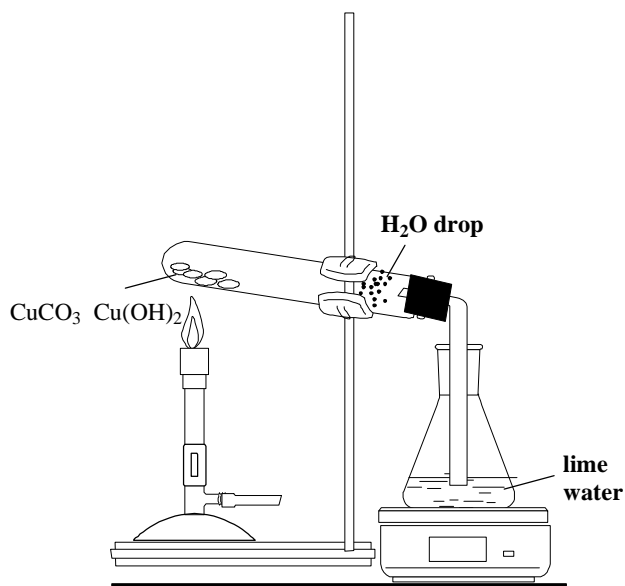


Chemistry
I part

Answer all the questions in the space provided.

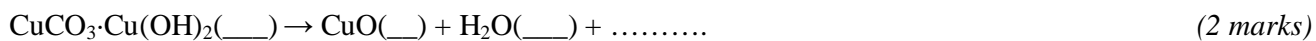
The diagram shows the apparatus used to study the decomposition reaction of malachite:



Decomposition of malachite

Malachite is a carbonate mineral normally known as “copper carbonate” with the formula $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$.

1. The malachite decomposes into copper (II) oxide, water and releases a gas.
Complete the equation for this reaction, including state symbols.



2. Draw the Lewis structure of formed **solid product** in the test tube. (2 marks)



3. Draw a diagram to show hydrogen bonding between two molecules of H_2O . (3 marks)



5. (a) When 11,1 g of malachite, is strongly heated it gives the gas. When the gas had reached the limewater, it had started to appear milky (precipitate) and the mass of flask increases by 1,1g. Calculate the percentage yield of gaseous product. (4 marks)

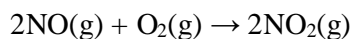
- (b) The decomposition of malachite was continued. A second sample of malachite was heated and continues to bubble gas through the solution in the same flask until the precipitate just disappears. Write the ion(s) symbol(s), which is(are) formed in the flask. (3 marks)

II part

Answer all questions. Write your answers in the answer table provided. The maximum mark for this part is 6.

Question number	1	2	3	4	5	6
Answer						

1. What is the amount of **atoms**, in moles, in 88 g of carbon dioxide?
2. Determine the percentage by mass of iron in iron (III) sulfide.
3. How many electrons are there in one ${}^{34}_{16}\text{S}^{2-}$ ion?
4. 5.0 dm^3 of NO is reacted with 2.0 dm^3 of O_2 according to the equation below.



What volume of NO_2 (in dm^3) is formed? (Assume the reaction goes to completion and all gases are measured at the same temperature and pressure.)

5. An element forms a covalently bonded compound with hydrogen that has the formula XH_3 , where X is the element. In which group of periodic table would you expect to find X?
6. 25.0 cm^3 of 2.00 mol dm^{-3} $\text{HNO}_{3(\text{aq})}$ reacts completely with 20.0 cm^3 of $\text{Ba}(\text{OH})_{2(\text{aq})}$. What is the concentration of barium hydroxide solution?