

APOLLO

Lab and Practical Skills

FBISE Chemistry Class 10 (SSC-II)

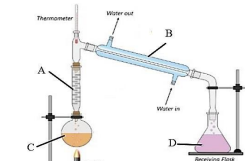
Domain G: Lab and Practical Skills

8 questions | questions

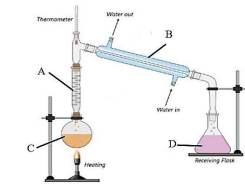
Original FBISE question crops. National Curriculum 2022-23 topic.

FBISE PBA model | Section A Q2 | 6 marks

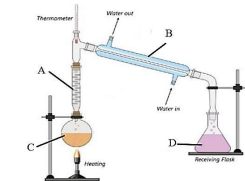
Q No.2 In the school laboratory, students are tasked with separating a mixture of water and alcohol using fractional distillation. The arrangement of the apparatus is shown in the figure below.



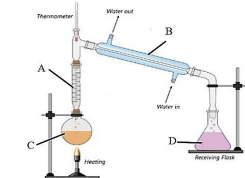
- a. Label the components A, B, C and D. [1]



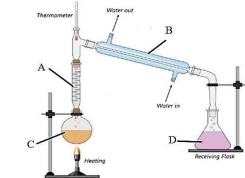
- a. Label the components A, B, C and D. [1]
- b. What is the purpose of the component labelled as 'A' in this setup, and how does it improve the separation process? [1]



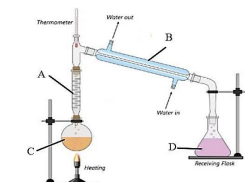
- a. Label the components A, B, C and D. [1]
- b. What is the purpose of the component labelled as 'A' in this setup, and how does it improve the separation process? [1]
- c. As you begin heating the mixture, which component (water or alcohol) will vaporize first, and why? [1]



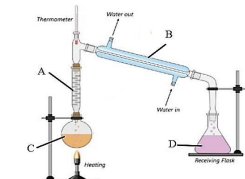
- a. Label the components A, B, C and D. [1]
- b. What is the purpose of the component labelled as 'A' in this setup, and how does it improve the separation process? [1]
- c. As you begin heating the mixture, which component (water or alcohol) will vaporize first, and why? [1]
- d. During the experiment, the thermometer stabilizes at around 78°C. What does this indicate, and which liquid is being collected at this temperature? [1]



- a. Label the components A, B, C and D. [1]
- b. What is the purpose of the component labelled as 'A' in this setup, and how does it improve the separation process? [1]
- c. As you begin heating the mixture, which component (water or alcohol) will vaporize first, and why? [1]
- d. During the experiment, the thermometer stabilizes at around 78°C. What does this indicate, and which liquid is being collected at this temperature? [1]
- e. How can you confirm that the distillate collected at 78°C is alcohol and not water? [1]

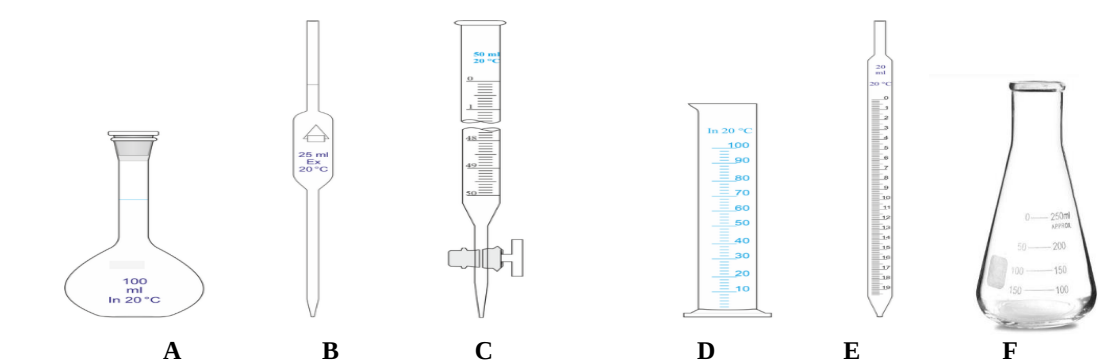


- a. Label the components A, B, C and D. [1]
- b. What is the purpose of the component labelled as 'A' in this setup, and how does it improve the separation process? [1]
- c. As you begin heating the mixture, which component (water or alcohol) will vaporize first, and why? [1]
- d. During the experiment, the thermometer stabilizes at around 78°C. What does this indicate, and which liquid is being collected at this temperature? [1]
- e. How can you confirm that the distillate collected at 78°C is alcohol and not water? [1]
- f. How would you adjust the heat source to ensure a steady and controlled distillation process? [1]



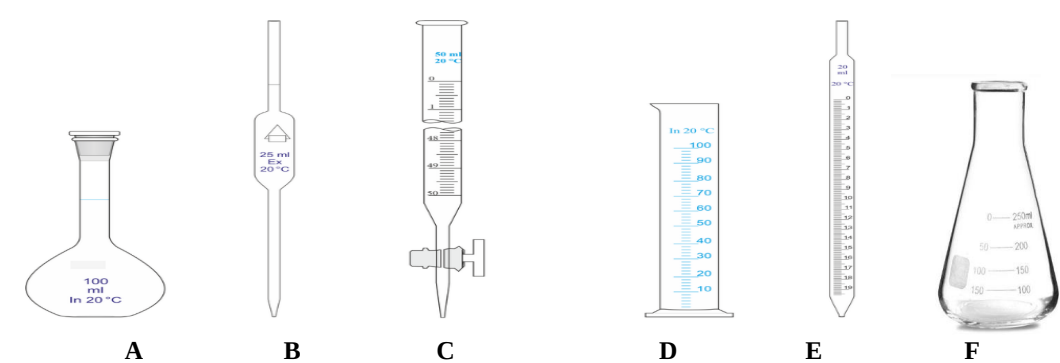
Q No.3 Purpose of this experiment is to determine the exact molarity of NaOH volumetrically. 0.1 M HCl is given.
In this experiment NaOH is taken in the conical flask and HCl in the burette.

- a. Which of the following apparatus is used to transfer 10cm³ of NaOH into the conical flask? [1]



Chemicals used:
Phenolphthalein
Distilled water
0.1M HCl

- In this experiment NaOH is taken in the conical flask and HCl in the burette.
a. Which of the following apparatus is used to transfer 10cm³ of NaOH into the conical flask? [1]



- b. See the figure given below and record the observations in table. [2]

Titration 1		Titration 2		Titration 3	
Initial Reading	Final Reading	Initial Reading	Final Reading	Initial Reading	Final Reading

Observation Table:

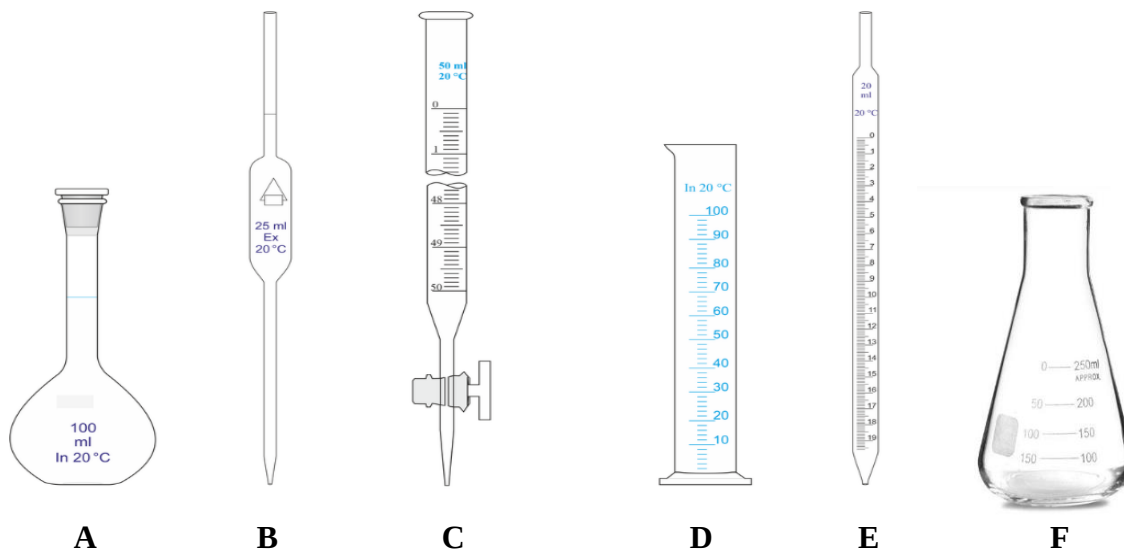
Sr. No	Initial Reading	Final Reading	Volume of HCl used
1	3.2cm ³		
2			
3			

Mean volume of HCl used= cm³

- c. By using the data given in the part “b” and volume of NaOH used. Calculate the molarity of NaOH. [1]
d. Why is it important to perform multiple titrations and take an average of the results? [1]
e. If a student accidentally adds too much indicator to the solution, how might this affect the titration results? [1]

Question no 1: Purpose of this experiment is to determine the exact molarity of Na_2CO_3 volumetrically. 0.1 M HCl is given.

- i. Which of the following apparatus are used in this experiment: Encircle the correct option. [01]



Chemicals used:

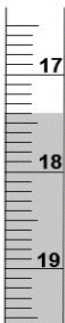
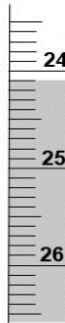
Methyl orange

Distilled water

0.1M HCl

$V_1 = 10\text{cm}^3$ (Na_2CO_3 solution)

ii. Refer to the figure given below and complete the observation table.

Titration 1		Titration 2		Titration 3	
Initial Reading	Final Reading	Initial Reading	Final Reading	Initial Reading	Final Reading
					

Observation Table:

Sr. No	Initial Reading	Final Reading	Volume of HCl used
1			
2			
3			

[01]

[01]

[01]

Mean volume of HCl used = cm^3

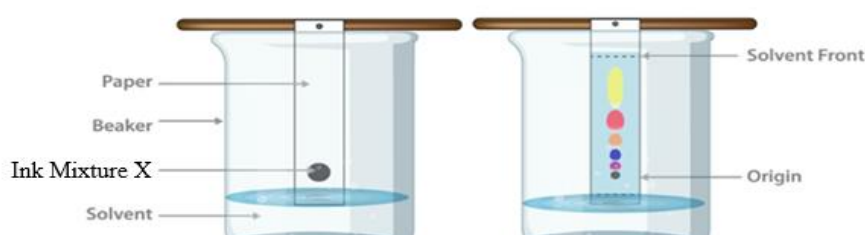
ii. When an unknown salt is subjected to a flame test, a crimson red flame is obtained. Give procedure of the test and indicate the cation which gave red flame.

[01]

Q No.1 Ali, a Grade 10 student, is tasked with separating the components of a mixture of inks using paper chromatography in the school laboratory. He has been provided with the following materials:

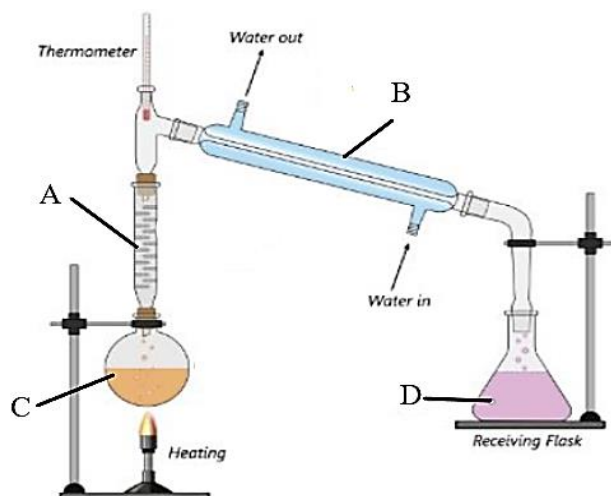
- Chromatography paper
- A pencil
- A capillary tube
- Beakers
- A solvent (water/alcohol mixture)
- Ink samples (Mixture X)

Ali is instructed to follow the standard procedure for paper chromatography and analyze his results to identify the composition of mixture X.



- a. Ali begins by drawing a baseline on the chromatography paper. Where should Ali draw the line, and why should he use a pencil instead of a pen? [1]
 Ali will draw the line at the bottom of the paper, just above the solvent level. He should use a pencil because it is not soluble in the solvent, unlike ink.
- b. Ali used a capillary tube to apply small spots of X (mixture of inks). How can he ensure that the spots are properly placed for effective separation? [1]
 He should ensure that the spots are applied to the baseline and are not too close to each other or the solvent level.
- c. After applying the ink spots, Ali placed the chromatography paper into a beaker with the solvent. What must Ali check to ensure the setup is correct before starting the experiment? [1]
 He should check that the solvent level is below the baseline and that the paper is not touching the sides of the beaker.
- d. How can Ali determine when the experiment is complete, and what should he do immediately after removing the paper from the beaker? [1]
 He should determine when the solvent front is near the top of the paper. After removing the paper, he should mark the solvent front and the positions of the separated spots.
- e. Ali observed that X separates into two distinct spots. What conclusion can Ali draw about the composition of X? [1]
 He can conclude that the mixture X contains at least two different substances.
- f. Perform the necessary calculations to Calculate the R_f values for substance A and B. [1]

Q No.2 In the school laboratory, students are tasked with separating a mixture of water and alcohol using fractional distillation. The arrangement of the apparatus is shown in the figure below.

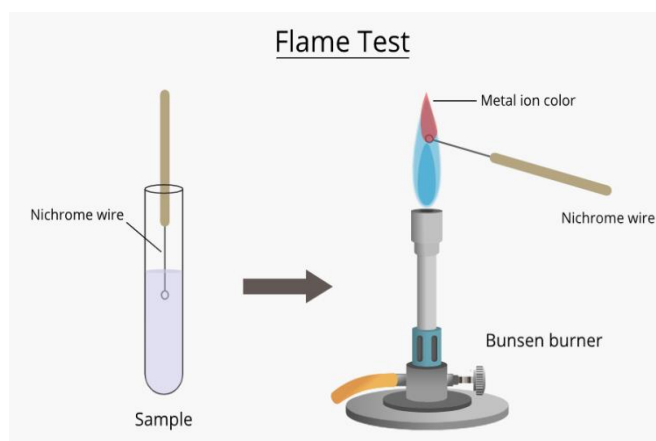


- a. Label the components A, B, C and D. [1]
- b. What is the purpose of the component labelled as 'A' in this setup, and how does it improve the separation process? [1]
- c. As you begin heating the mixture, which component (water or alcohol) will vaporize first, and why? [1]
- d. During the experiment, the thermometer stabilizes at around 78°C . What does this indicate, and which liquid is being collected at this temperature? [1]
- e. How can you confirm that the distillate collected at 78°C is alcohol and not water? [1]
- f. How would you adjust the heat source to ensure a steady and controlled distillation process? [1]

Q No.3 A student **Y** is working in the school laboratory to identify metal ions using the flame test. He is provided with:

- Solid samples of salts containing Na^+ , K^+ , Ca^{2+} , Cu^{2+} , and Ba^{2+} ions.
- A clean platinum/nichrome wire.
- Concentrated hydrochloric acid (for cleaning the wire).
- A Bunsen burner.
- Safety equipment (goggles, gloves).

Y must perform the flame test for each sample and record the flame color to identify the metal ion.



- What is the purpose of cleaning the nichrome/platinum wire before testing a new sample. Why is this step important. [1]
- Describe how **Y** should hold the wire in the Bunsen burner flame to observe the colour effectively. If **Y** observes a yellow flame while testing, which metal ion is likely present in the sample? [1]
- A student, **Z** is setting up an experiment to measure the boiling point of ethanol. He repeats the experiment 3 times to calculate the average. His determined boiling points are 70°C , 71°C , 70.5°C . The true boiling point of ethanol is 78°C . How would you describe his work in terms of accuracy and precision? [1]
- Design an experiment to separate a mixture of substances using sublimation. [1]