

1.

- (a) (i) Name the process used to separate petroleum into fractions.

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- (ii) Give the molecular formula for an alkane with nine carbon atoms.

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- (iii) Write an equation for the complete combustion of the alkane  $C_{11}H_{24}$

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- (iv) Write an equation for the incomplete combustion of  $C_{11}H_{24}$  to produce carbon and water only.

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(4 marks)

- (b) Alkenes can be produced by cracking the naphtha fraction obtained from petroleum.

- (i) Write an equation for the thermal cracking of one molecule of  $C_{10}H_{22}$  to give one molecule of propene and one molecule of an alkane only.

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- (ii) Draw the structure of the chain isomer of but-1-ene.

(2 marks)

- (c) The alkanes and the alkenes are examples of homologous series of compounds. One feature of an homologous series is the gradual change in physical properties as the relative molecular mass increases. State **two** other general features of an homologous series of compounds.

Feature 1 .....

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Feature 2 .....

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(2 marks)

Decane has the molecular formula  $C_{10}H_{22}$

- (i) State what is meant by the term *molecular formula*.

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- (ii) Give the molecular formula of the alkane which contains 14 carbon atoms.

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- (iii) Write an equation for the incomplete combustion of decane,  $C_{10}H_{22}$ , to produce carbon and water only.

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(3 marks)