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General Certificate of Secondary Education

Chemistry 4421

CHY3F Unit Chemistry 3

Report on the Examination

2012 examination – January series

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Chemistry
Foundation Tier CHY3F

General

This report should be read in conjunction with the published Mark Scheme.
The mark scheme was flexible enough to allow candidates to express their answers in a variety of ways and still gain marks.

The standard of responses was a lot higher than last year in all respects. The vast majority of scripts were also concise and legible. However, the following questions proved particularly difficult for over half of candidates: Question 1b – the reason why hydrogen should not have been put in column 1; Question 3b – the gas produced by the reaction of sodium with water; Question 4a – why the brown colour remains in the flask during distillation; Question 4d (i) – why the student decided that the mean of the results was 20.0 cm^3; Question 4d (ii) – working out 4.8g of ethanoic acid in 100 cm^3.

At least half of the studentss scored no marks on Question 6a(i) – identification of the gas and the ions after addition of hydrochloric acid.

Many of the questions that were less well answered tended to be those that involved recalling specific knowledge, and those that required explanation and the use of specific scientific terms. Students do need to make the effort to learn the factual material given in the Specification. Questions 5 and 6 were standard demand questions and were common with Questions 1 and 2 on the Chemistry Higher Tier Paper (CHY3H).

Question 1*(Low Demand)*

Generally, this question was quite well attempted.

(a) The vast majority of the students identified ‘groups’ correctly.

(b) Many students were unable to gain this mark. The most common answer given was ‘hydrogen is a gas’.

(c) Although a large number of students gained this mark, some students wrote ‘noble gases’ or ‘group 8’ and lost the mark.

(d) Nearly half of the students were unable to gain this mark.

Question 2 *(Low Demand)*

On the whole, this question was quite well attempted.

(a) All parts were well attempted and the vast majority of the students gained marks here.

(b) (i) Nearly half of the students lost this mark as most of them mentioned ‘formation of scale’.

(b) (ii) A large proportion of the students gained this mark although some thought that it was ‘sodium’ that causes hardness in water.

(c) (i) Some students did not gain this mark as they drew multiple lines and others joined up all the points without omitting the point at 20^0C. Some even tried to draw a curve. (c) (ii) and (iii) were quite well attempted.

Question 3 *(Low Demand)*

(a) Almost two thirds of the students gained both marks and another third gained at least one mark.

(b) Nearly two thirds of the students lost this mark and most of them gave their answer as 'oxygen'.

(c) A large number of students thought that sodium hydroxide was an alkali because it produced $Na^+(aq)$ ions.

Question 4 *(Low Demand)*

(a) Nearly three quarters of the students did not gain this mark. Although a large number of the students were aware of the fact that it was because of different boiling points, they were comparing the boiling point of water with that of ethanoic acid.

(b) (i) The vast majority of students were aware that weak acids are partially ionised in water.

(b) (ii) Just under two thirds of the students gained two marks and a further third gained one mark. In some cases, it was not clear whether the students were referring to ethanoic acid or hydrochloric acid, thus losing the marks.

(c) (i) At least half of the students gained three marks. There was confusion between 'pipette' and 'burette' which were frequently interchanged.

(c) (ii) A large number of students gained only one mark as they did not mention 'indicator'. Some students wrote 'from the reading on the burette'. Other answers included 'there will be no fizzing' and 'the reaction will stop'.

(d) (i) Just under a third of the students did not gain any mark here. The 'anomalous' result was not mentioned and they got an average of all the four results as '20.875'. They then went on to say that 'this was rounded down to 20'. Some students said that the first result was ignored and the median of the other three results was 20.

(d) (ii) Very few of the students gained this mark. Over two thirds of the students could not work out '4.8g of ethanoic acid in 100 cm^3' and the rest left it blank.

Question 5 *(Standard Demand)*

(a) (i) Was quite well attempted

(a) (ii) More than half of the students were able to gain this mark.

(b) (i) Just under a half of the students did not gain this mark. The most common response was 'move the crucible closer to the beaker' while some wrote 'use a plastic/polystyrene cup'.

(b) (ii) This was really well attempted with a majority of the students gaining two marks and few gaining at least one.

(b) (iii) This was poorly attempted. Half gained no marks. Many students made reference to the experiment not being repeated or inaccurate equipment

especially the thermometer. Some students gave two examples of a 'human / measurement error' which only scored one mark.

(c) About half the students did not gain this mark. A large proportion repeated the question e.g. 'so people know how much energy they can get from eating food'. Others talked in terms of 'balanced diet'.

Question 6 *(Standard Demand)*

(a) **(i)** Nearly half the students gained no marks here while over a third gained only one mark. While students were able to identify 'carbon dioxide' correctly, they had problems identifying the 'carbonate' ion.

(a) (ii) Only few students gained two marks while a further third gained one mark. Many were able to identify 'litmus' correctly but could not identify 'ammonia' as the gas released.

(b) (i) More than half of the students gained this mark. The majority of students wrote 'blue precipitate' or some irrelevant answer.

(b) (ii) Almost half of the students scored no marks here and just under half scored only one mark. All sorts of reagents and colours were written as their answers.

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