u>ovules</u> ;	**1**
10(d)(ii)	produce eggs / ova ;	**1**
10(e)	zygote ;	**1**

Question	Answer	Marks
11(a)(i)	any two from: chloride <u>ions</u> are attracted to the (oppositely charged) anode / chloride <u>ions</u> are negative (so attracted to the anode) ; electron loss occurs at the anode / oxidation occurs at the anode ; chlorine atoms combine to form chlorine molecules ; **max 2**	**2**
11(a)(ii)	hydrogen ;	**1**
11(a)(iii)	so electrodes do not react with the products / named substance present ;	**1**
11(b)	$Na^+(l) + e^- \rightarrow Na(l)$ half-equation ; state symbols ;	**2**

Question	Answer	Marks
11(c)	labelled Na^+ and Cl^- ions ; alternating positive and negative / Na and Cl ; e.g. 	2

Question	Answer	Marks
12(a)(i)	voltage is lowered ;	1
12(a)(ii)	$(N_S =) N_P V_S / V_P$ or $5000 \times 19/250$; number of coils = 380 ;	2
12(b)	2 hours = 2×3600 = 7200 s; (energy =) $VIt / 19 \times 1.1 \times 7200$; (energy =) 150 000 (J) ;	3
12(c)	(moment =) force $\times$ (perpendicular) distance or $12 \times 24(/100)$; 2.9 (Nm) ;	2

Question	Answer	Marks
12(d)	black surfaces are good emitters of thermal energy ; large surface area enables efficient convection;	2

Question	Answer	Marks
13(a)	any one from : for (good) plant growth ; to produce plant proteins / amino acids ; to produce sufficient food / increase yield AW ;	1
13(b)(i)	$N_2 + 3H_2 \rightleftharpoons 2NH_3$ correct formulae ; correctly balanced ;	2
13(b)(ii)	200 atmospheres ;	1
13(b)(iii)	catalyst speeds up rate of reaction ; (temperature of) 450 °C is used to increase the rate of reaction without sacrificing yield ;	2