

## Micropipette Experiment Questions

1. What is the main objective of Experiment 3?
  - A) Measuring pH
  - B) Learning micropipette use with accuracy and precision
  - C) Preparing buffers
  - D) Measuring temperature
2. Which micropipette has a range of 0.5–10  $\mu\text{L}$ ?
  - A) P1000
  - B) P50
  - C) P10
  - D) P200
3. Volume in a micropipette is read:
  - A) Top to bottom
  - B) Bottom to top
  - C) Left to right
  - D) Randomly
4. Accuracy refers to:
  - A) Reproducibility of results
  - B) Closeness to true value
  - C) Speed of pipetting
  - D) Weight of sample
5. Precision refers to:
  - A) Closeness to standard value
  - B) Scatter of measurements
  - C) Volume reading
  - D) Pipette type
6. The density of water at 25°C is:
  - A) 0.1 g/mL
  - B) 1.0 g/mL
  - C) 10 g/mL
  - D) 100 g/mL
7. 1  $\mu\text{L}$  of water weighs:
  - A) 1 g
  - B) 0.1 g
  - C) 0.001 g
  - D) 10 g
8. What happens if you exceed the upper limit of a micropipette?
  - A) Nothing
  - B) Less liquid is drawn
  - C) Liquid enters pipette body
  - D) Accuracy improves
9. The first stop of the plunger is used to:

- A) Expel all liquid
- B) Aspirate correct volume
- C) Clean the pipette
- D) Remove tip

10. The second stop is used to:

- A) Aspirate liquid
- B) Set volume
- C) Expel remaining liquid
- D) Measure density

11. Which of the following affects pipetting error?

- A) Working too fast
- B) Wrong tips
- C) Pipetting at angle
- D) All of the above

12. Standard deviation measures:

- A) Accuracy
- B) Precision
- C) Volume
- D) Temperature

13. %RSD is used to express:

- A) Accuracy
- B) Precision
- C) Density
- D) Mass

14. Which pipette is suitable for 750  $\mu\text{L}$ ?

- A) P10
- B) P50
- C) P1000
- D) None

15. What should you do if the pipette is dropped?

- A) Ignore it
- B) Continue working
- C) Inform instructor
- D) Clean only

Calculation Questions:

Q1. Calculate the mass of 750  $\mu\text{L}$  of water.

Q2. Given data: 84, 84, 89, 91, 110, 114, 116. Calculate mean and standard deviation.

Q3. Results: 910, 887, 882, 902, 921  $\mu\text{L}$ . Calculate mean and % error.

Answers:

1. B

2. C

3. B

4. B

5. B

6. B

7. C

8. C

9. B

10. C

11. D

12. B

13. B

14. C

15. C

Calculation Answers with Explanation:

Q1:  $1 \mu\text{L} = 0.001 \text{ g} \rightarrow 750 \mu\text{L} = 0.750 \text{ g}$

Q2: Mean = (sum  $\div$  n) = 98.3. Standard deviation  $\approx$  14.4

Q3: Mean = 900.4  $\mu\text{L}$ . % Error =  $|900.4 - 900| / 900 \times 100 = 0.044\%$