



General Certificate of Education

Applied Science **8771/8773/8776/8779**

SC11 Controlling Chemical Processes

Report on the Examination

2007 examination - June series

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General Comments

A substantial proportion of candidates were well prepared for the examination and their answers demonstrated a good understanding of the concepts. Questions involving Maxwell-Boltzmann distribution curves and application of Le Chatelier's principle proved to be demanding for most. Once again, the majority of candidates gained few marks on Question 4 which required experimental design (A03).

A significant number of candidates were unable to rise to the more demanding level required at A2.

Question 1

- (a) Many candidates gained the first mark but then did not state 'remain unchanged at end'.
- (b) Many candidates answered exothermic but did not give an explanation and so did not gain the mark. A good number of candidates sketched the correct profile.
- (c) A disappointing number of candidates could not correctly recall this definition.
- (d) The correctly shaped Maxwell-Boltzmann Distribution curve was only drawn by some candidates. A very small number could correctly mark the required activation energies and only a few candidates scored marks for their explanation of how a catalyst affects rate.

Question 2

- (a) Most candidates did not gain this mark.
- (b) Hazard preventions were often well answered.
- (c) Relative formula masses were usually correctly calculated but most candidates used 40 for NaOH in their calculation instead of taking into account the stoichiometry of the reaction. A substantial proportion failed to take into account the yield was 70%.
- (d) A larger proportion of candidates are now calculating oxidation number correctly.
- (e) Well answered by most candidates.

Question 3

- (a) Few candidates balanced the equation correctly.
- (b) Some candidate's answers seemed to show that they were unaware of the different types of cost.
- (c) Many answered well, but a substantial number did not mention rate when defining dynamic equilibrium. Most explained homogeneous but some candidates only mentioned reactants. Many candidates were able to suggest a use for the heat energy. Most candidates were unable to use Le Chatelier's principle correctly.

- (d) The definitions for batch and continuous processes were not well answered and the advantages and disadvantages were only correctly identified by a small number of candidates.
- (e) This calculation was frequently well answered although units were often missing.
- (f) Only a small number of candidates were able to give the correct expression and consequently only a few scored highly. Most answered temperature correctly.

Question 4

- (a) Only a few candidates were able to state that rate of reaction = change in concentration of reactant or product with change in time.
- (b) Most candidates did not make a significant attempt to design this experiment.
- (c) Some candidates correctly gave the effect on rate but were unable to give an explanation.
- (d) The overall order was often well answered but the effect of the concentration of NaOH was not identified.

Question 5

- (a) These costs were often not identified correctly.
- (b) Some candidates were able to apply Le Chatelier's principle correctly to this situation.
- (c) A larger number of candidates answered this well although some attempted to use Le Chatelier in this case as well.
- (d) Many identified the effect correctly but did not explain it correctly.
- (e) A large proportion of candidates failed to take into account that there are two atoms of nitrogen in ammonium nitrate. Some were unable to give the correct expression for the percentage calculation.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.