EXAMINERS' REPORT

IM CHEMISTRY

FIRST SESSION 2018

General Statistics

The examination consisted of a three-hour paper with three sections: Section A, with eight (8) compulsory questions requiring short answers; Section B with five (5) compulsory structured questions; and Section C with four (4) essay-type questions from which candidates were required to answer two (2).

Thirty-one (31) candidates registered for the examination, out of which twenty-five (25) were actually present and six (6) candidates were absent for the examination.

A summary of the results is shown in the Table below.

GRADE	A	B	C	D	E	F	abs	TOTAL
NUMBER	5	4	5	3	2	6	6	31
% OF TOTAL	16.1	12.9	16.1	9.7	6.5	19.4	19.4	100

General Comments by Markers

Section A

1. (a) Most answers were correct. Candidates knew the meaning of the $^A_Z S$ notation.
    (b) Several candidates found the average by diving by 100 rather than by 99.2.
    (c) A few candidates realised that the data covered 99.2% of the sulfur isotopes.

2. (a) Almost all candidates answered this part correctly.
    (b) Several responses indicated that if the volume of a fixed amount of gas is halved, then the number of molecules is reduced and the pressure is reduced too.

3. (a) Most candidates were able to use $pV = nRT$ to find n.
    (b) However inadequate answers were given when asked to find T, keeping the same number of moles at a different p.

4. (a) Most candidates gave the correct formulae.
    (b) (i) Most candidates did know that $MgCl_2$ dissolves in water.
    (c) (ii) Most candidates knew the reaction of $SiCl_4$ and water.

5. Most candidates did not answer this question in terms of oxidising power of the halogens.

6. (a) Most candidates gave the correct structures.
    (b) Most candidates related boiling point to structure but did not explain in terms of type of intermolecular forces.

7. Most candidates answered all this question incorrectly.

8. Most answers given indicated lack of familiarity with 'solvent extraction'.

Section B

9. (a) Most candidates did not give an ionic equation. Calculations were in most cases correct.
    (b) Several answers given indicated that candidates missed the fact that a limiting reactant was present.

10. This question was mostly answered well except that part (a), related to why the mixture was cooled before investigation, was very poorly answered.

11. (a) In this part, although the redox equation was not balanced correctly, many candidates identified the oxidation and reduction processes correctly.
    (b) Most of the calculations concerning quantitative analysis were incorrect. Few candidates commented on the effectiveness of sulfur dioxide.

12. Most candidates drew dot-and-cross diagrams well. Several candidates did not write a correct equation for ammonia in water and were not able to explain why ammonia is a weak base.
    Several candidates gave the pH of 0.1 $moldm^{-3}$ KOH as 1.

13. Many responses to this question indicated lack of familiarity with the identification of different types of structural isomers. Most were able to calculate the empirical formula and the molecular formula of an organic compound.

Section C

14. (a) (i) Most candidates were able to distinguish between reversible and irreversible reactions.
        (ii) Quite a few responses gave an incorrect equation for the combustion of an alkene and in some cases the equation was not balanced correctly. Others did not give a correct molecular formula for the alkene. Some did not know that the products of combustion are carbon dioxide and water.
        (iii) Several candidates did not show that the reaction is reversible.
        (iv) Few candidates stated that when a dynamic equilibrium is present, the rate of the forward reaction is equal to the rate of the backward reaction.
    (b) Most candidates answered parts (b) (i), (ii) and (iii) correctly. In the latter, several candidates gave the correct equation for K_p but did not perform a correct calculation because they ignored the power of the numerical values of pressure. In part (iv), most candidates did not refer to the shift in equilibrium and the change in value in K_p when the temperature is increased.

15. (a) (i) Most candidates were familiar with the terms oxidation and reduction.
        (ii) Quite a few candidates were not able to define a standard solution.
        (iii) Several candidates did not show that the reaction is reversible.
        (iv) Few candidates stated that when a dynamic equilibrium is present, the rate of the forward reaction is equal to the rate of the backward reaction.
    (b) Most candidates answered this part correctly.
    (c) (i) Many candidates were not able to give a correct balanced equation.

        In the other parts, in most cases, the candidates answered correctly using the ratio obtained in part (c)(i).

16. (a) Most of the candidates who answered this question were not able to balance the chemical equation for the combustion of benzene.

Most candidates did not know how to write the equation that represents the ∆H of formation of benzene. Most candidates answered the question on Hess' cycle correctly.

(b) Most candidates answered this part of the question quite well.

17. Very few candidates answered this question.
    (a) This part was mostly answered correctly.
    (b) In most cases, candidates were not able to describe the delocalised ring of electrons.
    (c) This part was mostly answered correctly.
    (d) Candidates did not perform well in this question.

Chairperson
2018 Examination Panel