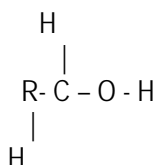


## Questions 4, 5, 6 - Organic chemistry

- If a structural formula of a chemical reaction is required, the inorganic compound must also be written in structural form -  $\text{H}_2\text{O}(\text{H}-\text{O}-\text{H})$  and  $\text{HBr}(\text{H}-\text{Br})$ ,  $\text{Br}_2(\text{Br}-\text{Br})$ , etc. Show ALL bonds and H-atoms. For example, when an alcohol is asked for, the bond between the O and H must be shown, i.e. -..... -C-O-H.
- When a chemical reaction is asked for, there must be a "+" between the reactants and an arrow indicating the direction of the reaction towards the products. If reactants and products cannot be identified in the reaction, then no marks are awarded.
- Hyphens: There is a hyphen between a letter and a number pent-1-ene, etc.
- When a functional group is asked for, the alkyl group(R-) MUST be indicated and all bonds must be shown. Example for alcohol:



- Teachers must focus on the types and strengths of the intermolecular forces between the molecules of each homologous series. The relative of the strength must be comparable to different homologous series, and then related to boiling point and vapour pressure. It seems that most teachers discussed only chain length in terms of the relative strength of the intermolecular forces.
- Teachers must note that hydrolysis is a reaction type that is listed under 'Substitution reactions'. The reaction of a haloalkane with a base in not ethanolic, to give an alcohol is hydrolysis.
- More time needs to spent on the different types of chemical reactions, their names, the conditions and the products to expect.
- Teachers must emphasise that carbon must have 4 bonds. Candidates often left out a bond and when there was a double bond with the oxygen, they added an extra hydrogen bond to the C atom.

**Question 8 - Chemical equilibrium and Kc**

- 8.1 Candidates should know, and use correctly, the differences between *reactants*, *products* and *reagents*. In this question the reactants and products (or reagents) are in more than one phase. The only reactant was  $\text{CaCO}_3$ .
- 8.2 To obtain all the marks allocated, candidates should write a SYSTEMATIC and LOGICAL answer which clearly shows what information was used, what was calculated and how one step follows on from the last. Candidates often drew up a table without showing whether they were working in mol, mass or concentration. An error in principle that many candidates made was to calculate the concentration of  $\text{CaCO}_3$  (the solid does not have a concentration) and then subtract this from the concentration of  $\text{CO}_2$ . In Grade 11 stoichiometry, it must be emphasised that all calculations be taken to moles. This will avoid this type of confusion.

This multi-step type of question must be practised in class so that candidates can see how to set out a logical answer that will earn the most marks in terms of the memo.

Note:  $K_c = [\text{CaO}][\text{CO}_2] / [\text{CaCO}_3] = [\text{CO}_2].1/1 = [\text{CO}_2]$  was not accepted.

- 8.3 Science candidates should understand and be able to apply logic and analysis, i.e. to combine two facts to generate a third one. In this question there were the following two facts:
- $K_c$  increases with temperature, meaning that the forward reaction was increased by an increase in T.

- Logic and knowledge states that an increase in temperature favours the endothermic reaction. Thus, applying logic, the forward reaction must be endothermic. If this kind of logical argument is used (and practised) candidates will be more successful with this type of question.

### Question 9- Electrochemical cell

9.1 Candidates confused *standard* temperature (273 K) and *room* temperature (298K). The room temperature is the condition for a *standard* cell. Also, if there are no gases present in the cell, the condition of 1 atm must NOT be listed as it is not relevant to that cell. The unit for concentration was carelessly written as mol.dm<sup>3</sup> and this cost many candidates a mark.

9.3 Cell notation had been badly taught – Mg/Mg(NO<sub>3</sub>)//Pb(NO<sub>3</sub>)/Pb was not accepted as a correct answer. The cell notation must show the ions. Mg/Mg<sup>2+</sup>//Pb<sup>2+</sup>/Pb is correct.

### Question 11- Chlor alkali industry

The candidates did very badly in this section. Teachers seem not to have spent enough time on the chemical systems. The terms *electrolyte*, *electrolytic cell* and *brine* were not known to many candidates. They did not know that there is a membrane that separates the two half cells and that it allows only Na<sup>+</sup> ions through. Some candidates stated that it does not allow a Cl<sup>-</sup> ion through, but forgot to mention the other negative ion, OH<sup>-</sup>, which also cannot get through the membrane. If a candidate states that the membrane does not allow ions through, both negative ions must be mentioned.