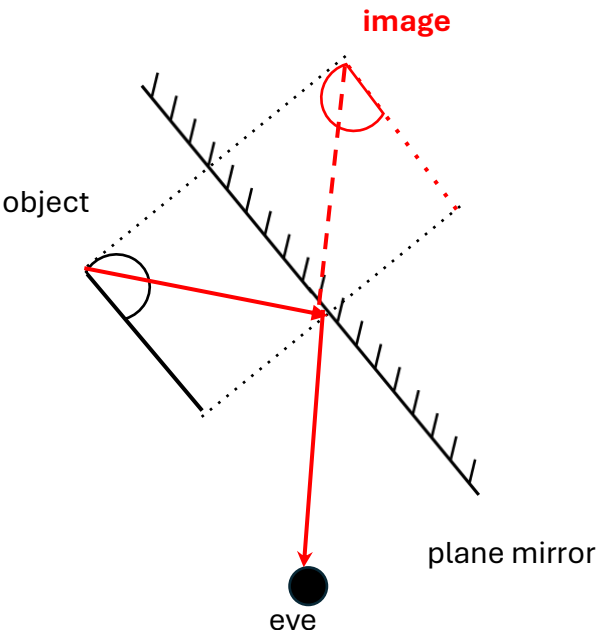


Anglo-Chinese School (Barker Road)
Secondary 2 Express Science
End-of-Year Examination 2024

Section A

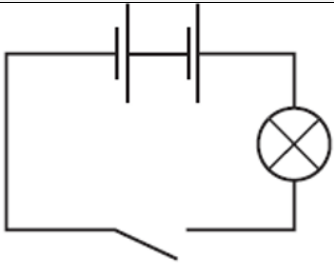
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
B	A	D	C	B	C	C	B	D	C
A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
C	C	B	C	B	C	C	C	C	C
A21	A22	A23	A24	A25	A26	A27	A28	A29	A30
C	D	C	D	D	D	C	D	A	B

Qn	Answers	Remarks												
B1(a)	<table><tr><td>substance</td><td>element</td><td>compound</td><td>mixture</td></tr><tr><td>solid P</td><td></td><td>✓</td><td></td></tr><tr><td>powder Q</td><td></td><td></td><td>✓</td></tr></table> [1] for each row	substance	element	compound	mixture	solid P		✓		powder Q			✓	
substance	element	compound	mixture											
solid P		✓												
powder Q			✓											
B1(b)	Add mixture P and Q into <u>water to dissolve solid P</u>. [1] <u>Filter the mixture</u> [1] OR <u>using a (filter) funnel and filter paper</u>, [1] to collect powder Q <u>as residue</u>. [1] Note: Use of a magnet is not required since qn requires isolation of Q from P only.	R: No water added, subsequent steps of filtration required the mixture to be in water to be mixed in water first. [0m]												
B1(c)	<table><tr><th>substance</th><th>chemical formula</th><th>number of atoms</th></tr><tr><td>nitrogen gas</td><td>N₂</td><td><u>2</u></td></tr><tr><td>ethene</td><td>C₂H₄</td><td><u>6</u></td></tr><tr><td>sulfuric acid</td><td>H₂SO₄</td><td><u>7</u></td></tr></table> [1] for each row	substance	chemical formula	number of atoms	nitrogen gas	N ₂	<u>2</u>	ethene	C ₂ H ₄	<u>6</u>	sulfuric acid	H ₂ SO ₄	<u>7</u>	
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B2(a)(i)	temperature of water [1]	R: temperature without mentioning substance												
B2(a)(ii)	1) volume of water / amount of water 2) mass of salt / amount of salt 3) rate of stirring 4) size of salt (powder/granular) [State any one – [1] each	R: Exact mass of salt shown in diagram Not a variable but a feature of the setup R: Type of salt												
B2(b)	<u>Z</u> ; [1] The <u>higher the temperature</u>, the faster the salt dissolves [1] <u>OR</u> Rate of dissolving occurs faster rate at higher temperature [1]													

Qn	Answers	Remarks
B3(a) (a)		MP1: Correct image (same size, laterally inverted, equidistant from mirror, label) Equidistance from the mirror. MP2: correct incident light ray and reflected light ray indicated by arrows pointing correctly. MP3 [1] angle of incidence = angle of reflection is correctly depicted (visually judge)
(b)	<u>laterally inverted</u> <u>Virtual</u> <u>Same size as object</u> <u>Same shape as object, upright</u> [any 2 features]	R: flipped, inverted, R: object distance to mirror = image distance to mirror (law of reflection, not property of image) R: size of image is proportional to object
B4(a)(i)	A [1]	
B4(a)(ii)	C [1]	
B4(a)(iii)	B [1]	
B4(b)	Physical reaction <u>does not form new substances</u> but chemical does [1] OR Physical reaction <u>does not involve rearrangement of particles</u> but chemical reaction does. [1] Physical reactions are <u>reversible</u> but chemical reactions are not. [1]	
B5(a)(i)	<u>Fatty acids</u> OR <u>glycerol</u> [1]	R: Incorrect spelling
B5(a)(ii)	<u>Fatty acids</u> produced caused the <u>pH of solution to decrease to 7</u> [1] OR <u>pH drops below 7</u> OR <u>pH drops / milk more acidic</u> B.O.D: Neutralisation occurred	R: Lipase is acidic
B5(b)(i)	Results are more reliable/consistent/precise OR Reduce human error, reduce random error [1]	R: increase/ensure accuracy, increase fairness, reduce chance of human error

Qn	Answers	Remarks												
B5(b)(ii)	B, C, A													
B6(a)(i)	transport/carry <u>oxygen around the body</u>	R: Carry oxygenated blood – RBC is a component of blood and it carries oxygen and not blood												
B6(a)(ii)	MP1: <u>biconcave</u>; MP2: To increase <u>surface area to volume ratio</u> for <u>faster</u> exchange of oxygen OR <u>Increase surface area for increase exchange of gases/ diffusion / OWTTE</u> OR MP1: No nucleus MP2: More space to store/bind to more oxygen [1] correct feature + [1] matched related function.	R: incorrect spelling for key features – e.g. bioconcave												
B6(b)	platelet(s) [1]	R: wrong spelling												
B6(c)(i)	B, C, G All 3 correct – [1]													
B6(c)(ii)	A, D, E, F [2] – 4 correct [1] – 3 correct [0] – 2 or less													
B7(a)	<table border="1"> <thead> <tr> <th>letter from Fig. 8.1</th><th>name</th><th>function</th></tr> </thead> <tbody> <tr> <td>T [1]</td><td>male sex glands</td><td>makes the fluid for the sperm to swim in</td></tr> <tr> <td>Z</td><td><u>urethra</u> [1]</td><td>carries urine and sperm out of the body</td></tr> <tr> <td>X</td><td>Testis/testes/testicle</td><td>produces <u>male sex hormones</u> and <u>cells/sperms</u> [1]</td></tr> </tbody> </table>	letter from Fig. 8.1	name	function	T [1]	male sex glands	makes the fluid for the sperm to swim in	Z	<u>urethra</u> [1]	carries urine and sperm out of the body	X	Testis/testes/testicle	produces <u>male sex hormones</u> and <u>cells/sperms</u> [1]	R: spelling error
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B7(b)	L → M → K → J → H → G MP1: M then K then J after L MP2: H then G at the end													
B7(c)	deepening of voice growth of facial and pubic hair muscular development [2] – 3 correct [1] – 2 correct [0] – 1 or less R: 1m for every additional tick													

Qn	Answers	Remarks											
C1(a)	Solar energy → heat/thermal energy → kinetic energy → electrical energy [2] – all 3 correct [1] – 2 correct R: If only 1 answer is correct & if energy is not indicated	R: trap heat											
C1 (b)	Metal (names of specific metals will be accepted) [1] black/dark coloured/dull [1]	R: reflect heat energy											
C1(c)	Black/Dark/Dull coloured metals are <u>good conductors and absorbers of heat energy</u> [both reasons are needed [1]	R: energy (must indicate that it is kinetic energy)											
C1(d)	MP1: To <u>reflect light (energy)</u> or <u>radiation</u> to the water container [1] MP2: Use of concave mirrors allows the light rays to be <u>concentrated /converged</u> towards the water container in the middle. [1] OR MP2: Surrounding the water container with multiple concave mirrors also <u>increases amount of light rays reflected</u> to the water container. [1]												
C1(e)	MP1: When the temperature increases, the molecules (BOD: particles) <u>gain more kinetic energy/kinetic energy increases</u> [1] MP2: Arrangement: from <u>closely packed</u> in disorderly manner to <u>far apart</u> in a random manner. [1] MP3: Movement: from <u>sliding past one another</u> (randomly) to <u>moving at high speeds</u> (randomly). [1]	R: energy increase R: small gaps to large gaps R: move randomly to move randomly faster											
C2(a)	May [1]												
C2(b)	4 [1]	R: names of months March, May, June, August											
C2(c)	<table><tr><td>electricity consumption / kWh</td><td>rate /\$</td><td>cost/ \$</td><td>total cost / \$</td></tr><tr><td>348</td><td>0.2250</td><td>348 X 0.225 = 78.30 [1]</td><td rowspan="2">78.30 + 13.39 = 91.69 [1]</td></tr><tr><td>52</td><td>0.2575</td><td>52 X 0.2575 = 13.39 [1]</td></tr></table>	electricity consumption / kWh	rate /\$	cost/ \$	total cost / \$	348	0.2250	348 X 0.225 = 78.30 [1]	78.30 + 13.39 = 91.69 [1]	52	0.2575	52 X 0.2575 = 13.39 [1]	Allow e.c.f for (ii) total cost R: 78.3
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C2(d)	• Turn/Switch off electrical appliances when not in use • Use a fan instead of air conditioner • Use more energy saving electrical devices • Reduce amount of time using electrical devices/appliances <i>Any two reasonable responses [2]</i>	R: Do not repeat ways that are the same idea (e.g. turn off the lights & turn off the fans)											

Qn	Answers	Remarks
C2(e)	 A switch opened/closed MP1: correct number of circuit components correct diagram for each component – 2 batteries, 1 bulb, 1 switch and wires MP2: all components are connected in series. [MP3: wires drawn with straight lines using ruler	R: MP1 if casing drawn around the circuit diagram R: no wire in between cell and bulb
C3(a)(i)	oxygen	
C3(a)(ii)	MP1: (Diffusion) involves the <u>movement of particles/molecules</u> [1] MP2: <u>from a region of higher concentration</u> to a <u>region of lower concentration</u>.	R: Deduct 1m if an explanation is provided R: missing word (particles/molecules)
C3(a)(iii)	MP1: undergo photosynthesis to <u>make food/produce oxygen</u> MP2: provides <u>energy for organisms</u> in a food chain to <u>support survival</u> OR [related to energy transfer in a food chain] MP2: provide <u>oxygen for respiration</u> [related to cellular process rather than breathing]	Substance should relate to its function R: oxygen for breathing e.g. green plants <u>produces oxygen in photosynthesis</u> for animals to <u>respire</u> (undergo respiration)
C3(b)(i)	$5.8 - 1.2 = 4.6 \text{ cm}^3$ MP1: read values 5.8 and 1.2 from graph correctly MP2: correct calculation + answer with units (accept: cm^3 & cm^3/h)	R: Deduct 1m if no calculation shown or no evidence of data from graph
C3(b)(ii)	xylem	
C3(c)	MP1: Phloem was removed MP2: Sugars cannot be transported down the stem and accumulate above the cut	BOD: food/glucose Note: sucrose is the accurate sugar molecule R: Starch (if mentioned in phloem)