Pearson Edexcel

Mark Scheme (Provisional)

Summer 2021

Pearson Edexcel International GCSE

In Science (Single Award) (4SS0) Paper 1C

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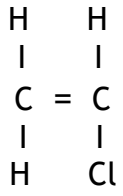
General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Notes	Marks
(a)	(paper) chromatography		1
1 (b) (i)	**B** filtration A is incorrect as P is not used for crystallisation C is incorrect as P is not used for fractional distillation D is incorrect as P is not used for simple distillation		1
(ii)	**C** fractional distillation A is incorrect as S is not used for crystallisation B is incorrect as S is not used for filtration D is incorrect as S is not used for simple distillation		1
(iii)	evaporating basin/dish	**ALLOW** evaporating bowl	1
			Total 4

Question number	Answer	Notes	Marks
2 (a) (i)	3/three		1
(ii)	nucleus	**ALLOW** nuclei	1
(iii)	1/one	**ALLOW** alkali metals	1
(iv)	2/two		
(v)	lithium	**IGNORE** Li	1
(vi)	+1/1+	**ALLOW** +/plus/positive	1
(b) (i)	**M1** atoms (of the same element) with same atomic number/ same number of protons **M2 but** different mass numbers/different number of neutrons	**REJECT** molecules/ compound once only	2
(ii)	**M1** (6 x 7.8) + (7 x 92.2) **OR** 692.2 **M2** 692.2 ÷ 100 = 6.9 **OR** answer to **M1** ÷ 100	**ACCEPT** 6.92/6.922 An answer of 7 with working scores 1 An answer of 7 without any working scores 0.	2
			Total 10

Question number	Answer	Notes	Marks
3 (a) (i)	halogens		1
(ii)	**B** bromine A is incorrect as astatine is a solid at room temperature C is incorrect as fluorine is a gas at room temperature D is incorrect as iodine is a solid at room temperature		1
(iii)	**C** green A is incorrect as chlorine is not brown B is incorrect as chlorine is not colourless C is incorrect as chlorine is not red		1
(iv)	**M1** (damp) litmus paper **M2** bleached	**ALLOW** universal indicator paper/ pH paper **ALLOW** turns white **ACCEPT** (damp) blue litmus paper turns red and then bleached for both marks.	2
(b) (i)	**M1** use of 56 and 35.5 in calculation **M2** 162.5	 91.5 without working scores 1 correct answer without working scores 2	2
(ii)	$2\,Fe + 3\,Cl_2 \rightarrow 2\,FeCl_3$	**ALLOW** multiples and fractions	1
			Total 8

Question number	Answer	Notes	Marks
4 (a) (i)	C_nH_{2n}	**ALLOW** upper case N or different letter e.g. x	1
(ii)	An explanation that links the following three points **M1** (a compound) with a (C=C) double bond **M2** (which contains) hydrogen and carbon (atoms) **M3** only	**ACCEPT** molecule or substance for compound **REJECT** element for compound and/or molecules for atoms once only **M3** dep on mention of just C and H in **M2**	3
(b) (i)			1
(ii)	An explanation that links one of the following pairs **M1** inert **M2** (so) do not biodegrade OWTTE **OR** **M1 b**urning polymers releases gases/fumes **M2** (which) are toxic/poisonous	 **ALLOW** do not react /unreactive **ALLOW** other relevant alternatives eg landfill sites fill up **ALLOW** (which) contribute to global warming /greenhouse effect	2
			Total 7

Question number	Answer	Notes	Marks
5 (a) (i)	OH^-	**ALLOW** $HO^-/OH^{-1}/OH^{1-}$ **ALLOW** lower case letters	1
(ii)	Any value between 0 and 3 inclusive		1
(b)	An explanation that links the following two points **M1** polystyrene is an insulator **M2** less heat (energy) will be lost	 **ALLOW** no heat (energy) will be lost	2
(c)	temperature in °C at end: 22.0 temperature in °C at start: 17.7 temperature change in °C: 4.3 1 mark each	**ALLOW** 22 If initial and final temperatures are reversed deduct 1 mark **ALLOW** ECF on temperature change	3
(d)	• give the expression for Q • substitute correct numbers into $Q = mc\Delta T$ • evaluation in J • conversion to kJ Example calculation **M1** $Q = mc\Delta T$ **M2** 50 x 4.2 x 5.2 **M3** 1092 (J) **M4** 1.1 (kJ)	 **M2** subsumes **M1** **ALLOW** ECF for **M3** and **M4** on incorrect values in **M2** **ACCEPT** answers correctly rounded to 2 or more sig figs 1.1, 1.09, 1.092 without working scores 4 1100, 1090, 1092 without working scores 3 0.546, 0.55 without working scores 3 546, 550 without working scores 2 **ALLOW** use of 4.18 giving an answer of 1.0868	4 Total 11

Question number	Answer	Notes	Marks
6 (a) (i)	C_7H_{16}	Penalise incorrect use of case and subscripts	1
(ii)	(surfacing) roads/roofs	**ALLOW** other correct uses	1
(iii)	A description that makes reference to the following three points **M1** gasoline has a **lighter** colour /ORA **M2** gasoline has a **lower** boiling point /ORA **M3** gasoline has a **lower** viscosity /ORA	**ACCEPT** reference to specific colours e.g. gasoline is colourless/ bitumen is black statements must be comparisons	3
(b) (i)	An explanation that links the following four points **M1** water vapour/steam condenses **M2** (because) the ice (and water) is below 100°C/ the boiling point of water **M3** carbon dioxide is still a gas/ does not condense (in the U-tube) **M4** (because) the ice (and water) is above – 78 °C/ the sublimation point of carbon dioxide	 **ALLOW** turns to liquid **ALLOW** (because) the ice (and water) are cold /at a low temperature/ at 0 °C	4
(ii)	A description including the following two points **M1** anhydrous copper(II) sulfate is white **M2** (when water is present) it turns blue		2
			Total 11

Question number	Answer	Notes	Marks
7 (a)	shared pair(s) of electrons (between two atoms)	**REJECT** if between molecules	1
(b) (i)	$N_2 + 2O_2 \rightarrow 2NO_2$	**ALLOW** multiples and fractions	1
(ii)	acid rain	**ACCEPT** breathing problems/ asthma **ALLOW** an effect of acid rain e.g. kills fish	1
(c)	An explanation that links the following six points **M1** nitrogen dioxide has a simple molecular structure **M2** silicon dioxide has a giant (covalent) structure **M3** many/strong (covalent) bonds in silicon dioxide (need to be broken) **M4** intermolecular forces in nitrogen dioxide **M5** are weak **M6** more energy needed to break the bonds in silicon dioxide than to overcome the (intermolecular) forces in nitrogen dioxide	**REJECT** ionic or metallic structure/ bonds for **M2** and **M3** **REJECT** mention of intermolecular forces for **M3** **REJECT** covalent bonds are weak for **M4** and **M5** **REJECT** reference to breaking of covalent bonds in nitrogen dioxide	6
			Total 9

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