

Chemistry

Section I – Part B (continued)

Marks

Question 22 (6 marks)

Justify the procedure you used to prepare an ester in a school laboratory. Include relevant chemical equations in your answer.

6

The ester solution is placed in a bulb which is connected to a condenser, these are then placed in a beaker containing water, placed over a bunsen burner. When the esters heat up, the vapours will try to evaporate whilst the condenser, which is connected to allow water to flow through will cool the vapour to bring it back to liquid state.

Question 23 (4 marks)

A household cleaning agent contains a weak base of general formula NaX. 1.00 g of this compound was dissolved in 100.0 mL of water. A 20.0 mL sample of the solution was titrated with $0.1000 \text{ mol L}^{-1}$ hydrochloric acid and required 24.4 mL of the acid for neutralisation.

- (a) What is the Brønsted–Lowry definition of a base?

1

A base is an electron donor.

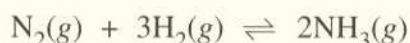
- (b) What is the molar mass of this base?

3

~~Molar mass would have something to do with~~
To work out molar mass, you would need to take note of the ~~the~~ 24.4 mL of acid required for neutralisation. Also the amount of water added to the base.

Question 24 (6 marks)

In the early twentieth century, Fritz Haber developed a method for producing ammonia, as shown by the equation:



- (a) Ammonia is used as a cleaning agent. State ONE other use of ammonia. 1

Household products, such as detergents.

- (b) Explain the effect of liquefying the ammonia on the yield of the reaction. 2

The yield will be much greater if liquefied. It will be increased.

- (c) Explain why it is essential to monitor the temperature and pressure inside the reaction vessel. 3

It is essential to monitor the temperature and pressure inside the reaction vessel because these elements act as catalysts and therefore speed up the reaction.