Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1

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Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) **M1** EQM amount A = 0.25 – 0.015 = 0.235 mol

Allow 0.24 mol for M1

1

M2 EQM amount B = 0.25 – (2 x 0.015) = 0.22 mol

1

(b) **M1** $K_c = \dfrac{[C]}{[A][B]^2}$

1

M2 $\dfrac{\frac{0.02}{0.35}}{\frac{0.30}{0.35} \times \left(\frac{0.25}{0.35}\right)^2}$

Correct insertion of numbers and use of volume

Allow ecf from their K_c

Scores M1 here (even if volume not used)

1

M3 = 0.13

Kc = 1.067 if vol not used Max 3

Kc = 7.63 if expression upside down Max 3

1

M4 Units $mol^{-2}\ dm^6$

Allow answers using cm^3 and then the corresponding units i.e. 1.31 x $10^5\ mol^{-2}\ cm^6$

Allow conseq units to wrong K_c

1

(c) $[H_2O]$ / conc of water is (effectively) constant (because it it so much larger than the other concentrations)

1

(d) **M1** Initial amount $ClCH_2CHO = {}^{4.71}/_{78.5}$ = 0.06 mol

Calculates initial mol

1

M2 EQM amount $ClCH_2CHO$ = (0.06 – x) mol
EQM amount $ClCH_2CH(OH)_2$ = x mol

Sets up algebraic expressions for EQM mol of both

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If no M2 can only score M3 and M5 conseq leads to 44.4 mol dm^{-3} via

[ClCH$_2$CHO] = $\frac{0.06}{0.05}$

1

M3 37 = $\dfrac{\frac{x}{V}}{\frac{(0.06-x)}{V}}$

Inserts into K

Does not need to show V as it cancels but allow expressions that do show V and subsequent calculations

1

M4 37(0.06 – x) = x

2.22 = 38x

x = 0.058421

Solve for x

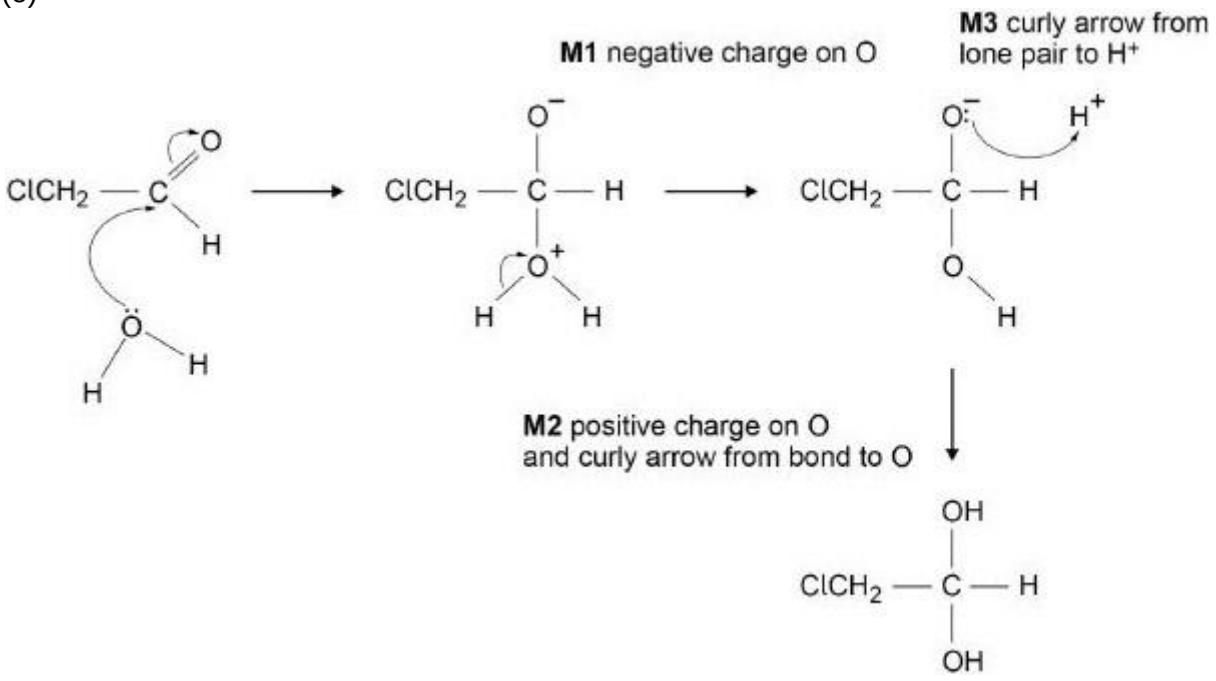
1

M5 [ClCH$_2$CH(OH)$_2$] = $\frac{0.058421}{0.05}$ = 1.17 mol dm^{-3}

Calculate concentration

1

(e)



3

(f) **M1** C in C=O is less δ+ / less electron deficient

Allow converse

Ignore discussion in terms of C-Cl bond polarity

1

M2 Because CH_3 attached is electron donating Or

CH_3 has a (positive) inductive effect

1

M3 So higher E_a

*Allow for **M3** water less attracted to δ+C / electron deficient C / C in*

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C=O

(so lower collision frequency/ fewer collisions with correct orientation)

1

[18]

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