Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Alkanes

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Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) $C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O$

Ignore state symbols

Allow multiples

M1

(b) Zeolite OR aluminosilicate

Allow porous pot / aluminium oxide / alumina / silica / silicon dioxide

M1

Slight/moderate pressure

Slightly above atmospheric – allow 1-5 atmospheres / 100-500kPa

M2

$C_{16}H_{34} \rightarrow C_7H_{16} + C_6H_{12} + C_3H_6$

M3

(c)

*If incorrect radical or ambiguous radical lose **M1** but can award **M2** for ecf in each equation.*

M1

Allow equations in either order

Allow dot anywhere on the second carbon

Ignore extra initiation and termination steps

M2

(d) Cl•

*Allow Cl or Chlorine in **M1** and **M4***

M1

$Cl\bullet + O_3 \rightarrow ClO\bullet + O_2$

Penalise absence of dot once in the equations

M2

$ClO\bullet + O_3 \rightarrow Cl\bullet + 2O_2$

Allow dot anywhere on the radical

Apply the list principle in the equations and penalise

M3

Cl• is regenerated (and causes a chain reaction in the decomposition of ozone)

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initiation from Cl_2
Allow equations in either order.
Ignore Cl• acts as a catalyst

M4

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Q2.

(a) $C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$

allow fractions / multiples

allow any correct structural representation of molecules

ignore state symbols

1

(b) **M1** working that leads to n = 13

e.g. $-6650 = -(496\mathbf{n} + 202)$

and/or $496\mathbf{n} = 6650 - 202$

and/or $496\mathbf{n} = 6448$

$(\mathbf{n} = 13)$

1

M2 $C_{13}H_{28}$

*$C_{13}H_{28}$ scores **M1** and **M2** if some correct working shown*

*$C_{13}H_{28}$ with no working scores **M2** only*

*allow error carried forward for **M2** for a correct formula of an alkane from the value of **n** worked out for **M1** (but there must be some working shown leading to this incorrect value of **n**); for example, allow $C_{14}H_{30}$ if error in **M1** stemming from error in rearranging equation*

1

(c) Idea that

- alkane is not gaseous or
- equation relates to gaseous alkanes or
- it takes energy to convert it into a gas or
- that water / alkane / substances are gaseous in calculations using bond enthalpies

ignore references to heat loss, incomplete combustion, loss of evaporation, not being in standard conditions or that it is not standard state

1

(d) **M1** plotting the four values correctly (allow one error where point is ±1 square out)

*If plotted points for wrong number of C atoms for two or more compounds, cannot score **M1** or **M2**, but could score **M3** if read value off for 3C atoms*

1

M2 smooth best fit curve

M2 *best fit curve for their four points for the correct number of C atoms*

1

M3 value from their best fit line for 3 C atoms (allow ± 1 square)

M3 *need – sign (but ignore units);*

*cannot score **M3** unless there is a line on the graph*

1

(e) **M1** mass of isooctane = 692 (g)

*correct answer scores **M1** and **M2***

1

M2 3.31×10^4 or 33100 (kJ) (**3sf only**)

M2 *correct value to incorrect number of sig figs is 1 mark;*

ignore sign ;

*no error carried forward for **M2***

1

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