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

Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

This question is marked using levels of response. Refer to the Mark Scheme Instructions for Examiners for guidance on how to mark this question.	
Level 3 **5-6 Marks**	All stages are covered and the explanation of each stage is generally correct and virtually complete. Answer is well structured with no repetition or irrelevant points. Accurate and clear expression of ideas with no errors in use of technical terms.
Level 2 **3-4 Marks**	All stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies OR two stages are covered and the explanations are generally correct and virtually complete. Answer shows some attempt at structure. Ideas are expressed with reasonable clarity with, perhaps, some repetition or some irrelevant points. Some minor errors in use of technical terms.
Level 1 **1-2 Marks**	Two stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies, OR only one stage is covered but the explanation is generally correct and virtually complete. Answer includes isolated statements but these are not presented in a logical order or show some confusion. Answer may contain valid points which are not clearly linked to an argument structure. Errors in the use of technical terms.
Level 0	Insufficient correct chemistry to gain a mark.

Indicative chemistry content

Stage 1: Temperature
1a. The reaction is endothermic (so equilibrium shifts to RHS to reduce the temperature)
1b. So, higher temperature increases the yield **1c.** High temperatures are costly (so compromise temperature used)

Stage 2: Pressure
2a. More moles of gas on the right hand side, (so equilibrium shifts to RHS to increase the yield)

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2b. So, lower pressure increases the yield
2c. A low pressure means a low cost

Stage 3: Catalyst
3a. Catalyst has no effect on yield
3b. Adding a catalyst allows a lower temperature to be used
3c. So, this lowers the cost

[6]

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Q2.

(a) M1 decreases yield

1

M2 So equilibrium shifts to side with more moles/molecules or more moles/molecules on LHS

Allow M2 independent of M1

1

M3 So equilibrium shifts (to left side) to oppose decrease in pressure **OR** to increase pressure

Must refer to equilibrium shifting to gain maximum marks

1

(b) M1 amount SO_2 (= 0.46 – 0.18) = 0.28 mol

1

M2 amount O_2 (= 0.25 – 0.09) = 0.16 mol

1

M3 total amount (= 0.28 + 0.16 + 0.18) = <u>0.62</u> mol

1

M4 partial pressure of SO_2 = $\frac{0.28}{0.62}$ x 215 = 97(.1) (kPa)

$M4 = \frac{M1}{M3} \times 215$

1

(c) M1 $K_p = \frac{(pp\ SO_3)^2}{(pp\ SO_2)^2 \times pp\ O_2}$

Penalise square brackets in M1

1

M2 = $1.2(0) \times 10^{-2}$

1

M3 = kPa^{-1}

1

(d) Stays the same

1

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