



**General Certificate of Education (A-level) Applied
June 2011**

Applied Science

SC11

**(Specification
8771/8773/8776/8777/8779)**

Unit 11: Sports Science

Report on the Examination

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General Comments

It was clear that a number of candidates were well prepared.

However, a significant number were unable to deal with areas of the specification such as equilibria and rates of reaction. Oxidation numbers seem misunderstood. The terms 'reactant' and 'product' were all too often transposed by candidates.

Unfortunately, a significant number of candidates did not realise that brackets next to each other in a mathematical expression should be multiplied. Many were unable to deal with standard form and rearranging equations.

Question 1

- (a) Some candidates were well prepared and gave the appropriate definition. A significant number, however, gave only a non-specific description, and some simply said 'speed'. A rewording of the question such as the latter did not score.
- (b)(i) A good proportion of correct answers were seen. A number of candidates identified the correct order but were unable to explain their choice.
- (ii) This was very well answered. Only a small proportion of candidates failed to gain merit. Most incorrect answers discussed concentration.
- (c)(i) Many correct answers were seen although some incorrectly labelled both axes.
- (ii) Whilst many candidates drew careful accurate sketches there was a significant proportion that did not skew the peak to the right or make it lower than the original.
- (iii) Extremely well answered.
- (iv) Many good answers were seen. Unfortunately, some candidates seemed to believe that activation energy would alter if the temperature was increased. Others discussed equilibria and some only mentioned pressure despite the question being about temperature.

Question 2

- (a)(i) Only about half of candidates gained both marks. Many candidates incorrectly calculated the relative molecular mass of ammonia as twice its actual value.
- (ii) This was done well by a greater proportion of candidates than in previous years. A large number got confused whilst trying to apply the ratio method.
- (iii) Most answered this correctly. Only a few incorrect answers were seen.
- (b)(i) Many candidates did not identify that a thermometer would be required for a determination of enthalpy change. A significant proportion either intended to carry out a titration or calorimetry.
- (ii) Many candidates described an enthalpy of combustion or titration experiment and therefore failed to score. Many excellent and thorough answers were seen.

- (iii) Some good answers were seen. Many candidates' answers were too general. Without specific variables identified they could not score. 'Keep everything the same', or words to that effect, was a popular answer. As the question was about accuracy, non-specific statements for a fair test could not score.
- (iv) Answered well. A good number simply said mass and temperature. Greater detail was required to score either mark.

Question 3

- (a) Extremely well answered. Only a few wrong answers were seen. Most of these involved equilibrium.
- (b) Generally well answered. Many candidates scored one mark as they only defined a reversible reaction.
- (c)(i) Whilst a good number of candidates gave the correct expression many confused indices and multiples whilst others did not multiply products together.
- (ii) Only a few good answers were seen. The majority recognised that the quantities of reactants and products would be required and so scored one mark.
- (d) This was well answered. Some candidates gave a definition that omitted equilibrium and so could not score maximum marks.
- (e) Whilst some excellent answers were seen, many candidates incorrectly linked pressure with energy. Other wrong answers used Le Chatelier's principle to explain the effect on rate while others discussed the effect of the number of gaseous particles on the equilibrium position of exothermic reactions and some believe pressure was a catalyst. Many answers linked unconnected scientific terms in a confused manner.
- (f) This was generally well answered. A significant number of candidates drew an approximation to a Maxwell-Boltzmann curve. Many answers transposed reactants and products.
- (g)(i) Generally well answered.
- (ii) Only a few candidates were able to calculate this correctly. Some failed to divide the answer to part (i) by 2 to obtain the moles of ethyne. Many did not use the enthalpy change given in the stem of the question but incorrectly used the volume quoted in the question instead.

Question 4

- (a) This was well answered. Wrong answers included hydrolysis and Haber. Several candidates wrote both electrolysis and Haber and therefore could not be awarded the mark. A question requiring one answer must not be answered with two guesses. It will not gain credit even if one answer is correct.
- (b) Answered very well.
- (c) Generally answered well although several candidates referred to keeping the sodium hydroxide away from a naked flame.

- (d)(i) A good number of excellent answers seen. Several defined direct or indirect costs instead.
- (ii) Whilst some excellent answers were seen, many candidates seemed unaware of the distinctions between the costs. Unspecific answers such as ‘chemicals’ will not gain credit.
- (e) Extremely well answered. A few incorrect answers defined a batch process instead.
- (f)(i) Of those that scored, the majority only scored one out of two. The majority of candidates were unable to correctly assign oxidation states.
- (ii) Only a few correctly identified the oxidation and explained their choice.

Question 5

- (a)(i) Whilst many candidates gained one mark for identifying this was when one mole of a compound was formed, most did not complete their definition to include enthalpy change. A large number confused moles and enthalpy so that it was ‘the number of moles when the enthalpy was formed’.
- (ii) Many candidates gained full marks. Several incorrectly subtracted the sum of the enthalpy of the products from the sum of the enthalpy of the reactants. A small number of candidates attempted to divide their numbers.
- (b)(i) Whilst most candidates substituted numbers into the expression correctly, only just above half of these could then arrive at the correct answer. The most common errors were adding instead of multiplying, and truncating instead of rounding their final answer.
- (ii) Only a small proportion of candidates showed working for this. It was those candidates who arrived at the correct answer.
- (c) Some excellent answers were seen. A good proportion of answers identified that a catalyst has no effect on the position of equilibrium.
- (d)(i) Most candidates answered this question well. Some simply stated ‘not continuous’ and were not credited, while others confused reactants and products, again.
- (ii) Well answered.

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