Name: ……………………………………………………   Adm No. ……………………………

Class: ………………………………………………….   Date: …..

233/2
CHEMISTRY
PAPER 2
FORM III
END TERM 2 EXAMS
Time: 2 hours

ANESTAR SCHOOLS JOINT EXAMINATIONS 2021

233/2

CHEMISTRY

FORM III

INSTRUCTIONS TO THE CANDIDATES:-

- Write your **name** and admission **number** on the spaces provided.
- Answer *all* the questions in the spaces provided.
- Mathematical tables and electronic used calculators may be
- All working **MUST** be clearly shown where necessary.

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-30	80	

1. The figure below represents a section of the periodic table. Study it and answer questions (a) to (h). Note that the letters do not represent the actual symbols of the elements.

A							D	
B			G	J		F	H	E
C							I	

(a) Consider elements D. H and I

   i) Give the chemical family of these elements.   (1 mk)
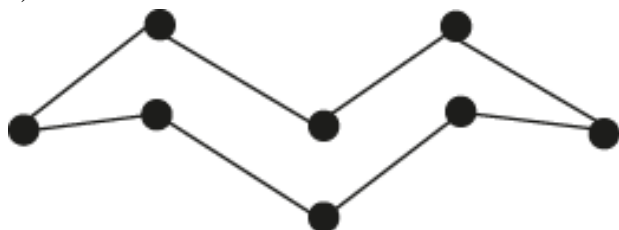
_____

   ii) How do their ionic size compare.   (1mk)

_____

   iii) Compare and explain the reactivity of the three elements.   (2mks)

_____

_____

   b) Write the electronic configuration of;

   i) Element H   (1mk)

_____

   ii) The ion of element G.   (1mk)

_____

   c) A molecule of one of the elements is shown below.   (2mks)


   i) Identify this element from the section of the periodic table and give its actual symbol and name. (2mks)

_____

   ii) Explain why this element has a higher boiling point compared to that of oxygen.   (2mks)

_____

_____

   iii) Write an equation to show the reaction between the element named above with oxygen.   (1mk)

_____

   iv)   Predict the pH of the oxide of the above element when in water. Explain.   (2mks)

2. The flow chart below shows some reactions starting with copper (II) nitrate. Study it and answer questions that follow.
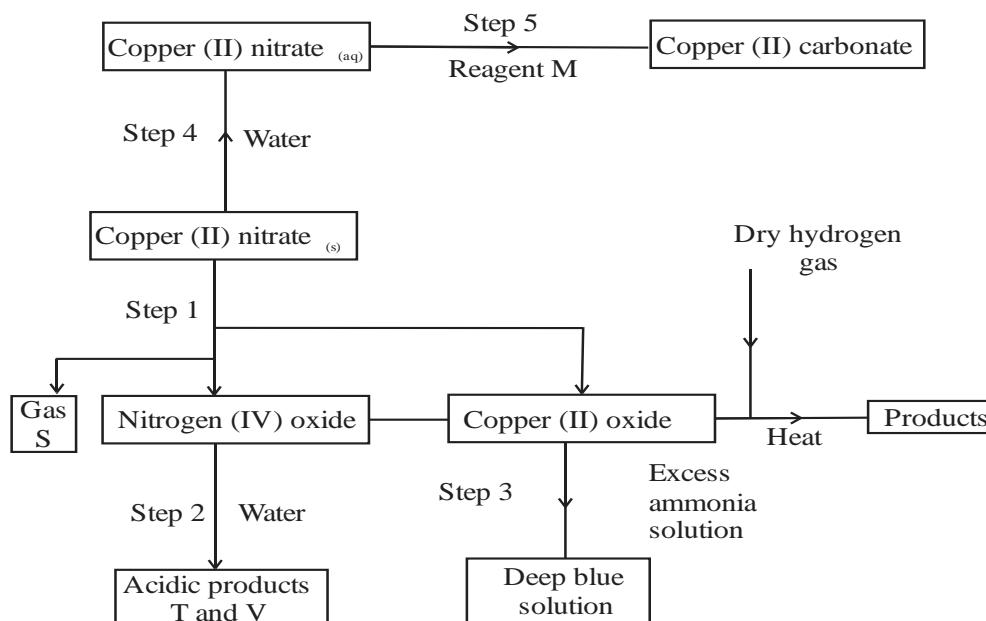
i) State the condition necessary in step 1. (1mk)
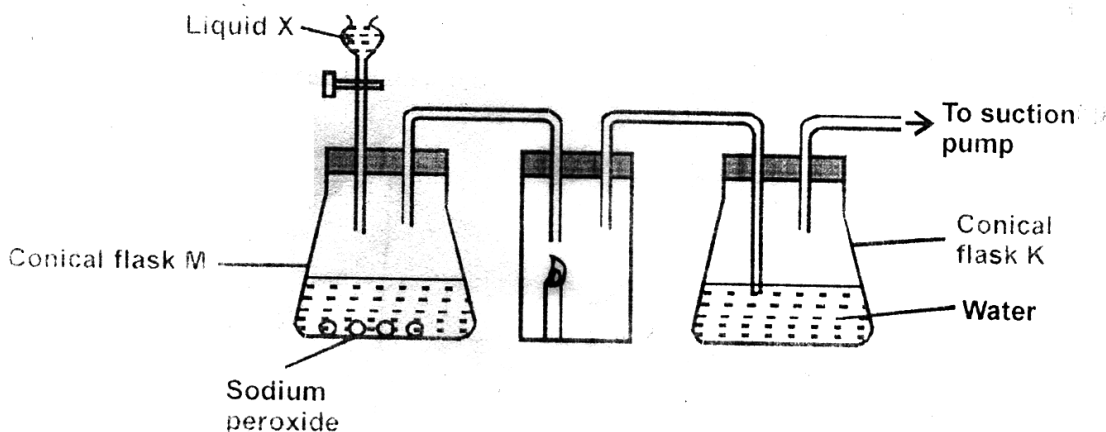
_____

ii) Identify: (4mks)

Reagent M _____

Gas S _____

Acidic products T_____

V_____

iii) Write the formula of the complex ion formed in step 3. (1mk)

_____

iv) Write the equations for the reaction in (2 marks)

Step 1

_____

Step 2

_____

3. a) The diagram below shows a set up that was used to prepare oxygen gas and passing it over a burning candle. The experiment was allowed to run for some time.

i) Name liquid X   (1mk)
_____

ii) Suggest the pH of the solution in conical flask K. Explain   (2mks)
_____
_____

iii) Write an equation for the reaction taking place in the conical flask M.   (1mk)
_____

b) State and explain the two observations made when hydrogen sulphide is bubbled into the solution containing iron (III) chloride.   (2mks)
_____
_____

c) i) Describe a simple chemical test that can be used to distinguish between carbon (IV) oxide and carbon (II) oxide gases.   (3mks)
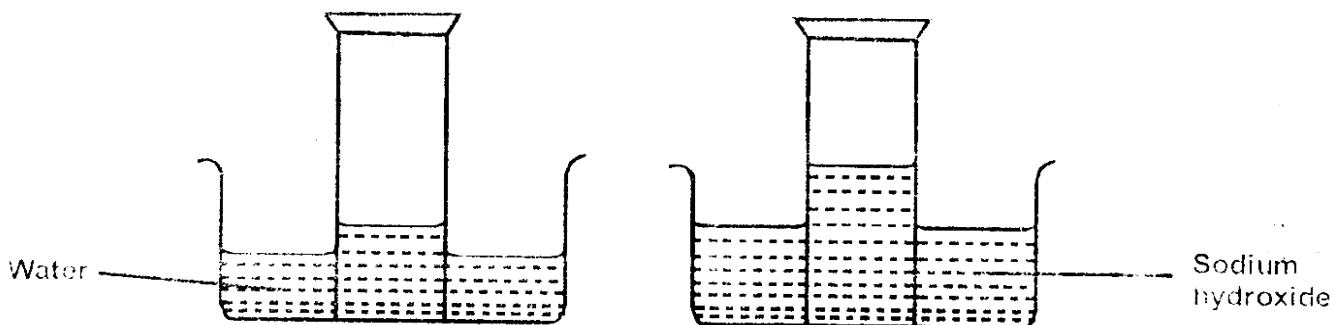_____
_____
_____

ii)   Give one use of carbon (II) oxide.   (1mk)
_____

d) A form two student inverted a gas jar full of carbon (IV) oxide over water and sodium hydroxide solution as shown below.
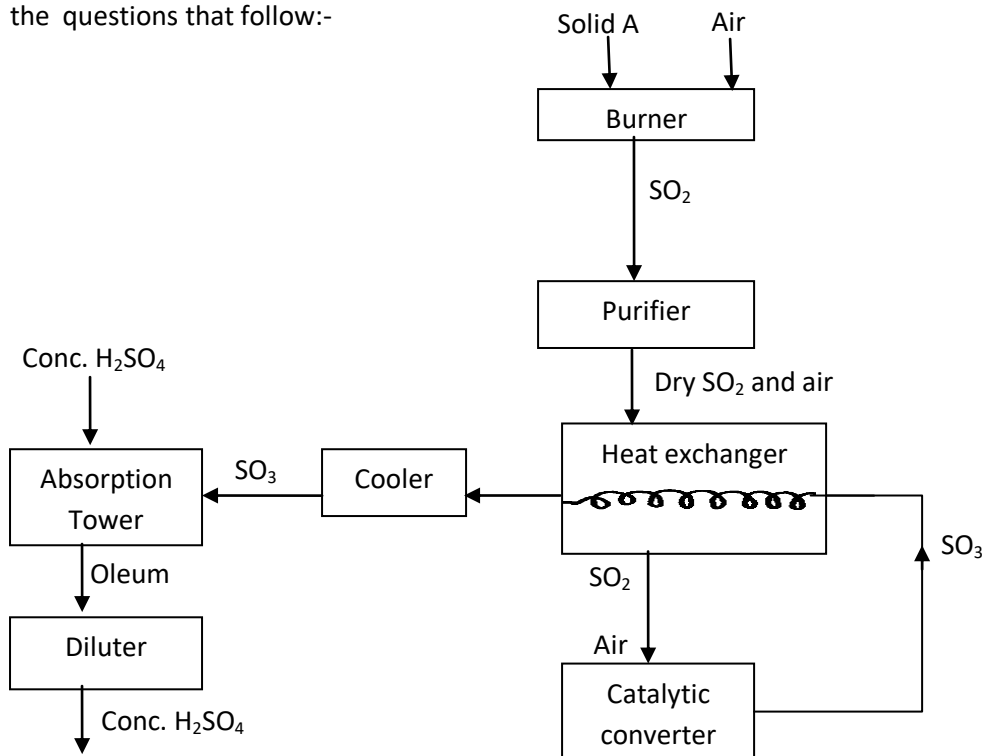

Explain the observations made.   (2mks)
_____
_____

4.   (a) Name the **two** crystalline forms of sulphur   (1 Mark)

(b) The scheme below represents the steps followed in the contact process. Study it and answer the questions that follow:-

Solid A   Air

Burner

SO_2

Purifier

Dry SO_2 and air

Conc. H_2SO_4

Heat exchanger

Absorption Tower ← SO_3 ← Cooler ←

SO_3

Oleum

SO_2

Air

Diluter

Catalytic converter

Conc. H_2SO_4

(i) Name **one** impurity removed by the purifier.   (1 mark)

………

(ii) Why is it necessary to remove impurities?   (1 mark)

……
………

(iii) Write down the equation of the reaction taking place in the converter   (1 mark)

……
………

(iv) Name the **two** catalysts that can be used in the converter   (2 marks)

……
………

(v) What is the function of heat exchanger?   (1 mark)

……
………

(vi) Sulphuric (VI) Oxide is not dissolved directly into water? Explain   (1 mark)

……
………

(vii) (I) Name the main pollutant in the contact process.   (1 mark)

……

....

(II) How can the pollution in **(g) (I)** above be controlled? (1 mark)

....
....

(vii) Give **one** use of sulphuric (VI) acid (1 mark)

....
....

5. The flow chart below shows industrial manufacture of sodium carbonate.
Study it and answer the questions that follow.
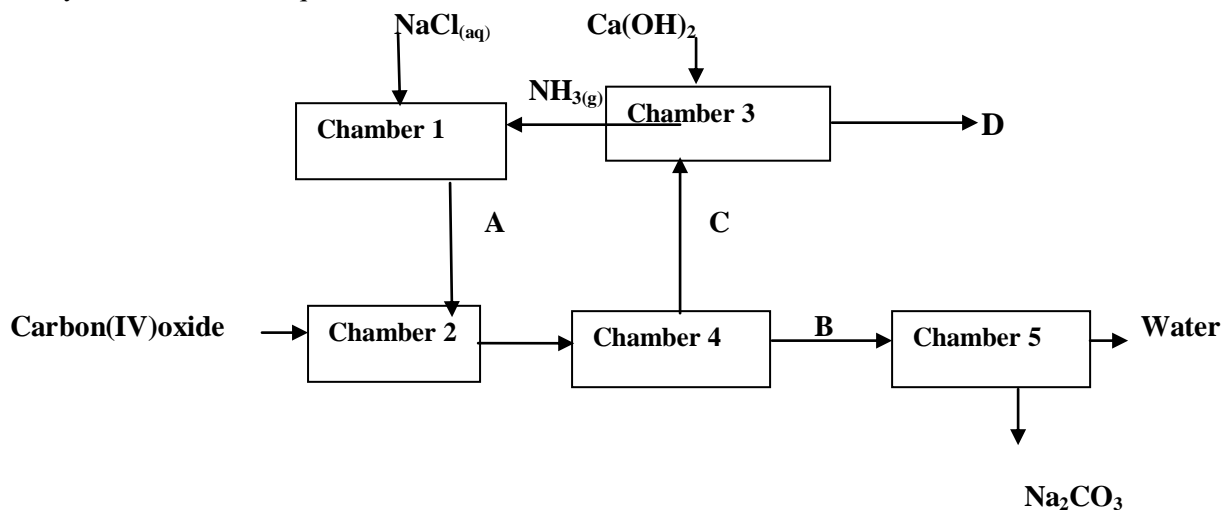
(a) Name substances **A**, **B**, **C** and **D**. (4mks)

A _____ B
_____
C _____
D _____

(b) Write equation for the reactions taking place in chamber 3 and 5. (2mks)
Chamber 3

_____
Chamber 5

_____
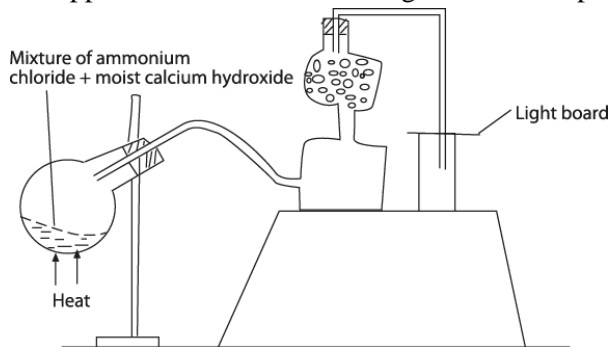
(c) Name the physical process in chamber 4 and 5. (2mks)
Chamber 4

_____
Chamber 5

_____

(d) Name **one** source of cheap carbon (IV) oxide for Solvay process. (1mk)

_____

6. a) A student set up the apparatus as shown in the diagram below to prepare and collect dry ammonia gas.

i) Identify **three** mistakes in the set up and give a reason why each is mistake.   (3mks)

_____

_____

_____

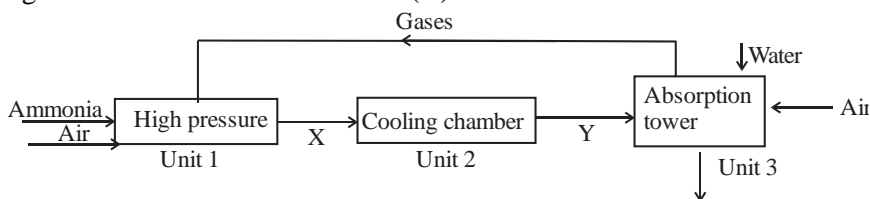ii) Name a suitable drying agent for ammonia.   (1mk)

_____

iii) Write an equation for the reaction that occurred when a mixture of ammonium chloride and calcium hydroxide was heated.   (1mk)

_____

iv) Describe one chemical test for ammonia gas.   (1mk)

_____

b) Ammonia gas is used to manufacture nitric (V) acid as shown below.

i) This process requires the use of a catalyst. In which unit is the catalyst used?   (1mk)

_____

ii) Identify compound X and Y.   (2mks)

_____

_____

iii) Ammonia reacts with nitric (v) acid to form ammonium nitrate fertilizer. Calculate the percentage composition of nitrogen in ammonium nitrate. (N = 14, O = 16, H = 1)   (3 marks)

_____

_____

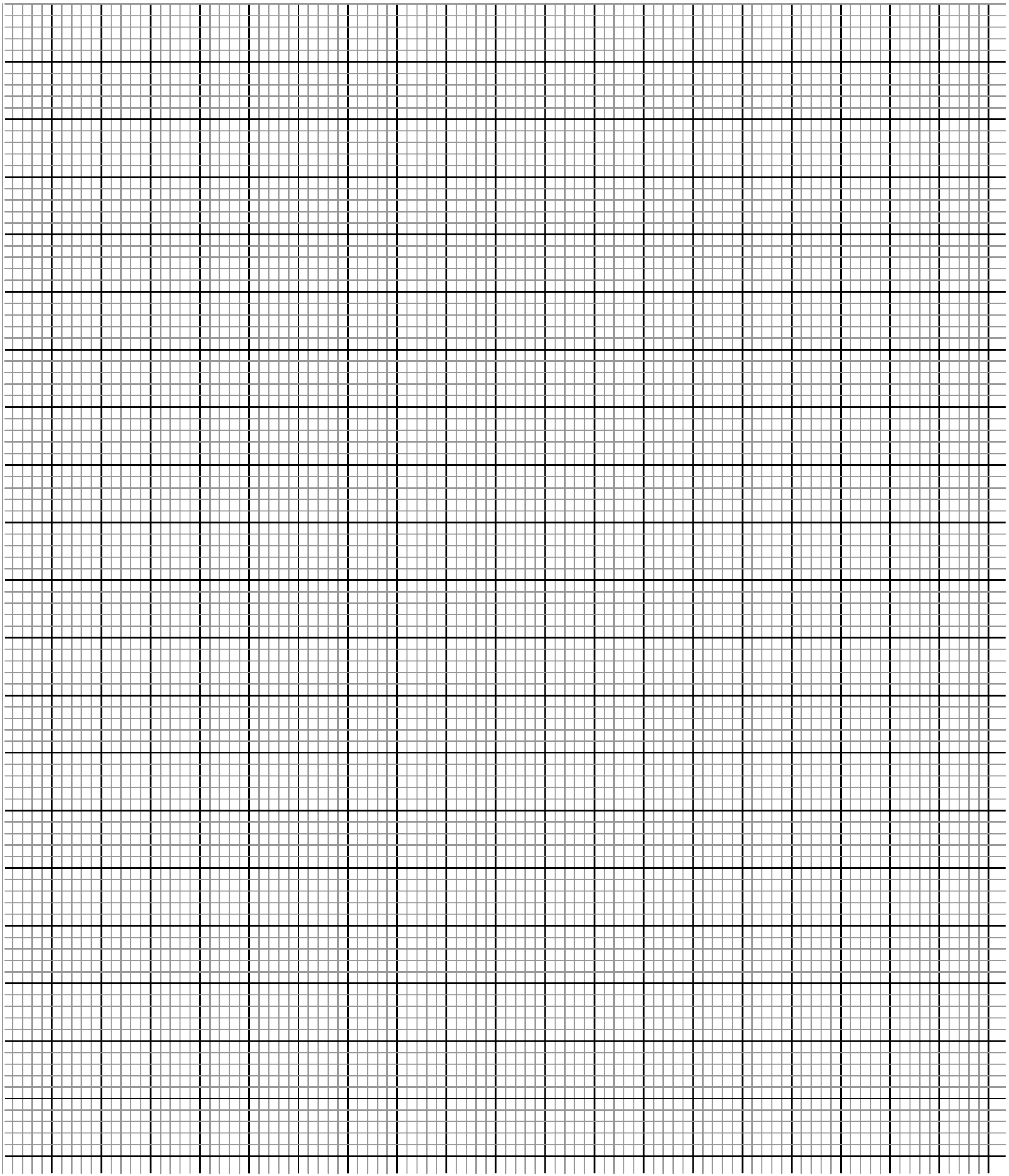**7.** a)   *State* Graham's Law.   (2mks)

_____

_____

_____

b)   The table below shows the relationship between the pressure and volume of a fixed mass of ozone gas.

Pressure (K pa)	1	4	8	16	20	160
Volume (cm^3)	140	40	20	10	8	1
Inverse of volume 1/v (cm^{-3})						

i)   Complete the table by filling the inverse of volume.   (3mks)

ii)   *Draw* a graph of pressure against the reciprocal (*inverse*) of volume.   (4mks)

(c)   Using the graph, ***determine*** the volume of ozone if pressure is 12Kpa.   (3mks)

_____

_____

_____

_____