Pharmacy Technician Certification Board (PTCB) Math Practice Exam (Sample)

Study Guide

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Questions

1. If 15 cc equals how many milliliters?

A. 15

B. 30

C. 10

D. 25

2. What volume of purified water is needed to dilute an 8% solution to a final volume of 500ml?

A. 50ml

B. 100ml

C. 200ml

D. 250ml

3. How much flow rate in milliliters per hour is required to infuse 1500ml of D5W over 12 hours?

A. 100

B. 110

C. 125

D. 150

4. What is the result of dividing 5/6 by 1/8?

A. 5/48

B. 6/5

C. 40/6

D. 8/6

5. If a solution contains 5% concentration, how many grams are in 100ml?

A. 5g

B. 10g

C. 2g

D. 15g

6. How many cubic centimeters are in 1 milliliter?

A. 0.1

B. 1

C. 10

D. 100

7. If 50ml of a solution contains 2 grams of amoxicillin, what is the percentage strength of the solution?

A. 2%

B. 4%

C. 6%

D. 8%

8. How many teaspoons are in 1 tablespoon?

A. 2

B. 3

C. 4

D. 5

9. How many ounces are there in 2 pints?

A. 16

B. 24

C. 32

D. 48

10. If 250ml of LR is to be infused over 10 hours, what is the flow rate in milliliters per hour?

A. 15

B. 20

C. 25

D. 30

Answers

1. A
2. B
3. C
4. C
5. A
6. B
7. B
8. A
9. C
10. C

Explanations

1. If 15 cc equals how many milliliters?

A. 15

B. 30

C. 10

D. 25

The correct answer is determined by the understanding of volume measurements in the metric system. In this system, cubic centimeters (cc) and milliliters (mL) are equivalent units; thus, 1 cc is equal to 1 mL. Therefore, when converting 15 cc to milliliters, you find that 15 cc directly equals 15 mL. This highlights the simplicity of the conversion, as no mathematical operations are necessary; it's simply a matter of noting that the two units are interchangeable. Understanding this equivalence is crucial in the field of pharmacy, ensuring accurate medication dispensing and patient safety. Other choices suggest different values, but they do not reflect the fundamental relationship between cc and mL.

2. What volume of purified water is needed to dilute an 8% solution to a final volume of 500ml?

A. 50ml

B. 100ml

C. 200ml

D. 250ml

To determine the volume of purified water needed to dilute an 8% solution to a final volume of 500 ml, we can start by calculating the amount of the active ingredient in the final solution. An 8% solution means that there are 8 grams of solute in every 100 ml of solution. To find out how much solute is present in 500 ml of an 8% solution, we use the equation: \[\text{Amount of solute} = \text{Concentration} \times \text{Volume} = 0.08 \times 500 \text{ml} = 40 \text{grams} \] This tells us that in the final volume of 500 ml, we need 40 grams of the solute. Since we want the final volume to be 500 ml, and we already have 40 grams of the solute in the initial 8% solution, we now need to determine how much of the original 8% solution we need to use. The volume of an 8% solution that contains 40 grams of solute can be found by rearranging the concentration formula: \[\text{Volume of initial solution} = \frac{\text

3. How much flow rate in milliliters per hour is required to infuse 1500ml of D5W over 12 hours?

A. 100

B. 110

C. 125

D. 150

To determine the flow rate in milliliters per hour required to infuse 1500 ml of D5W over a time period of 12 hours, you can use the formula: Flow Rate (ml/hr) = Total Volume (ml) / Total Time (hr). In this case, the total volume is 1500 ml, and the total time is 12 hours. Plugging these values into the formula gives you: Flow Rate (ml/hr) = 1500 ml / 12 hr = 125 ml/hr. This calculation shows that in order to complete the infusion of 1500 ml over a span of 12 hours, a flow rate of 125 ml per hour is required. It is important to perform these calculations accurately to ensure that the medication is delivered safely and effectively.

4. What is the result of dividing 5/6 by 1/8?

A. 5/48

B. 6/5

C. 40/6

D. 8/6

To determine the result of dividing 5/6 by 1/8, you need to remember that dividing by a fraction is the same as multiplying by its reciprocal. The reciprocal of 1/8 is 8/1. Thus, dividing 5/6 by 1/8 can be rewritten as: (5/6) ÷ (1/8) = (5/6) × (8/1). When you multiply fractions, you multiply the numerators together and the denominators together: Numerator: 5 × 8 = 40, Denominator: 6 × 1 = 6. Putting these together gives you the fraction 40/6. This fraction can be simplified, but as it stands, 40/6 is indeed the result of the operation, which aligns with the provided answer. The understanding of how to handle division of fractions and confirming that multiplying by the reciprocal yields a straightforward outcome is key here.

5. If a solution contains 5% concentration, how many grams are in 100ml?

A. 5g

B. 10g

C. 2g

D. 15g

To determine how many grams are in a 100 mL solution with a 5% concentration, you can start by understanding how percentage concentration is calculated. A percentage concentration of 5% means that there are 5 grams of solute (the substance being dissolved) in every 100 mL of solution. Therefore, for a 100 mL solution with a 5% concentration, you directly calculate: 5% of 100 mL = 5 grams This means that in 100 mL of a solution with a 5% concentration, there are exactly 5 grams of solute present. This aligns perfectly with the requested outcome, confirming that the correct answer is indeed 5 grams.

6. How many cubic centimeters are in 1 milliliter?

A. 0.1

B. 1

C. 10

D. 100

One milliliter is equivalent to one cubic centimeter. This is based on the definitions of metric units, where both milliliters and cubic centimeters are used to measure volume. The metric system defines these two units to be directly interchangeable, meaning that 1 mL = 1 cm^3. This equivalence is particularly useful in the fields of pharmacy and medicine, as it allows for straightforward conversions and calculations when measuring liquids—important for administering accurate dosages. Therefore, when you see the measurement of 1 milliliter, you can confidently understand it as equal to 1 cubic centimeter.

7. If 50ml of a solution contains 2 grams of amoxicillin, what is the percentage strength of the solution?

A. 2%

B. 4%

C. 6%

D. 8%

To determine the percentage strength of a solution, you need to calculate how much of the solute (in this case, amoxicillin) is present in a certain volume of the solution. The formula for percentage strength is: $$\text{Percentage Strength} = \left(\frac{\text{mass of solute (g)}}{\text{volume of solution (mL)}} \right) \times 100$$ In this scenario, you have 2 grams of amoxicillin in a 50 mL solution. First, plug the values into the formula: $$\text{Percentage Strength} = \left(\frac{2 \text{ g}}{50 \text{ mL}} \right) \times 100$$ Calculating this gives: $$\text{Percentage Strength} = \left(0.04 \right) \times 100 = 4\%$$ This shows that the percentage strength calculated is 4%, which correctly matches the calculation for the percentage of the solution. Therefore, the percentage strength of the amoxicillin solution is indeed 4%.

8. How many teaspoons are in 1 tablespoon?

A. 2

B. 3

C. 4

D. 5

One tablespoon is equivalent to 3 teaspoons. This is a standard conversion used in cooking and pharmacy settings to ensure accurate dosing when preparing medications or recipes. Knowing this relationship is crucial for pharmacy technicians, as precise calculations are essential in compounding medications or advising patients on proper dosages. While the other options present different quantities, they do not align with the established measurement conversion of 1 tablespoon equating to 3 teaspoons. Understanding this can help prevent medication errors and improve the accuracy of pharmaceutical calculations.

9. How many ounces are there in 2 pints?

A. 16

B. 24

C. 32

D. 48

To determine how many ounces are in 2 pints, it's essential to know the conversion factors between pints and ounces. One pint is equal to 16 ounces. Therefore, to find the total amount in ounces for 2 pints, you would multiply the number of pints by the number of ounces in one pint: 2 pints × 16 ounces/pint = 32 ounces. This clearly shows that 2 pints are equivalent to 32 ounces. Understanding this conversion is fundamental in the pharmacy field, as accurate measurements are crucial for medication preparation and patient care. The other choices do not accurately reflect this calculation.

10. If 250ml of LR is to be infused over 10 hours, what is the flow rate in milliliters per hour?

A. 15

B. 20

C. 25

D. 30

To determine the flow rate in milliliters per hour for a volume of 250 mL of Lactated Ringer's solution to be infused over a period of 10 hours, you need to use the formula for flow rate, which is the total volume divided by the total time. Here's how to calculate it: 1. **Total volume: 250 mL 2. **Total time**: 10 hours Using the flow rate formula: \[\text{Flow Rate} = \frac{\text{Total Volume}}{\text{Total Time}} \] Substituting in the values: \[\text{Flow Rate} = \frac{250 \, \text{mL}}{10 \, \text{hours}} \] When you perform the division: \[\text{Flow Rate} = 25 \, \text{mL/hour} \] This means that to infuse 250 mL over a span of 10 hours, the infusion should be set to deliver 25 mL each hour. This calculation confirms that the correct answer reflects the appropriate flow rate needed for the infusion.**