Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Chemical Equilibria, Le Chatelier's Principle And Kc

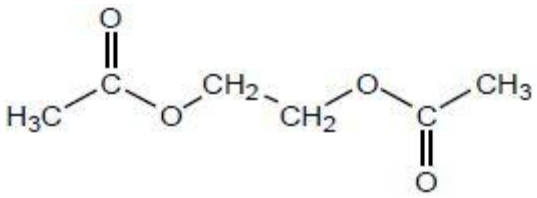
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Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

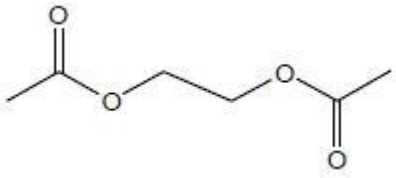
Mark Schemes

Q1.

(a)



Allow $CH_3COOCH_2CH_2OOCCH_3$
OR $CH_3COOCH_2CH_2OCOCH_3$
OR



1

(b) Mol $HOCH_2CH_2OH$ = 6.00×10^{-2} OR 0.06(00)

1

Mol $C_6H_{10}O_4$ = 1.45×10^{-1} OR 0.145

1

Mol H_2O = 2.90×10^{-1} OR 0.29(0)

1

(c)

$$(K_c =) \frac{[\text{ester}] \times [H_2O]^2}{[CH_3COOH]^2 \times [HOCH_2CH_2OH]}$$

Allow words for acid and alcohol

1

The volume cancels out (Penalise a contradictory justification from expression if the volumes do not cancel out)
OR
there are equal no of moles on each side of the equation
OR
there are equal no of molecules on each side of the equation

1

(d)

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$$(\text{Mol } CH_3COOH / V)^2 = \frac{(8.02 \times 10^{-1}/V)(1.15/V)^2}{6.45 \times (2.64 \times 10^{-1}/V)}$$

M1

$$\text{Mol } CH_3COOH = \sqrt{\frac{(8.02 \times 10^{-1}) \times (1.15)^2}{6.45 \times (2.64 \times 10^{-1})}} = \sqrt{0.623}$$

M2

Mol CH_3COOH = 0.789 (must be 3 sfs) Allow 0.788 – 0.790

M3

0.789 scores 3

Allow without V : $(nCH_3COOH)^2 = \frac{(8.02 \times 10^{-1})(1.15)^2}{6.45 \times (2.64 \times 10^{-1})}$

If $(nCH_3COOH)^2$ =0.623 then award M1 and M2

If K_c is correct in (c) but incorrect rearrangement, then CE=0 except if upside down rearrangement then M3 only awarded for 1.27

If K_c is incorrect in (c) then only M1 can be awarded for correct rearrangement.

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Q2.

(a) Mol CO = (0.73 − 0.43) = 0.30 (mol)

1

Mol H_2 = (1.25 − 2(0.43)) = 0.39 (mol)

1

(b) $K^c = \dfrac{[CH_3OH]}{[CO][H_2]^2}$

1

(c) Divides throughout by volume

1

$K_c = \dfrac{[0.273/9.40]}{[0.1.06/9.40]^2[0.452/9.40]}$

1

$K_c = \dfrac{0.029}{0.0000061146}$

$K_c = 4.75 \times 10^3$

1

Unit = $mol^{-2}\ dm^{+6}$

1

(d) pV = nRT

$T = \dfrac{pV}{nR}$

1

n = 0.452 + 0.106 + 0.273 = 0.831 (mol)

Calculation of moles and substitution of all values

1

$= \dfrac{482.9 \times 10^3 \times 9.40 \times 10^{-3}}{0.831 \times 8.31} = 657\ K$

Correct conversion of p and V

1

= 384 °C

Conversion to °C

1

[11]

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