EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

Time allowed
23 Minutes

Score /19

Percentage %

CHEMISTRY

Edexcel AS & A LEVEL

Mark Scheme

Paper 1: Advanced Inorganic and Physical Chemistry

Question Number	Acceptable Answers	Reject	Mark
1(a)(i)	Mark the two points independently, subject to the constraint in Reject column Effect: (Equilibrium) shifts to the right (1) *ALLOW:* "favours forward reaction" / "increase the amount of product" / "increase the yield (of product)" Reason: Exothermic (in forward direction) (1) *NOTE:* Just "(equilibrium) shifts in the exothermic direction" scores (1)	"Equilibrium shifts to left" will score (0) for (a)(i)	2

Question Number	Acceptable Answers	Reject	Mark
1(a)(ii)	First mark: Activation energy for the reaction is too high / (if cooled) molecules would not have enough energy to react / few(er) molecules have the required E_a/more molecules have energy ≥ E_a at higher temperatures OR not (technologically) feasible to cool the gases before they enter the converter/costly to cool the gases (1) Second mark: (cooling the gases would make) the rate (too) slow /rate is faster if the temperature is high (so the gases are not cooled) (1)	Cooling the gases decreases the yield (of products) /an incorrect Le Chatelier argument	2

Question Number	Acceptable Answers	Reject	Mark
1(a)(iii)	Mark the two points independently, subject to the constraint in Reject column Effect: (Equilibrium) shifts to the right *ALLOW:* "favours forward reaction" / "increase the amount of product" / "increase the yield of product" (1) Reason: Shifts / moves in the direction of fewer (moles of gas) molecules *ALLOW* "shifts in direction of fewer moles (of gas molecules)" (1) *IGNORE* effect on the rate	"Equilibrium shifts to left" will score (0) for (a)(iii) "…. fewer atoms"	2

Question Number	Acceptable Answers	Reject	Mark
1(b)(i)	(In NO): +2 / 2+ (1) (In NO_3^-): +5 / 5+ (1) *NOTE:* (In NO): Just "2" AND (In NO_3^-): Just "5" scores (1)		2

Question Number	Acceptable Answers	Reject	Mark
1(b)(ii)	$NO_3^- + 4H^+ + 3e^- \rightarrow NO + 2H_2O$ *ACCEPT* multiples		1

Question Number	Acceptable Answers	Reject	Mark
1(b)(iii)	$Ag \rightarrow Ag^+ + e^{(-)}$ / $Ag - e^{(-)} \rightarrow Ag^+$ *ACCEPT* multiples *IGNORE* state symbols, even if incorrect	"$Ag + e^- \rightarrow Ag^+$"	1

Question Number	Acceptable Answers	Reject	Mark
1(b)(iv)	$3Ag + NO_3^- + 4H^+ \rightarrow 3Ag^+ + NO + 2H_2O$ (2) (1) for multiplication of the silver half-equation by three or cq multiple from (b)(ii) (1) for rest of equation correct *NOTE:* Equation must be completely correct for the second mark. *IGNORE* state symbols, even if incorrect	if any e^- are left in the final equation, second mark cannot be scored	2

Question Number	Acceptable Answers	Reject	Mark
2(a)	(Greater yield) as fewer moles/molecules (of gas) on RHS OR 3 moles/molecules on left but only 1 on right **(1)** ALLOW arguments in terms of K_p remaining constant Disadvantage: Extra cost of (building) equipment (to withstand higher pressure)/ thicker pipes/compressor/maintaining equipment **(1)** OR Higher cost **of energy** needed for compression **(1)** IGNORE references to explosion	Just (higher) cost	**2**

Question Number	Acceptable Answers	Reject	Mark
2(b)(i)	(Reaction is exothermic) so the value of $\Delta S_{surroundings}$ becomes more positive/larger (at 100 °C) **(1)** Therefore ΔS_{total} becomes more positive/larger/less negative(at 100 °C) **(1)** Second mark consequential on first		**2**

Question Number	Acceptable Answers	Reject	Mark
2(b)(ii)	(Higher temperature gives a) faster rate of reaction /more particles have $E \geq E_a$ (ALLOW more successful collisions (per second) IGNORE references to yield		**1**

Question Number	Acceptable Answers	Reject	Mark
2(c)	Remove methanol/the product (as it is formed) **(1)** Recycle/reuse **unreacted** reactants **(1)** IGNORE references to catalyst and increasing amounts of reactants		**2**