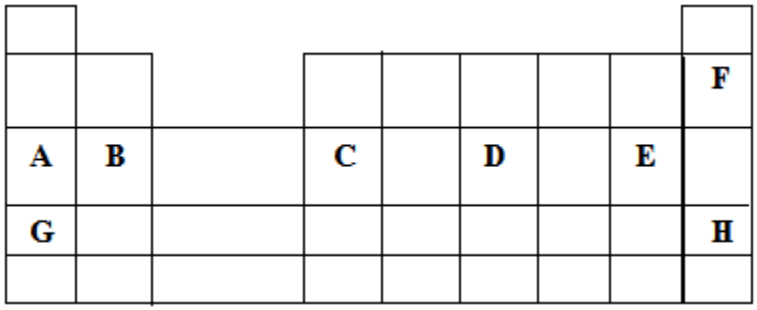
CHEMISTRY
FORM 3
EXAM

NAME……..ADMN……..……..

ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED

1. The table below shows elements in the periodic table. Use it to answer the questions that follow. The letters are not the actual symbols of the elements.



a) i) Write the electron arrangement of elements; B and A(2mks)

ii) Write the formula of the compound formed between the elements B and E.(1mk)

b) Element K has atomic number 14. Indicate by use of tick ( ) the position of this element in the table above(1mk).

c) i)T he ionization energy of A is higher than that of G. Explain. (2mks)

ii) The atomic radius of C is larger than that of D.(2mks)

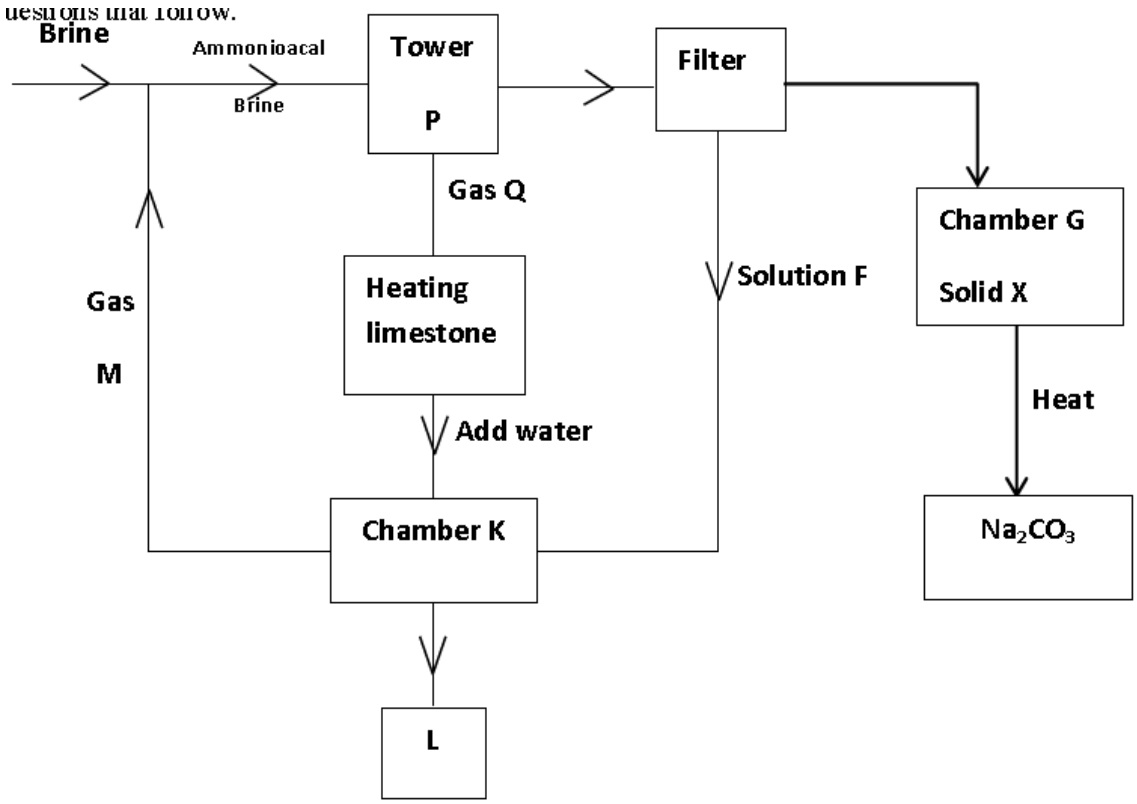
iii) Compare the reactivity of elements A and B.
Explain your answer.(2mks)

d) i) State the name of the group to which elements F and H belong. (1mk)

ii) Give one use of any of the elements of in group in d(i) above. (1mk)

e) The chloride of B is ionic, while the chloride of C is covalent. Explain this observation. (2mks)

2. The flow chart below is for the manufacture of sodium carbonate using Solvay process. Use it to answer the questions that follow.



(a) Name(3mks)
(i) Gas **M**……

(ii) Solution **F** ……..……..…

(iii) Solid X ……..…

(iv) The product **L**……

(b) Write an equation for the reaction in chamber **K**. (2mks)

(c) Name **two** raw materials used in Solvay process.(2mks)

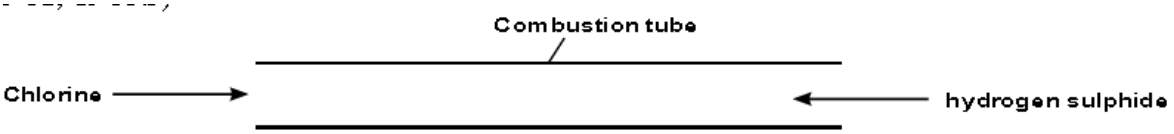
(d) (i) Name **one** substance recycled in Solvay process.(1mk)

(ii) Give **two** reasons why carbon (IV) oxide is used as fire extinguisher. (2mks)

(iii) Explain why lead carbonate is not reacted with dil. H_2SO_4 in preparation of carbon (IV) oxide in the laboratory. (2mks)

3. a) State Graham's law of diffusion. (1 mark)

b) An experiment was carried out to compare the rates of diffusion of chlorine gas and hydrogen sulphide gas. (H=1, S=32, Cl=35.5)



i)What observation was made in the combustion tube? (1 mark)

ii)Indicate where the observation in (i) above would occur. (1 mark)

iii) It takes 15 seconds for 45cm³ of chlorine to diffuse through the combustion tube. How long will it take 135cm³ of hydrogen sulphide to diffuse under similar conditions? (3 marks)

4. **a)** State Charles's law. (1 mark)

b) The table below shows the relationship between the volume of a fixed mass of a gas and its temperature (°C) at constant pressure.

Volume (cm^3)	30	32	34	37	39	41	43
Temperature (°C)	0	20	40	60	80	100	120
Temperature (K)							

i) Complete the table by filling the corresponding temperature in Kelvin. (3½ marks)

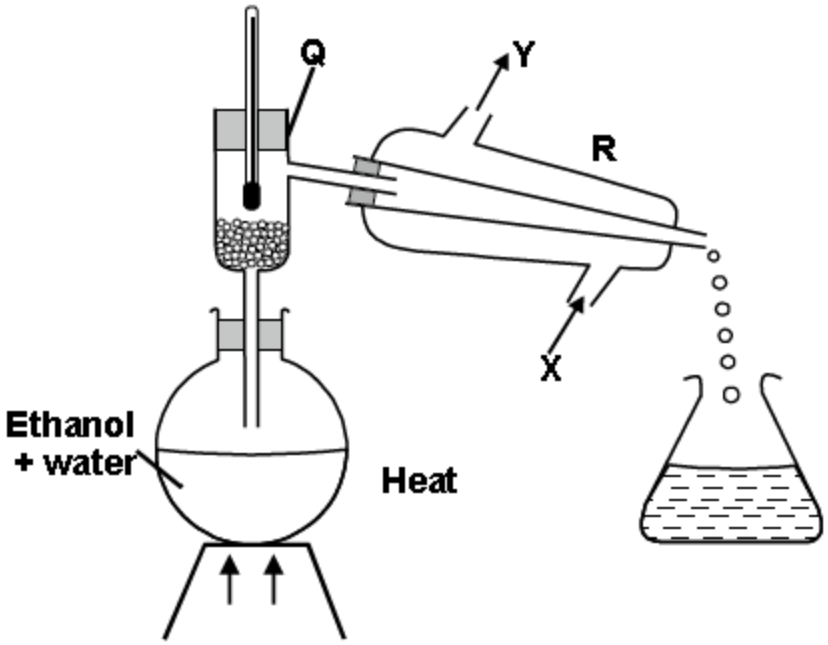
ii) Plot a graph of volume (cm^3) on the vertical axis against temperature in Celsius on the Horizontal axis using a temperature range : -300°C to 120°C (3 marks)

iii) Extrapolate the graph in (ii) above to cut the horizontal axis and read the temperature value. (1 mark)

iv) Determine from the graph, the volume of the gas when the temperature is -225°C. (1 mark)

c) A balloon contains 100cm³ of air at 25°C. The balloon was put outside in the sun where the temperature was 40°C. Calculate the new volume of air. (2½ marks)

5. **1.** The diagram below shows a set-up of apparatus used to separate a mixture of ethanol (B.P=78.0°C) and water (B.P = 100.0°C)



a) Name the parts labelled Q and state its function. (2 marks)

b) Name the apparatus R. (1 mark)

c) At what point should apparatus R be connected with water? (1 mark)

d) Name the distillate that was collected first. (1 mark)

e) State the purpose of the thermometer. (1 mark)