InkChemistry

QUESTION WORKBOOK

Electronegativity, polarity and intermolecular forces

Bonding and structure · Unit C03

AQA 3.1.3.6, 3.1.3.7 · OCR A 2.2.2

19 questions · 58 marks

NAVY SCREEN EDITION

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SECTION A · Short, 1 to 2 marks

A1 EPI-Q9

Identify which of NH_3, CH_4, HCl and HF form hydrogen bonds between their molecules. [2]

A2 EPI-Q20

Suggest why grease, a mixture of long-chain hydrocarbons, can be washed off a bicycle chain with hexane but not with water. [2]

A3 EPI-Q1

State what is meant by the term electronegativity. [1]

SECTION B · Standard, 3 to 5 marks

B1 EPI-Q2

Explain why electronegativity increases across Period 3 and decreases down Group 7. [4]

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B2 EPI-Q4 Explain how induced dipole–dipole forces arise between two bromine molecules. [4]

B3 EPI-Q6 Explain why water, H_2O, has a much higher boiling point than hydrogen sulfide, H_2S. [4]

B4 EPI-Q8 Describe the features of a diagram showing a hydrogen bond between two water molecules. [4]

B5 EPI-Q14 Compare the boiling points of butan-1-ol (118 °C) and pentane (36 °C), which have the same number of electrons. [4]

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B6 EPI-Q3 Explain why tetrachloromethane, CCl_4, is not a polar molecule even though its C–Cl bonds are polar. [3]

B7 EPI-Q5 Explain why the boiling points of the halogens increase from fluorine to iodine. [3]

B8 EPI-Q7 Explain why pentane boils at 36 °C but its isomer 2,2-dimethylpropane boils at 10 °C. [3]

B9 EPI-Q10 Name the strongest type of intermolecular force between molecules of Br_2, of HCl and of CH_3OH. [3]

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B10 EPI-Q11 Suggest whether trichloromethane, $CHCl_3$, is a polar molecule, and give a reason. [3]

B11 EPI-Q12 Suggest why hydrazine, N_2H_4, boils at 114 °C while ethane, C_2H_6, which has the same number of electrons, boils at -89 °C. [3]

B12 EPI-Q13 Suggest why propanone, CH_3COCH_3, mixes with water although it cannot form hydrogen bonds between its own molecules. [3]

B13 EPI-Q15 Evaluate the claim that water has a high boiling point because its O–H bonds are strong. [3]

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B14 EPI-Q16 Explain why water boils higher than hydrogen fluoride, although an H–F bond is more polar than an O–H bond. [3]

B15 EPI-Q18 Explain why water has a much higher surface tension than hexane. [3]

B16 EPI-Q19 Suggest why 1-chlorobutane does not dissolve in water, although its molecules are polar. [3]

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