SECTION A (36 marks)

Answer all questions in this section.

1. Mention four (4) safe ways of storing chemicals in a school laboratory.
2. Distinguish between achievement test and aptitude test in relation to Chemistry.
3. With the aid of two (2) examples in each case, define the following types of symbols which appear on containers of chemicals:
   (a) Hazard.
   (b) Safety.
4. (a) What do you understand by the term brainstorming?
   (b) Mention four (4) rules which govern the process of brainstorming.
5. (a) What is meant by instructional objectives?
   (b) Mention three (3) advantages of instructional objectives:
6. Define the following types of test items:
   (a) Matching.
   (b) Alternative choice.
   (c) Multiple choice.
   (d) Essay.
7. Explain four (4) advantages of using a chemistry textbook as a curriculum material.
8. Without putting some details, prepare a format of scheme of work to be used by chemistry teachers.
9. Specify four (4) criteria for selecting instructional materials.

SECTION B (40 marks)

Answer both questions in this section.

10. Study the diagram below (figure 1) and answer the questions that follow:

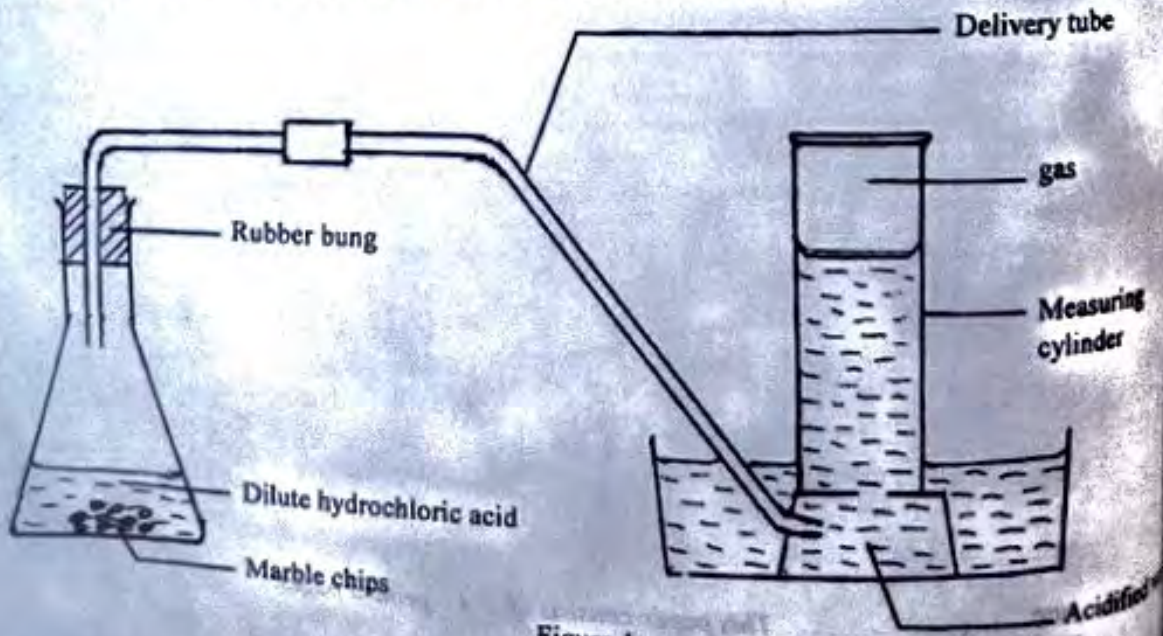


Figure 1

(a) Write the aim of this experiment simply by looking at the set up in the diagram in figure 1.

(b) Why is acidified water used instead of pure or tap water in the trough?

(c) Using a sample of 2 M HCl solution and some clean marble chips, describe a procedure for demonstrating the effects of particle size on the rate of a chemical reaction.

(d) Complete table 1 below by calculating the rates, $1/t\ (S^{-1})$, i.e. the reciprocals of time.

(e) Use the data in the completed table 1 to plot on the same graph, two graphs, one for large marble chips and the other for powdered marble, where volume is on the y – axis and time on the x – axis.

LARGE MARBLE CHIPS			POWDERED MARBLE		
Volume of CO_2 evolved (cm^3)	Time (S)	Rate $1/t\ (s^{-1})$	Volume of CO_2 evolved (cm^3)	Time (S)	Rate $1/t\ (s^{-1})$
20	30	0·023	30	30	0·033
45	60	0·017	65	60	0·017
66	90	0·011	87	90	0·011
87	120	0·008	95	120	0·008
92	150	0·007	96	150	0·007
95	180	0·006	99	180	0·006
98	210	0·005	100	210	0·005
98	240	0·004	100	240	0·004

Table 1

(f) Explain why both graphs finally become horizontal.

11. (a) As a teacher, you have decided to use question and answer as your teaching/learning strategy for a form three chemistry class. Discuss nine (9) techniques which you have to employ in order to make the strategy as successful as possible.

(b) (i) Explain the techniques of preparing to teach a chemistry lesson to a form two class using "active" approaches.

(ii) Describe the possible problems of teaching a chemistry lesson without enough preparations.

SECTION C (24 marks)

Answer two (2) questions from this section.

12. An experiment to determine the rate of decomposition of dinitrogen pentoxide $(N_2O_{5(g)})$ gas was carried out by Form IV students.

(a) Write the summary of the experiment based on the meaning of reaction rate.

(b) The following were the results of the rate of decomposition of the gas at 67 °C.

Time (min)	0	1	2	3	4
Conc. N_2O_5 (mol l^{-1})	0.160	0.113	0.080	0.056	0.040
Initial rate (mol l^{-1} min^{-1})	0.56	0.039	0.028	0.020	0.014

(i) Calculate the average rate of decomposition of $N_2O_{5(g)}$ at t = 0 and t = 1 min.

(ii) Sketch a graph of concentration against time so that the instantaneous rate can be found.

13. Using relevant equations, outline a procedure for preparing pure samples of each of the following compounds in the laboratory:

(a) Lead (II) sulphide from lead (II) carbonate.

(b) Copper (II) chloride from copper (II) sulphate.

(c) Methane from sodium ethanoate.

(d) Ethyne from calcium carbide.

14. Prepare a marking scheme for the following question and score it out of **twenty (20) marks.**

Using relevant examples or chemical equations, give the difference between the following:

(a) Oxidation and reduction in terms of electron transfer.

(b) Elimination and addition on a two carbon organic compound.

(c) Isotopy and isomerism.

(d) Fractional distillation and destructive distillation of coal.

(e) Reversible reaction and equilibrium reaction.

(f) Producer gas production and water gas production.

15. As a chemistry teacher you will be required to construct standard chemistry objective test items.

(a) What do you understand by the terms item stem, key, distracters and options as far as multiple choice test items are concerned?

(b) Outline and briefly explain the guidelines that are used in constructing multiple choice questions.