Mark Scheme (Results)

January 2019

Pearson Edexcel International
Advanced Subsidiary Level
In Chemistry (WCH02)
Paper 01 Application of Core Principles of Chemistry

https://xtremepape.rs/

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2019
Publications Code WCH02_01_1901_MS
All the material in this publication is copyright
© Pearson Education Ltd 2019

https://xtremepape.rs/

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.

https://xtremepape.rs/

Using the Mark Scheme

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge. Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

The mark scheme gives examiners:
- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

/ means that the responses are alternatives and either answer should receive full credit.
( ) means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
ecf/TE/cq (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Quality of Written Communication
Questions which involve the writing of continuous prose will expect candidates to:
- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.
Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

https://xtremepape.rs/

Section A (multiple choice)

Question Number	Answer	Mark
1	**The only correct answer is C** **A** *is not correct because the molecule has two tetrahedral carbons* **B** *is not correct because the molecule has a tetrahedral carbon* **D** *is not correct because the molecule has a tetrahedral carbon*	**1**

Question Number	Correct Answer	Mark
2	**The only correct answer is B** **A** *is not correct because it does not contain a 120^{o} bond angle* **C** *is not correct because it does not contain a 90^{o} bond angle* **D** *is not correct because it contains neither bond angle*	**1**

Question Number	Correct Answer	Mark
3	**The only correct answer is B** **A** *is not correct because the N-H bond is less polar than the O-H bond* **C** *is not correct because the C-Cl bond is less polar than the O-H bond* **D** *is not correct because the C-I bond is less polar than the O-H bond*	**1**

Question Number	Correct Answer	Mark
4	**The only correct answer is D** **A** *is not correct because the molecule is non-polar* **B** *is not correct because the bond is polar* **C** *is not correct because the bond is polar and the molecule is non-polar*	**1**

https://xtremepape.rs/

Question Number	Correct Answer	Mark
5	**The only correct answer is A** **B** *is not correct because both effects are incorrect* **C** *is not correct because the effect of increasing chain length is to increase the boiling temperature* **D** *is not correct because the effect of increasing branching is to decrease the boiling temperature*	**1**

Question Number	Correct Answer	Mark
6	**The only correct answer is A** **B** *is not correct because HF has the highest boiling temperature* **C** *is not correct because HF has the highest boiling temperature and HCl the lowest* **D** *is not correct because the trend for HI, HBr and HCl is incorrect*	**1**

Question Number	Correct Answer	Mark
7	**The only correct answer is D** **A** *is not correct because metal nitrites only form with some Group 1 nitrates* **B** *is not correct because metal oxides do not form with some Group 1 nitrates* **C** *is not correct because nitrogen dioxide only forms with Group 2 and lithium nitrates*	**1**

Question Number	Correct Answer	Mark
8	**The only correct answer is D** A *is not correct because hydrogen bromide usually forms first* B *is not correct because bromine forms* C *is not correct because sulfur dioxide forms*	**1**

https://xtremepape.rs/

Question Number	Correct Answer	Mark
9	**The only correct answer is C** **A** is *not correct* because chlorine disproportionates from 0 to +1 and -1 **B** is *not correct* because chlorine disproportionates from 0 to +5 and -1 **D** is *not correct* because chlorine disproportionates from +5 to +7 and -1	**1**

Question Number	Correct Answer	Mark
10	**The only correct answer is A** **B** *is not correct because this is the effect of lowering the temperature* **C** *is not correct because this is the effect of increasing the temperature* **D** *is not correct because the area under the curve does not change*	**1**

Question Number	Correct Answer	Mark
11(a)	**The only correct answer is B** **A** *is not correct because both effects are incorrect* **C** *is not correct because the yield increases* **D** *is not correct because the rate decreases*	**1**

Question Number	Correct Answer	Mark
11(b)	**The only correct answer is D** **A** *is not correct because the yield increases* **B** *is not correct because the rate increases* **C** *is not correct because both effects are incorrect*	**1**

https://xtremepape.rs/

Question Number	Correct Answer	Mark
11(c)	**The only correct answer is C** **A** *is not correct because the quantities have been doubled* **B** *is not correct because the quantities have been doubled* **D** *is not correct because the quantities have been doubled*	**1**

Question Number	Correct Answer	Mark
12	**The only correct answer is D** **A** *is not correct because the volume of H_2O gas has been ignored* **B** *is not correct because the volume of carbon dioxide has been ignored* **C** *is not correct because the volume of excess oxygen has been ignored*	**1**

Question Number	Correct Answer	Mark
13	**The only correct answer is A** **B** *is not correct because it is a primary alcohol* **C** *is not correct because it is a secondary alcohol* **D** *is not correct because it is a secondary alcohol*	**1**

Question Number	Correct Answer	Mark
14	**The only correct answer is A** **B** *is not correct because butane is not formed* **C** *is not correct because butane is not formed* **D** *is not correct because butene is not formed*	**1**

https://xtremepape.rs/

Question Number	Correct Answer	Mark
15(a)	**The only correct answer is C** **A** *is not correct because it is not an addition reaction nor electrophilic* **B** *is not correct because it is not an addition reaction nor nucleophilic* **D** *is not correct because it is not nucleophilic*	**1**

Question Number	Correct Answer	Mark
15(b)	**The only correct answer is D** **A** *is not correct because it is not an addition reaction* **B** *is not correct because it is not an addition reaction* **C** *is not correct because it does not involve a free radical*	**1**

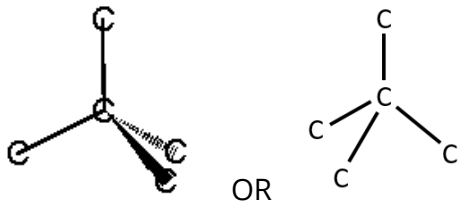
Question Number	Correct Answer	Mark
16	**The only correct answer is A** **B** *is not correct because it is emitted in smaller amounts* **C** *is not correct because it is emitted in smaller amounts* **D** *is not correct because it is emitted in smaller amounts*	**1**

Question Number	Correct Answer	Mark
17	**The only correct answer is B** **A** *is not correct because neither water vapour nor carbon dioxide depletes the ozone layer* **C** *is not correct because carbon dioxide does not deplete the ozone layer* **D** *is not correct because water vapour does not deplete the ozone layer*	**1**

(Total for Section A = 20 marks)

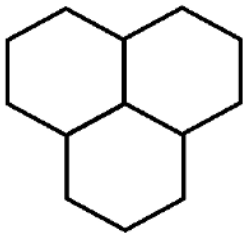
https://xtremepape.rs/

Section B

Question Number	Acceptable Answers	Reject	Mark
18(a)(i)	 OR ALLOW Open/solid circles for C atoms Skeletal structures IGNORE Number of tetrahedral units Fewer than four bonds to peripheral C atoms Stated bond angles	Bonds at right angles **only** Atoms of any other element Any C atom with 5 (or more) bonds	**1**

Question Number	Acceptable Answers	Reject	Mark
18(a)(ii)	Mark all points independently Shape: tetrahedral ALLOW Tetrahedron Any reasonable attempt at spelling **(1)** Bond angle: 109.5° ALLOW 109° **(1)** Explanation: minimum repulsion / maximum separation **and** (between) **four** (bonding) pairs of electrons ALLOW As far apart as possible for maximum separation **Four** bond pairs / regions of electron density / covalent bonds **(1)**	Four bonds Four atoms	**3**

https://xtremepape.rs/

Question Number	Acceptable Answers	Reject	Mark
18(b)(i)	Diagram showing 2, 3, 4 or 5 interlocking hexagons with 13 to 19 carbons inclusive ALLOW 11 to 21 carbons e.g.  ALLOW Non skeletal diagrams **(1)** IGNORE Number of bonds to peripheral carbons Additional layers Bond angle 120° **(1)**	Any carbon with four (or more) bonds	**2**

Question Number	Acceptable Answers	Reject	Mark
18(b)(ii)	London/dispersion force(s) / van der Waals' ALLOW Any reasonable attempt at spelling Instantaneous dipole-induced dipole Induced dipole-induced dipole Temporary dipole-induced dipole IGNORE Intermolecular forces	Hydrogen bond (Permanent) dipole-dipole	**1**

https://xtremepape.rs/

Question Number	Acceptable Answers	Reject	Mark
18(b)(iii)	Graphite has delocalised electron**s** (and diamond does not) ALLOW Delocalised / free moving electron per atom or if linked to every carbon having three bonds Sea of delocalised electrons Graphite has some free moving electron**s** Electrons can move between layers Diamond does not contain delocalised electrons IGNORE Just free electrons Reference to charge carriers	Just one / a delocalised electron Lone pair of electrons Free moving electro**n** Electrons move perpendicular to layers Any reference to graphite molecules	**1**

https://xtremepape.rs/

Question Number	Acceptable Answers	Reject	Mark
18(b)(iv)	Heat is not conducted at right angles to the layers OR Heat is conducted well in the direction of / within the layers ALLOW Heat is conducted well between the layers / spread out evenly across the spacecraft **(1)** Graphite has a high melting / boiling temperature ALLOW Graphite can withstand high temperatures / is thermally stable / is inert **(1)** IGNORE Soft / slippery / layers can slide Reference to reduced friction Malleable/mouldable Low density/weight		**2**

Question Number	Acceptable Answers	Reject	Mark
18(c)	(Buckminster)fullerene(s) / (carbon/fullerene) nanotubes / graphene ALLOW Buckyball(s) Any reasonable attempt at spelling IGNORE 'Carbon sixty'/C_{60} Amorphous carbon	Charcoal / soot / coal / carbon fibre	**1**

(Total for Question 18 = 11 marks)

https://xtremepape.rs/

Question Number	Acceptable Answers	Reject	Mark
19(a)(i)	• Hydrogen bonding ALLOW H-bond(ing) • London/dispersion / van der Waals' / instantaneous dipole-induced dipole / temporary dipole-induced dipole • Permanent dipole(-permanent dipole) IGNORE Just dipole-dipole All three **(2)** Any two **(1)** Any reference to a covalent bond with one or two correct intermolecular forces scores (0) Any reference to a covalent bond with three correct intermolecular forces scores (1)		**2**

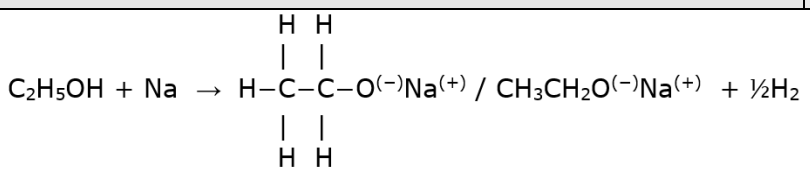
https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
19(a)(ii)	Butan-2-ol forms hydrogen bonds with water (making some dissolve) ALLOW Butan-2-ol cannot form H-bonds with water easily / forms H-bonds with water less easily than ethanol **(1)** IGNORE Just butan-2-ol can/forms/has H-bonds London/dispersion forces between butan-2-ol molecules are relatively strong / stronger than in ethanol (limiting solubility) ALLOW London/dispersion forces in butan-2-ol are strong(er) ACCEPT van der Waals' / instantaneous dipole-induced dipole / temporary dipole-induced dipole forces for London/dispersion forces **(1)** Energy released from intermolecular forces formed between butan-2-ol and water less than that required to break intermolecular forces (within butan-2-ol and water) scores (1) IGNORE Comparison of strength of London forces in butan-2-ol to H-bonding in water Reference to the number of H-bonds formed / in water/butan-2-ol/ethanol Reference to polarity of water/butan-2-ol/ ethanol / hydrophobic/hydrophilic properties	Cannot form H-bonds with water	**2**

https://xtremepape.rs/

Question Number	Acceptable Answers	Reject	Mark
19(b)(i)	Sodium disappears ALLOW Dissolves for disappears Solid for sodium White solid (forming) **(1)** IGNORE White precipitate forms Heat produced Sodium sinks/floats Sodium decreases in mass Sodium melts Bubbles / fizzing / effervescence **(1)** IGNORE Gas/vapour/hydrogen/H_2 produced	Yellow flame Any other gas eg CO_2/O_2	**2**

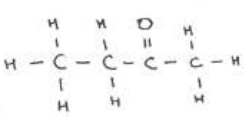
https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
19(b)(ii)			**2**
	Correct formula of sodium ethoxide ALLOW $C_2H_5O^{(-)}Na^{(+)}$ **(1)** Rest of equation **(1)** M2 dependent on M1 or O–Na/CH_3CH_2NaO/C_2H_5NaO ALLOW Multiples Fully correct equation for alcohol other than ethanol eg CH_3OH/C_3H_7OH scores (1) IGNORE state symbols even if incorrect	O–Na CH_3CH_2NaO C_2H_5NaO C_2H_6O	

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
19(c)(i)	Ethanoic acid **(1)** IGNORE CH_3COOH Displayed/skeletal formula Carboxylic acid Just ethanoic Any one from: • Fizzes / effervesces / bubbles / with sodium carbonate/ hydrogencarbonate / calcium carbonate ALLOW Gas produced turns limewater cloudy for fizzes etc • Neutralises (a significant volume of) sodium carbonate/ hydrogencarbonate solution • Fizzes / effervesces / bubbles with Mg/magnesium • Fruity smell (when heated) with an alcohol (in the presence of an acid catalyst) **(1)** No TE on M1 unless near miss e.g. CH_3COOH/carboxylic acid IGNORE Tests involving indicators eg litmus	PCl_5/phosphorus(V) chloride Na/sodium	**2**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
19(c)(ii)	$CH_3CH_2COCH_3$ / $C_2H_5COCH_3$ OR  OR 	Molecular formula	**1**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
19(c)(iii)	Any two from: • Butan-2-ol has O–H peak/absorption/trough ALLOW OH/–OH/hydroxyl for O–H C–O/C–OH peak Wavenumber/stretch/vibration for peak etc Reverse argument for oxidation product IGNORE Alcohol absorption • Oxidation product has C=O peak/absorption/trough ALLOW Carbonyl bond peak Butan(-2-)one/ketone/product for oxidation product Reverse argument for butan-2-ol • Both have different fingerprint regions **(2)** IGNORE Different C–H absorptions Different C–C absorptions Wavenumbers, even if incorrect	Penalise omission of peak once only OH^-/hydroxide C=O Aldehyde C=O C–O Aldehyde C–H	**2**

(Total for Question 19 = 13 marks)

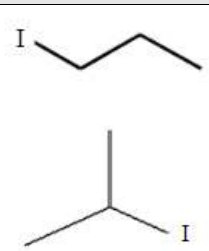
https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
20(a)(i)	$2I^- + Cl_2 \rightarrow I_2 + 2Cl^-$ ALLOW Multiples Spectator ions if crossed out IGNORE Full equation (as working) Half equations (as working) State symbols even if incorrect		**1**

Question Number	Acceptable Answer	Reject	Mark
20(a)(ii)	Any suitable named **liquid** organic solvent e.g. hexane / cyclohexane ALLOW Tetra / trichloro(m)ethane Hydrocarbon solvent **(1)** Pink / purple / violet / mauve **(1)** IGNORE Modifiers eg pale M2 dependent on M1	Any alcohol / alkene / arene Halogenoalkane	**2**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
20(a)(iii)	Sulfur / S oxidised from (+)2 to (+)2½ **(1)** Iodine / I / I_2 reduced from 0 to -1 **(1)** OR Sulfur / S from (+)2 to (+)2½ **(1)** Iodine / I / I_2 from 0 to -1 **and** Sulfur / S oxidised Iodine / I / I_2 reduced **(1)** ALLOW Oxidation states from annotated equation	$S_2O_3^{2-}$ oxidised $S_2O_3^{2-}$ $S_2O_3^{2-}$ oxidised	**2**

Question Number	Acceptable Answer	Reject	Mark
20(b)(i)	 IGNORE Bond angles and bond lengths Displayed / structural formulae even if incorrect		**1**

Question Number	Acceptable Answer	Reject	Mark
20(b)(ii)	There is only one (stable) isotope of iodine ALLOW No isotopes of iodine (Both) chlorine and bromine have **two** isotopes Chlorine has ^{35}Cl and ^{37}Cl and / or bromine has ^{79}Br and ^{81}Br ACCEPT Chloro- / chloride for chlorine Bromo- / bromide for bromine	Isomer	**1**

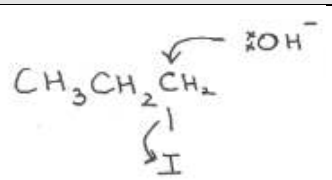
https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
20(b)(iii)	$CH_3CH_2CH_2^+$ ALLOW $C_3H_7^+$ Displayed formula **(1)** IGNORE Position of positive charge The C-I bond breaks (may be shown on a diagram) **(1)** IGNORE Loses iodine	Omission of charge $CH_3CHCH_3^+$ Just fragmentation	**2**

Question Number	Acceptable Answer	Reject	Mark
20(c)(i)	Yellow ALLOW Bright yellow **(1)** Silver iodide **(1)** IGNORE AgI	Pale yellow	**2**

Question Number	Acceptable Answer	Reject	Mark
20(c)(ii)	$Ag^+(aq) + I^-(aq) \rightarrow AgI(s)$ TE on silver chloride / silver bromide in (c)(i)		**1**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
20(d)	 Curly arrow from lone pair on OH^- to carbon (of C-I) **(1)** Curly arrow from C-I bond to the iodine or just beyond (can be scored from a transition state) **(1)** Correct S_N1 mechanism scores (2) IGNORE Dipoles even if incorrect Transition state / intermediate in S_N2 mechanism Products, even if incorrect	Penalise incorrect carbon chain / missing hydrogens once only From Na-OH $OH:^-$ Full charges	**2**

Question Number	Acceptable Answer	Reject	Mark
20(e)(i)	Elimination		**1**

Question Number	Correct Answer	Reject	Mark
20(e)(ii)	Propene ALLOW Prop-1-ene IGNORE Alkene		**1**

(Total for Question 20 = 16 marks)
(Total for Section B = 40 marks)

https://xtremepape.rs/

Section C

Question Number	Acceptable Answer	Reject	Mark
21(a)(i)	**Electrons** excited / promoted (to higher energy levels / orbitals by heat) ALLOW Raised/move / jump for excited **(1)** (Electrons) relax to lower energy levels / orbitals ALLOW Return / drop / fall / de-excite for relax Ground state for lower energy levels **(1)** To score both M1 and M2 energy levels / orbitals must be mentioned somewhere IGNORE Reference to stability of excited / ground state Energy / photons emitted as (visible) light ALLOW Wavelength / frequency / radiation for energy Given out / released for emitted Visible range / region / spectrum for light **(1)** IGNORE ion or atom throughout	...by electricity / combustion / burning Pushed Reflected	**3**

Question Number	Acceptable Answer	Reject	Mark
21(a)(ii)	Yellow-red ALLOW Brick-red / red	Just yellow Any mention of orange	**1**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
21(a)(iii)	Energy / frequency / wavelength (emitted) is outside the visible range / region / spectrum ALLOW Photon / radiation / light for energy etc Too high / low / in the ultraviolet for outside Energy etc cannot be detected by the eye	..of the ions White light	**1**

Question Number	Acceptable Answer	Reject	Mark
21(b)	$CaCO_3 + CO_2 + H_2O \rightarrow Ca(HCO_3)_2$ ALLOW H_2CO_3 for ($CO_2 + H_2O$) Multiples IGNORE state symbols even if incorrect		**1**

Question Number	Acceptable Answer	Reject	Mark
21(c)	Barium sulfate is (much) less soluble (in water) or reverse argument ALLOW Barium sulfate is insoluble Solubility of sulfates decreases down group IGNORE Reference to hydration/lattice enthalpy Reference to reactivity		**1**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
21(d)(i)	Calcium ions / Ca^{2+} are larger than magnesium ions / Mg^{2+} ALLOW Calcium ions / Ca^{2+} have a lower charge density than magnesium ions / Mg^{2+} **(1)** The calcium ions / Ca^{2+} polarise the C–O bond / carbonate ion less ALLOW The calcium ions / Ca^{2+} distort (the electron cloud in) the carbonate ion less **(1)** The C–O bond is less easily broken ALLOW More energy needed to break the bonds in the carbonate ion Bonds in the carbonate ion are less easily broken **(1)** ALLOW Reverse arguments for magnesium ions / Mg^{2+} throughout		**3**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
21(d)(ii)	moles of CO_2 = $\frac{1.626}{24}$ (= 0.06775) **(1)** Then **Route 1** M_r metal carbonate = $\frac{10.0}{0.06775}$ = 147.6 **(1)** TE on moles CO_2 A_r metal (= 147.6 – 60) = 87.6 So the metal (ion) is $Sr^{(2+)}$/strontium **(1)** TE on M_r metal carbonate provided nearest A_r is that of a group 2 element M_r = $\frac{10.00 \times 24}{1.626}$ = 147.6 scores M1 and M2 A_r = $\frac{10.00 \times 24}{1.626}$ – 60 = 87.6 and Sr scores (3) OR **Route 2** Mass metal = 10.00 – 0.06775 × 60 = 5.935 (g) **(1)** TE on moles CO_2 A_r metal = $\frac{5.935}{0.06775}$ = 87.6 So the metal (ion) is $Sr^{(2+)}$/strontium **(1)** TE on M_r metal carbonate provided nearest A_r is that of a group 2 element Correct metal with no working scores (1) IGNORE SF except 1SF Units	Ra / radium Ra / radium	**3**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
21(d)(iii)	$Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O(l)$ ALLOW $CO_2(aq)$	$H_2O(aq)$	**1**

Question Number	Acceptable Answer	Reject	Mark
21(e)(i)	Methyl orange **(1)** From yellow to orange **(1)** M2 dependent on M1 ALLOW Any acid-alkali titration indicators with correct colour change e.g. Phenolphthalein **(1)** From pink to colourless **(1)** ALLOW Any recognisable spelling of indicator	Litmus and universal indicator ...to red / pink From red... From purple...	**2**

https://xtremepape.rs/

Question Number	Acceptable Answer	Reject	Mark
21(e)(ii)	Mols of HCl = $\frac{8.90 \times 0.05}{1000}$ $= 4.45 \times 10^{-4} / 0.000445$ **(1)** Mols of $Ca(OH)_2 = 4.45 \times 10^{-4} \times ½$ $= 2.225 \times 10^{-4} / 0.0002225$ **(1)** $[Ca(OH)_2] = 2.225 \times 10^{-4} \times 100$ $= 2.225 \times 10^{-2} / 0.02225$ **(1)** Concentration of calcium hydroxide $= 2.225 \times 10^{-2} \times 74.1$ $= 1.648725$ ($g\ dm^{-3}$) **(1)** ALLOW TE at each stage IGNORE units, even if incorrect IGNORE SF except 1SF Correct answer with no working scores (4)		**4**

(Total for Section C = 20 marks)

(TOTAL FOR PAPER = 80 MARKS)

https://xtremepape.rs/