# AQA GCSE Chemistry

## Practice answers

| Question | Answers | Extra information | Mark | AO / Specification reference |
|---|---|---|---|---|
| 01.1 | propane | | 1 | AO2<br>4.7.1.1 |
| 01.2 | ethanol | | 1 | AO2<br>4.7.2.3 |
| 01.3 | all points plotted properly<br>line of best fit | | 1<br>1 | AO2<br>AO3<br>4.7.2.4 |
| 01.4 | for each homologous series, boiling point increases with number of carbon atoms<br>for each number of carbon atoms, the boiling point increases from alkane to alcohol to carboxylic acid | | 1<br>1 | AO3 |
| 01.5 | as molecular size increases, strength of intermolecular forces increases<br>so more energy is needed to overcome the forces | | 1<br>1 | AO2<br>4.2.2.4 |

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| 02.1 | ethene is drawn with 2 C atoms and 4 H atoms. The C atoms are linked together by an '=' and each C atom is joined to 2 H atoms by a '-'<br>ethanol is drawn with 2 C atoms, 5 H atoms and 1 O atoms. One carbon atoms is joined to 1 C atom and 3 atoms by '-'. The other C atom is joined to 1 C atom, 2 H atoms and 1 atoms by '-'. The O atom is joined to 1 C atom and 1 H atom by '-'<br>butane is drawn with 4 C atoms and 10 H atoms. 2 C atoms are joined to 3 H atoms and 1 C atom by '-'. 2 C atoms are joined to 2 C atoms and 2 H atoms.<br>butanol is drawn with 4 C atoms, 10 H atoms and 1 O atom. One C atom is joined to 3 H atoms and 1 C atom by a '-'. Two C atoms are joined to 2 C atoms and 2 H atoms by a '-'. One C atom is joined to 1 C atom, 2 H atoms and 1 O atom by '-'. One O atom is joined to 1 C atom and 1 H atom. | | 1<br>1<br>1<br>1 | AO1<br>4.7.2.1<br>4.7.2.3 |
| 02.2 | carboxylic acid | | 1 | AO1<br>4.7.2.4 |
| 02.3 | butene | | 1 | AO1<br>4.7.2.1 |
| 03.1 | bubbles<br>because carbon dioxide gas is made (in the chemical reaction) | | 1<br>1 | AO1<br>4.7.2.4 |
| 03.2 | to speed up the reaction | | 1 | AO1<br>4.6.1.4 |
| 03.3 | ethyl ethanoate | | 1 | AO1<br>4.7.2.4 |

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| 03.4 | (sweet) smell | | 1 | AO1<br>4.7.2.4 |
| 04.1 | colour change from orange-brown to colourless | | 1 | AO1<br>4.7.2.2 |
| 04.2 | 3 C atoms, 6 H atoms and 2 Br atoms are drawn.<br>one C atom is joined to 3 H atoms and 1 C atom by -.<br>one C atom is joined to 2 C atoms, 1 H atom and 1 Br atom by -.<br>one C atom is joined to 1 C atom, 2 H atoms and 1 Br atom by -. | | 1 | AO2<br>4.7.2.2 |
| 04.3 | 60 °C<br>metal catalyst | | 1 | AO1<br>4.7.2.2 |
| 04.4 | 3 C atoms and 8 H atoms are drawn.<br>2 C atoms are joined to 3 H atoms and 1 C atom by -<br>1 C atom is joined to 2 C atoms and 2 H atoms by - | | 1<br><br><br><br>1 | AO2<br>4.7.1.1<br>4.7.2.2 |
| 05.1 | as number of chlorine atoms increases, pH decreases<br>showing that the hydrogen ion concentration increases<br>showing that the degree of ionisation must be greater | | 1<br><br>1<br><br>1 | AO2<br>4.4.2.6 |

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| 05.2 | bubbles formed in both cases<br>D bubbles more vigorously/C bubbles less vigorously | | 1<br>1 | AO3<br>4.4.2.6<br>4.7.2.4 |
| 05.3 | calcium propanoate | | 1 | AO3<br>4.7.2.4 |
| 06.1 | **Level 3:** The identities of X, Y and Z are given correctly. The justification draws on all the available evidence and is detailed, logical and coherent. | | 5-6 | AO3<br>4.7.2.2<br>4.7.2.3<br>4.7.2.4 |
| | **Level 2:** The identities of two of X, Y and Z are given correctly. Some points, drawing on the evidence, are made to justify their identities. | | 3-4 | |
| | **Level 1:** The identities of one of X, Y and Z are given correctly. Some points are made to justify this conclusion, but they are not clearly articulated and the structure of the answer is disorganised. | | 1-2 | |
| | **No relevant content.** | | 0 | |
| | **Indicative content**<br>• Z bubbles with sodium carbonate, so Z is ethanoic acid<br>• Z bubbles more quickly with sodium than X, so Z is ethanoic acid<br>• X reacts with sodium more slowly than Z, so is ethanol<br>• X burns with a blue flame, so is ethanol<br>• Y does not react with sodium or sodium carbonate, so Y is pentene<br>• Y burns with a smoky flame, so is pentene | | | |
| 06.2 | alcohols | | 1 | AO3<br>4.7.2.3 |

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| 06.3 | propanoic acid | | 1 | AO2<br>4.7.2.4 |
| 07.1 | the alcohol | | 1 | AO2 |
| 07.2 | **two** from:<br>• volume/mass of water<br>• distance between the lamp and the container<br>• volume/mass/amount of alcohol burnt | allow other suitable answers<br>award one mark for each correct control variable, to a maximum of two | 2 | AO2 |
| 07.3 | as size of alcohol increases, temperature increase of the water increases<br>because more carbon atoms in the alcohol/more bonds are broken<br>therefore, more energy is transferred in the exothermic reaction to the water | | 1<br>1<br>1 | AO3<br>4.5.1.3 |
| 07.4 | $C_4H_9OH + 6O_2 \rightarrow 4CO_2 + 5H_2O$ | one mark for formulae of reactants<br>one mark for formulae of products<br>one mark for balancing | 3 | AO2<br>4.7.2.3 |

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| 07.5 | 5 C atoms, 12 H atoms and 1 O atom.<br>one C atom is joined to 3 H atoms and 1 C atom.<br>3 C atoms are joined to 2 C atoms and 2 H atoms.<br>one C atom is joined to 1 C atom, 2 H atoms and 1 O atom<br>O atom is joined to 1 C atom and 1 H atom | | 1 | AO3<br>4.7.2.3 |
| 08.1 | yeast | | 1 | AO1<br>4.7.2.3 |
| 08.2 | 37 °C | allow any value between 30 °C and 40 °C | 1 | AO1<br>4.7.2.3 |
| 08.3 | alcoholic drinks<br>fuel | | 1<br>1 | AO1<br>4.7.2.3 |
| 08.4 | $M_r$ of ethanol = (2 × 12) + (6 × 1) + 16 = 46<br>number of moles of ethanol = $\frac{80}{46}$ = 1.74<br>moles of glucose = $\frac{1.74}{2}$ = 0.87<br>$M_r$ of glucose = (6 × 12) + (12 × 1) + (6 × 16) = 180<br>mass of 0.87 mol of glucose = 0.87 × 180 = 156.6 g | | 1<br>1<br>1<br>1<br>1 | AO2<br>4.3.2.1<br>4.3.2.2 |
| 09.1 | $M_r$ of $C_{10}H_{21}OH$ = (10 × 12) + (22 × 1) + 16<br>= 158 | award two marks if correct answer given with no working | 1<br>1 | AO2<br>4.3.1.2 |
| 09.2 | X | | 1 | AO2<br>4.7.2.2 |

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| 09.3 | $C_{10}H_{22}$ | | 1 | AO2<br>4.7.2.2 |
| 09.4 | ester | | 1 | AO2<br>4.7.2.4 |
| 10.1 | butane | | 1 | AO1<br>4.7.1.1 |
| 10.2 | propene | | 1 | AO1<br>4.7.2.2 |
| 10.3 | $C_8H_{16}$ | | 1 | AO2<br>4.7.2.1 |
| 10.4 | $C_5H_{12}$ | | 1 | AO2<br>4.7.1.1 |
| 11.1 | methanol | | 1 | AO1<br>4.7.2.3 |
| 11.2 | as the number of carbon atoms increases,<br>the solubility in water decreases | | 1<br>1 | AO2 |
| 11.3 | the hydrocarbon part of the molecule does not mix with the water | | 1 | AO3<br>4.7.2.3 |

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| 11.4 | $C_5H_{11}OH$<br>mass of one mole = (5 × 12) + (12 × 1) + 16 = 88 g<br>number of moles that dissolves in 100 $cm^3$ of water = $\frac{26.4}{88}$ = 0.030 mol<br>so concentration = 0.030 × 10 = 0.30 $mol/dm^3$ | <br><br><br><br>one mark for correct answer, one mark for two significant figures | 1<br>1<br>1<br><br>2 | AO2<br>4.3.4 |
| 12.1 | neutralisation | | 1 | AO1<br>4.4.2.2 |
| 12.2 | no<br>energy is not created or destroyed in a chemical reaction<br>the test tube got hotter because energy was transferred from the reaction/chemicals/bonds to the surroundings | | 1<br>1<br><br>1 | AO2<br>4.5.1.1 |
| 12.3 | energy transferred from the surroundings to the system to break bonds in the reactants<br>energy transferred to the surroundings on the formation of the bonds in the products<br>more energy released (on formation of bonds) then transferred (to break bonds). | | 1<br><br>1<br><br>1 | AO2<br>4.5.1.3 |
| 12.4 | **one** from:<br>• combustion<br>• oxidation | allow other valid examples (e.g., respiration) | 1 | AO1<br>4.5.1.1 |
| 13.1 | $M_r$ = 40 + 12 + (3 × 16)<br>= 100 | | 2 | AO2<br>4.3.2.1 |

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| 13.2 | $\frac{40}{100}$<br>= 0.4 | | 1<br>1 | AO1<br>4.3.2.1 |
| 13.3 | CaO | | 1 | AO1<br>4.1.1.1 |
| 13.4 | $M_r$ of CaO = 40 + 16 = 56<br>$M_r$ of $CO_2$ = 12+ 16 x 2 = 44<br>*atom economy* = $\frac{\text{relative formula mass of desired product from equation}}{\text{sum of relative formula masses of all reactants from equation}}$ *× 100%*<br>= $\frac{56}{(56+44)} \times 100\%$<br>= 56% | | <br><br>1<br>1<br><br><br>1<br><br>1 | AO2<br>4.3.3.2 |
| 13.5 | gas produced<br>lost from reaction vessel | | 1<br>1 | AO1<br>4.3.1.1 |

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