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) *Condition:* U.V. light or sunlight or 450°C or high temp **(1)**
Explanation: U.V. light etc. provides energy to break(Cl-Cl) bond **(1)**
Do not accept reference to E_a or wrong bond or 'to make Cl radicals'
2

(b) (i) (Free) radical substitution **(1)**

(ii) *Step 1:* initiation **(1)**
Step 2: propagation **(1)**
Step 3: termination **(1)**
Any order
Don't be too harsh on spelling
4

(c) (i) *Equation 1:* $CH_3 + Cl\bullet \rightarrow CH_2Cl\bullet + HCl$ **(1)**
Equation 2: $CH_2Cl\bullet + Cl_2 \rightarrow CH_2Cl_2 + Cl\bullet$ **(1)**
or $CH_2Cl\bullet + Cl\bullet \rightarrow CH_2Cl_2$
Mark equ independently
any order

(ii) $CH_2Cl\bullet + CH_3\bullet \rightarrow CH_3CH_2Cl$ **(1)**
or $CH_3CH_2\bullet + Cl_2 \rightarrow CH_3CH_2Cl + Cl\bullet$
or $CH_3CH_2\bullet + Cl\bullet \rightarrow CH_3CH_2Cl$
Equ must have CH_3CH_2Cl as product
Accept C_2H_5Cl
Penalise absence of • once only
3

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Q2.

(i) $C_{15}H_{32} + 23\ O_2 \rightarrow 15\ CO_2 + 16\ H_2O$

Products (1)
Balance (1)
If wrong reactant C.E

(ii) Identity of product: CO or carbon monoxide **(1)**

Equation: $CH_4 + \frac{3}{2}\ O_2 \rightarrow CO + 2\ H_2O$ (1)

Any balanced equation using CH_4, producing CO could also make C + CO_2

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Q3.

Penalise missing • once only

(i) $Cl_2 \rightarrow 2\ Cl\bullet$ **(1)**

(ii) $CH_2Cl_2 + Cl_2 \rightarrow CHCl_3 + HCl$ **(1)**

(iii) $CH_2Cl_2 + Cl\bullet \rightarrow CHCl_2\bullet + HCl$ **(1)**
$CHCl_2\bullet + Cl_2 \rightarrow CHCl_3 + Cl\bullet$ **(1)**

Can reverse order

(iv) Effect on rate: increases **(1)** **If decrease given C.E zero marks**
Explanation: more Cl• radicals formed **(1)**

More Cl atoms, more Cl—Cl or Cl_2 bonds broken, more Cl_2 have E_A, increased rate of Cl• production

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