InkChemistry

QUESTION WORKBOOK

Naming and representing organic molecules

Introduction to organic chemistry · Unit C16

AQA 3.3.1.1 · OCR A 4.1.1

16 questions · 56 marks

NAVY SCREEN EDITION

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SECTION B · Standard, 3 to 5 marks

B1 NRO-Q1

Give the molecular formula and the empirical formula of hexane, $CH_3(CH_2)_4CH_3$, the general formula of the homologous series it belongs to, and the molecular formula of the member of that series with eight carbon atoms. [4]

B2 NRO-Q3

Name the four compounds $CH_3CH_2CH(CH_3)CH_2OH$, $CH_3COCH_2CH_2CH_3$, $CH_3CH_2COOCH_3$ and $CH_3CH_2CONH_2$. [4]

B3 NRO-Q5

Draw the skeletal formula of each of the compounds $(CH_3)_2CHCH_2CHO$ and $CH_2=C(CH_3)CH_2CH_3$, and name each one. [4]

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B4 NRO-Q7 Explain, in terms of the homologous series they belong to, why ethanol, CH_3CH_2OH, and propan-1-ol, $CH_3CH_2CH_2OH$, are both oxidised by acidified potassium dichromate(VI), but propan-1-ol boils about 19 °C higher. [4]

B5 NRO-Q17 Evaluate a student's name of 2-methylpentan-4-ol for the alcohol $(CH_3)_2CHCH_2CH(OH)CH_3$. [4]

B6 NRO-Q6 Explain why the compound $CH_3CH(C_2H_5)CH_3$ is named 2-methylbutane and not 2-ethylpropane. [3]

B7 NRO-Q9 Explain why the molecular formula $C_4H_8O_2$ is not enough to identify a compound, but a structural formula is. [3]

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B8 NRO-Q11 Calculate the percentage by mass of oxygen in propan-2-ol, $CH_3CH(OH)CH_3$. Use Ar values H 1.0, C 12.0, O 16.0. [3]

B9 NRO-Q12 Suggest why propanone and butanone are named without a number, the ketones with five carbons are named pentan-2-one and pentan-3-one, and butanal needs no number either. [3]

B10 NRO-Q13 Suggest a name for $CH_2=CHCH_2OH$, which contains both a C=C bond and an OH group, and explain how each part of the name is chosen. [3]

B11 NRO-Q14 Compare the information shown by the displayed formula and by the skeletal formula of butan-2-ol, $CH_3CH(OH)CH_2CH_3$. [3]

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B12 NRO-Q15 Describe how the chain of a branched alkane is chosen and numbered, and how the prefixes are written, using 3-ethyl-2,2-dimethylpentane as the example. [3]

B13 NRO-Q19 Explain why the H–C–H bond angle in ethane is about 109.5° but the H–C–H bond angle in ethene is about 120°. [3]

B14 NRO-Q20 Suggest the bond angle around each carbon atom of ethanenitrile, CH_3CN, and the hybridisation of each carbon. [3]

B15 NRO-Q21 Name the alcohol that is a six-carbon ring carrying one OH group, and the two cyclohexenes that carry a methyl group, one on a carbon of the C=C and one on the carbon next to the C=C. [3]

SECTION C · Long, 6 marks or more

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C1 NRO-Q23 Explain, step by step, how the IUPAC name of the compound $HOCH_2CH_2CH(CH_3)CH(Br)CH_3$ is worked out, and give the name. [6]

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