

1. A beaker of water contains some water that is at 87°C . Describe the temperature of the water
 - a) in a "qualitative" way

 - b) in a "quantitative" way

2. Say whether the following statements describe physical properties or chemical properties.
 - a) C_3H_8 burns in O_2 _____
 - b) gold does not rust _____
 - b) glass is brittle _____
 - d) NaCl dissolves in water _____

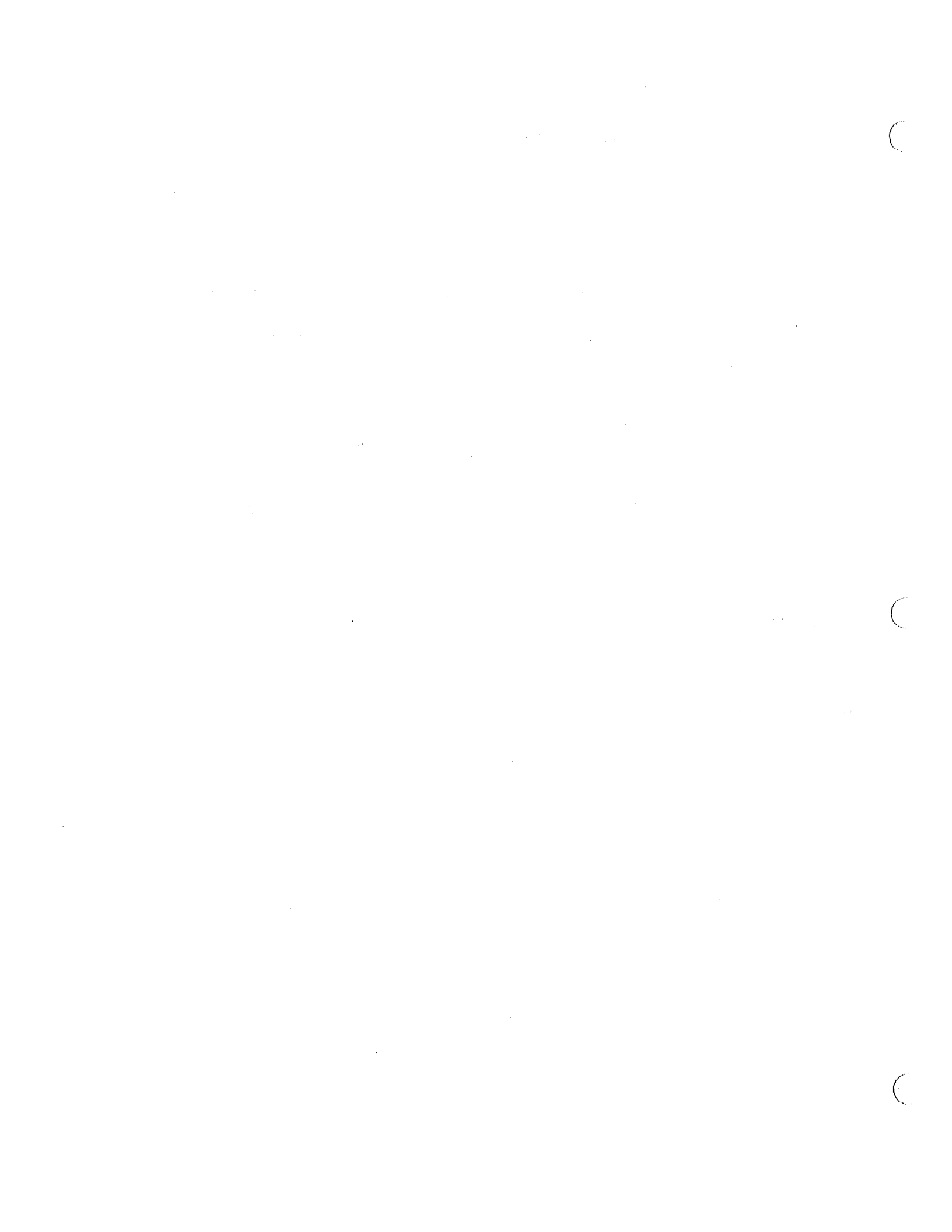
3. Fill in the blank. Spelling counts.
 - a) _____ is the intermingling of fluids as a result of molecular motion.
 - b) _____ is the resistance of a fluid to flow.
 - c) _____ is the ability to be rolled or hammered into thin sheets.

4. Give a scientific explanation of each of the following terms:
 - a) substance

 - b) boiling point

 - c) chemical property

5. If the boiling point of acetone is 56°C , should the gaseous form of acetone be called a "gas" or a "vapour"? _____ Explain your reasoning.



6. When some water at room temperature is placed in a bell jar and the air is removed with a vacuum pump, the water starts to boil. Explain why this happens.

7. Acetone has a ^{vapour} pressure of 31 kPa at room temperature. Butanol has a vapour pressure of 0.9 kPa at the same temperature. Which of these liquids has the lower boiling point?

8. Complete a chart to show how chemists classify matter. Spelling counts.

9. According to the information given, classify the following materials as completely as possible. Note: You will be using the classifications from the chart completed for question 8.

a) a clear yellow liquid has an increasing boiling point. _____

b) a white liquid slowly clears at the top. _____

c) a pale blue solid has white crystals and blue crystals. _____

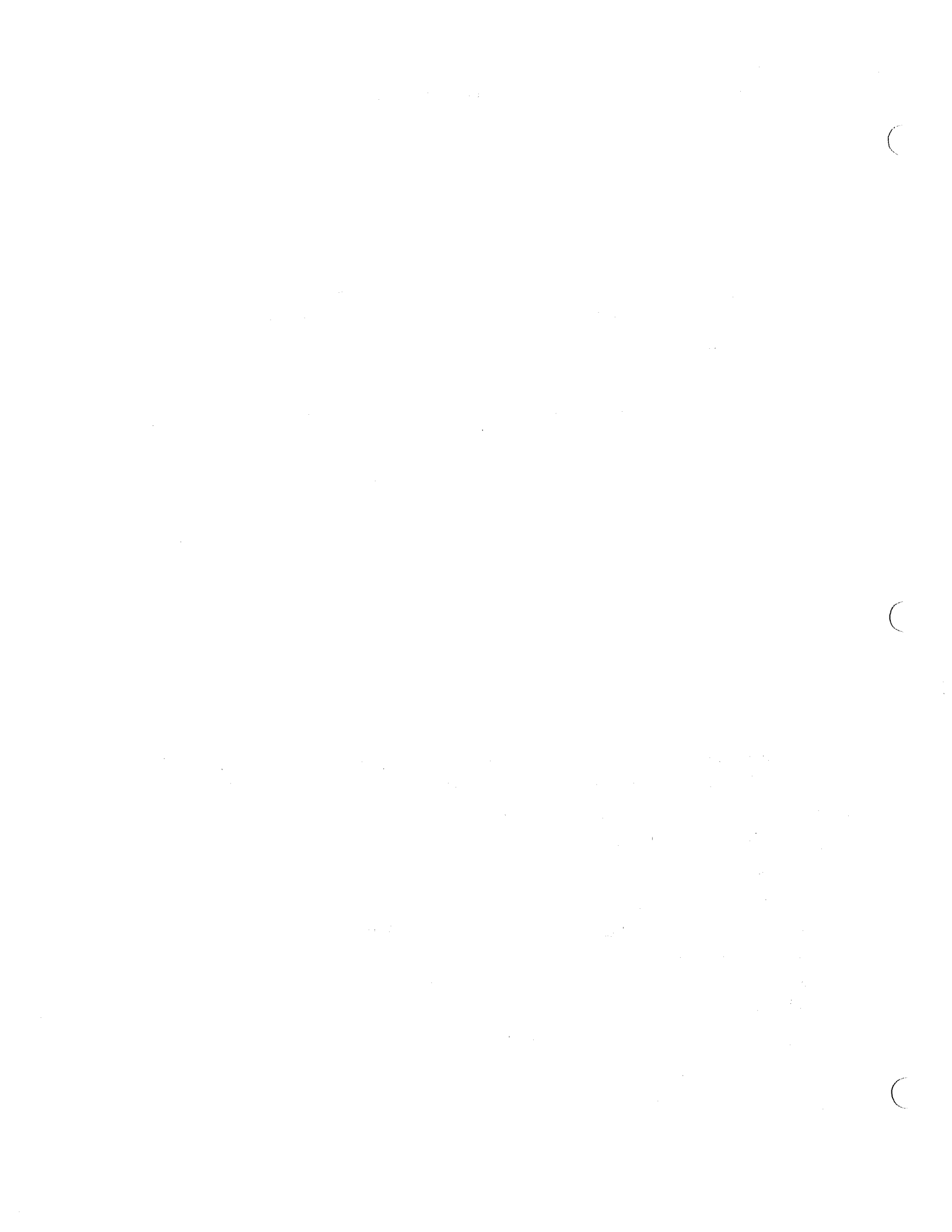
d) a clear blue liquid leaves a blue residue after evaporation. _____

e) the boiling point of this clear liquid rises slowly until all of the liquid has evaporated. _____

f) a green solid when heated to 311°C turns black and gives off a colourless gas. _____

g) a colourless liquid boils at a steady 62°C. _____

h) a reddish solid melts at 1085°C and boils at 2563°C. Neither additional heat nor electricity will create new substances from it. _____

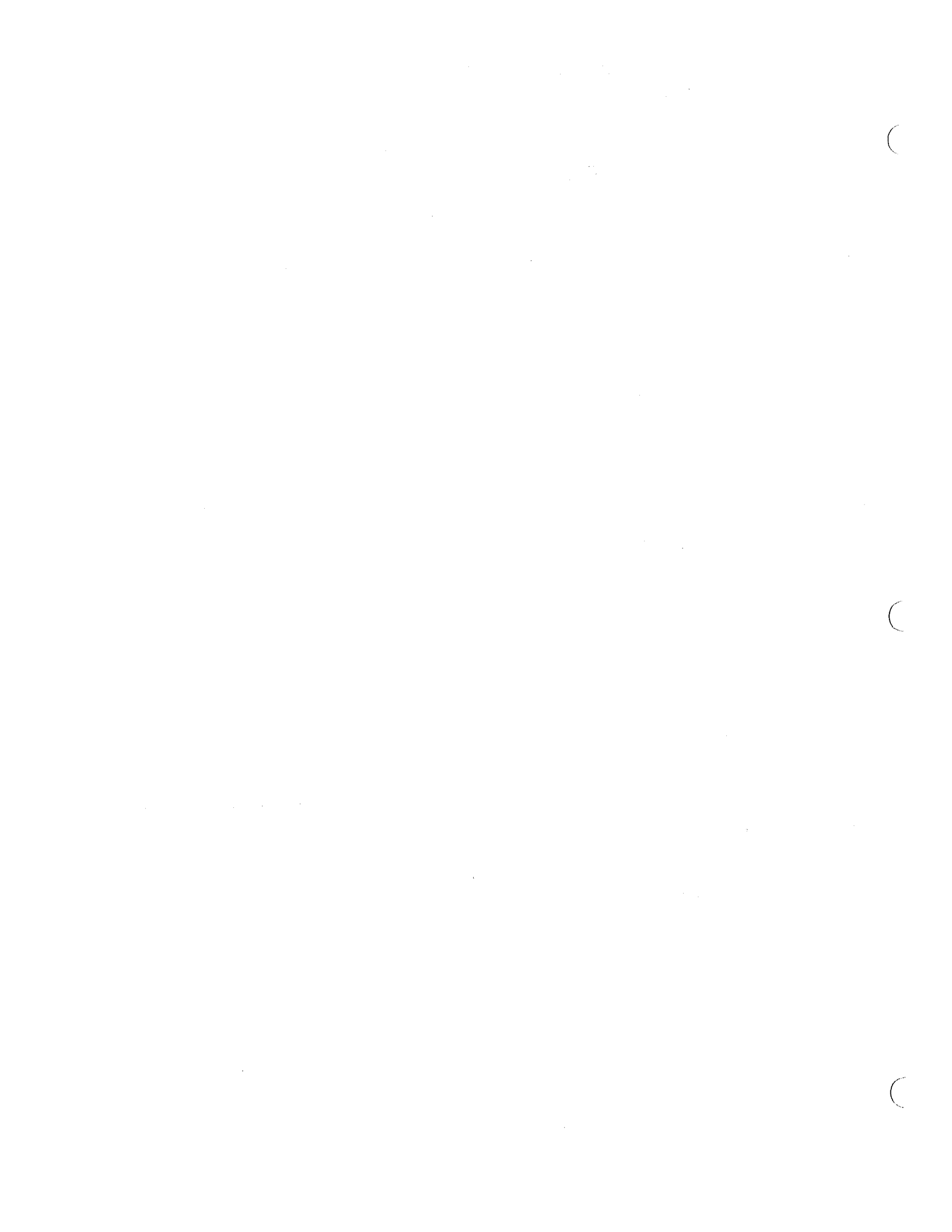


10. Name one separation method (from our list of 8 methods) that could be used to easily separate the following mixtures. Spelling counts.
- a) a solution of methanol in water _____
 - b) sawdust particles floating around in water _____
 - c) a mixture of I_2 (soluble in CCl_4) and NaCl (soluble in H_2O) _____
 - d) brass pellets mixed with glass pellets _____

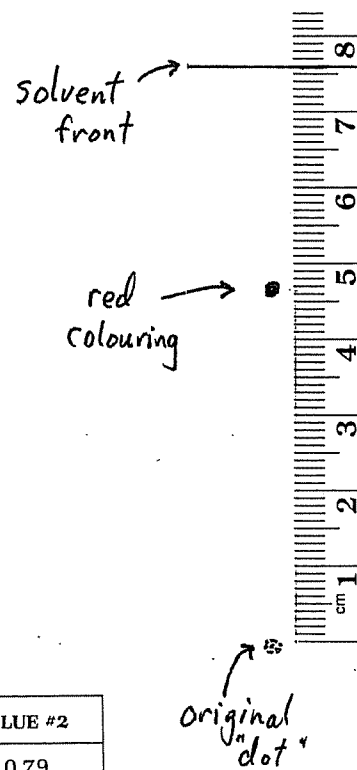
11. Explain how recrystallization is able to purify many solid substances. You may include a diagram but you must also explain in writing.

12. Sketch and label the apparatus that you would use in a science lab to do a distillation.

13. a) What is the name for the separation technique wherein a mixture of food colourings can be separated using a strip of filter paper and some water? _____
- b) Explain, by describing what is happening with the particles, how this technique is able to cause the separation to occur.



- c) For the separation shown on the right, make the appropriate measurements and then calculate the R_f value for the red food colouring (solute).



- d) Using the chart, determine the identity of the red food dye from question 13c. _____

Table 4 Some of the Dyes Approved for Food Colorings

DYE	RED #2	RED #3	RED #4	YELLOW #5	YELLOW #6	BLUE #1	BLUE #2
R_f	0.81	0.41	0.62	0.95	0.77	1.0	0.79

14. Classify each of the following as primarily a physical change or a chemical change.

- a) distilling petroleum _____ b) burning wood _____
 c) tarnishing of silver _____ d) dissolving salt in water _____

15. Fill in the blanks: a) $-22^{\circ}\text{C} = \text{_____K}$ b) $289\text{K} = \text{_____}^{\circ}\text{C}$

16. What happens to the particles of a material when

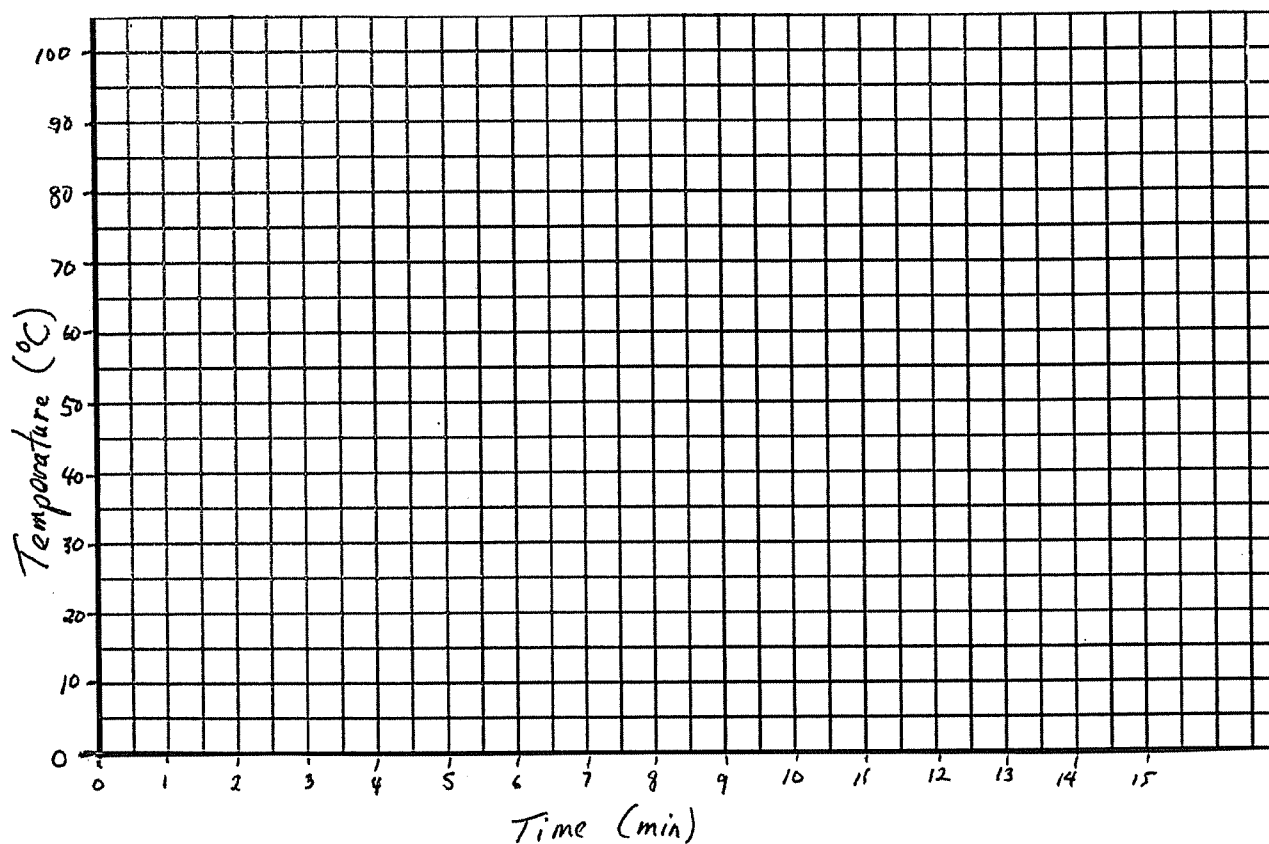
- a) their potential energy is increased?
 b) their kinetic energy is decreased?

17. Fill in the blank with either **increasing**, **decreasing**, or remaining relatively **constant**.

- a) During the process of freezing (solidification), the kinetic energy is _____ and the potential energy is _____.
- b) While heating a liquid from 27°C to 56°C , the kinetic energy is _____ and the potential energy is _____.



18. Substance X has a melting point of 37°C and a boiling point of 279°C . When a sample at 15°C is placed in a large beaker of boiling water at 100°C , liquid starts to form after 5 minutes. After a total of 11 minutes, the sample is completely liquid. After a total of 14 minutes, no noticeable changes are taking place. As accurately as possible, graph the heating curve.



19. Substance Y melts at 31°C and boils at 74°C . Plot a graph showing the temperature vs time behaviour of substance Y as its temperature is cooled from 85°C to 15°C . Label the axes. No scale needs to be specified for the time axis.

