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

Study Guide

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Questions

1. **If a label reads 300 mcg/mL, how many mL are needed to prepare 0.75 mg?**

   A. 1.5

   B. 2.5

   C. 3.0

   D. 4.0

2. **Express 2 out of 50 as a percentage.**

   A. 2%

   B. 3%

   C. 4%

   D. 5%

3. **How many grams of drug does it take to make 500ml of a 1:20 solution?**

   A. 20 grams

   B. 25 grams

   C. 30 grams

   D. 35 grams

4. **What is the amount of drug in grams contained in 250ml of a 7% solution?**

   A. 10

   B. 17.5

   C. 20

   D. 15

5. **What is the result of multiplying 4/5 by 2/8?**

   A. 1/5

   B. 1/4

   C. 1/2

   D. 2/5

6. What is the volume of 28 ml of cherry syrup in ounces?

A. 0.95 oz

B. 1 oz

C. 1.5 oz

D. 2 oz

7. Which Roman numeral represents the number 70?

A. LXX

B. XLV

C. LIX

D. LIV

8. What is the following in Arabic numbers iss?

A. 1.5

B. 2.5

C. 1.0

D. 2.0

9. What total volume is required to prepare the mouthwash mixture?

A. 500ml

B. 600ml

C. 700ml

D. 800ml

10. What is the flow rate in mL/hr for a 1500mL IV infusion over 12 hours?

A. 125 mL/hr

B. 100 mL/hr

C. 150 mL/hr

D. 200 mL/hr

Answers

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

Explanations

1. If a label reads 300 mcg/mL, how many mL are needed to prepare 0.75 mg?

A. 1.5

B. 2.5

C. 3.0

D. 4.0

To determine how many milliliters are needed to prepare 0.75 mg using a solution that is labeled as 300 mcg/mL, it is essential to first convert the mass from milligrams to micrograms, since the concentration is given in micrograms. 1. Start by converting 0.75 mg to micrograms: - Since 1 mg equals 1000 mcg, multiply by 1000: \[0.75 \, \text{mg} \times 1000 = 750 \, \text{mcg} \] 2. Now that we know we need 750 mcg, we can use the concentration of the solution to find out how many milliliters will provide this amount. The concentration is 300 mcg/mL, which means each milliliter of the solution contains 300 micrograms. 3. To find how many milliliters are necessary to obtain 750 mcg, use the following formula: \[\text{Volume (mL)} = \frac{\text{Desired amount (mcg)}}{\text{Concentration (mcg/mL)}} \] Substituting in the values:

2. Express 2 out of 50 as a percentage.

A. 2%

B. 3%

C. 4%

D. 5%

To express 2 out of 50 as a percentage, you first need to set up the calculation by dividing the part (2) by the whole (50), and then multiplying the result by 100 to convert it into a percentage. Here's how the calculation works: 1. Start with the fraction: 2 out of 50, which can be written as 2/50. 2. Next, perform the division: 2 divided by 50 equals 0.04. 3. Finally, to convert the decimal to a percentage, you multiply by 100: 0.04 x 100 = 4. Thus, 2 out of 50 is equal to 4%, which is the correct answer. This conversion process is crucial in determining percentage values, as it allows for clear comparison between different quantities relative to a whole.

3. How many grams of drug does it take to make 500ml of a 1:20 solution?

A. 20 grams

B. 25 grams

C. 30 grams

D. 35 grams

To determine how many grams of drug are needed to create a 500 milliliter (ml) solution with a concentration of 1:20, it's essential to understand what this ratio means. A 1:20 solution indicates that there is 1 part drug for every 20 parts total solution. First, let's calculate the total number of parts in a 1:20 solution. In that case, 1 part of the drug and 19 parts of a diluent (solvent) adds up to 20 parts in total. Here is how to find the amount of drug needed for 500 ml of solution. 1. **Determine the Drug Volume: With a total of 20 parts in the solution and 1 part being the drug, the drug will make up 1/20 of the total solution. To find out how much volume (or weight, since density is usually assumed to be uniform in such calculations) of the drug corresponds to 500 ml, you calculate: \[\frac{500 \text{ ml}}{20} = 25 \text{ ml of drug} \] 2. **Convert Volume to Grams**: Assuming the drug has a density of**

4. What is the amount of drug in grams contained in 250ml of a 7% solution?

A. 10

B. 17.5

C. 20

D. 15

To determine the amount of drug in grams contained in 250 ml of a 7% solution, you can use the definition of a percentage concentration. A 7% solution means there are 7 grams of drug in every 100 ml of solution. First, find out how many 100 ml units are in 250 ml. You can do this by dividing 250 ml by 100 ml: 250 ml ÷ 100 ml = 2.5 Next, since each 100 ml contains 7 grams of the drug, you can calculate the total amount of drug in 250 ml by multiplying the number of 100 ml units (2.5) by the grams of drug in each unit (7 grams): 2.5 × 7 grams = 17.5 grams Thus, the amount of drug in 250 ml of a 7% solution is 17.5 grams, making this the correct answer.

5. What is the result of multiplying 4/5 by 2/8?

A. 1/5

B. 1/4

C. 1/2

D. 2/5

To find the result of multiplying two fractions, you multiply the numerators together and the denominators together. For the fractions \(\frac{4}{5} \) and \(\frac{2}{8} \), you start by multiplying the numerators: \(4 \times 2 = 8 \). Next, you multiply the denominators: \(5 \times 8 = 40 \). This gives you the new fraction \(\frac{8}{40} \). Next, you simplify \(\frac{8}{40} \). Both 8 and 40 can be divided by 8. When you divide the numerator and the denominator by 8, you get \(\frac{1}{5} \). Thus, the correct answer is \(\frac{1}{5} \). This process of multiplying fractions and then simplifying is essential for carrying out operations with rational numbers in pharmacy calculations and ensures accurate dosing and formulation of medications.

6. What is the volume of 28 ml of cherry syrup in ounces?

A. 0.95 oz

B. 1 oz

C. 1.5 oz

D. 2 oz

To convert milliliters (ml) to ounces (oz), it is essential to know the conversion factor between these two units. The standard conversion is that 1 ounce is approximately equal to 29.57 milliliters. Therefore, to convert 28 ml to ounces, the calculation would involve dividing the volume in milliliters by the number of milliliters per ounce. Using the conversion factor: Volume in ounces = 28 ml / 29.57 ml/oz. Carrying out this calculation: Volume in ounces ≈ 0.946 oz. This rounds to approximately 0.95 oz, making that the correct conversion for 28 ml of cherry syrup into ounces. Understanding this conversion process is crucial for pharmacy technicians, as they often need to convert measurements for dosing purposes or when preparing medications.

7. Which Roman numeral represents the number 70?

A. LXX

B. XLV

C. LIX

D. LIV

The Roman numeral representation of the number 70 is LXX. In Roman numerals: - The letter 'L' represents 50. - The letter 'X' represents 10, so when you see 'XX' following 'L', it indicates an additional 20 (10 + 10) is being added to 50. Therefore, when you combine them, L (50) + XX (20) = 70. This understanding of how Roman numerals are constructed is crucial, as they often combine various letters to create different values. In contrast, the other options represent different numbers: - The numeral 'XLV' equates to 45 (50 - 10 + 5). - The numeral 'LIX' represents 59 (50 + 9). - The numeral 'LIV' equals 54 (50 + 4). This basic knowledge of Roman numeral values helps clearly identify that LXX is indeed the correct representation for 70.

8. What is the following in Arabic numbers iss?

A. 1.5

B. 2.5

C. 1.0

D. 2.0

The representation "iss" typically corresponds to the Arabic numeral that signifies the value of one and a half. In this context, the most accurate representation in Arabic numbers for "iss" is 1.5. This number is the decimal equivalent representing one whole unit plus an additional half unit. Understanding how to interpret terms like "iss" is crucial for pharmacy technicians, especially when converting between different number formats or when precise measurements are crucial for dosage and medication administration.

9. What total volume is required to prepare the mouthwash mixture?

A. 500ml

B. 600ml

C. 700ml

D. 800ml

To determine the total volume required for the mouthwash mixture, it's crucial to consider the concentrations and volumes of the individual components that need to be combined. When preparing a mixture, the total volume is the sum of the volumes of all the ingredients being used, taking into account any necessary adjustments for dilution or concentration. If the correct answer is 500 ml, it indicates that the sum of the ingredients—after any calculations for diluent or adjustment factors—results in a total of 500 ml. This could suggest a straightforward calculation based on the volumes of each component, meaning that when combined, they do not exceed the capacity of the final product. In scenarios involving preparation, especially with pharmaceuticals, accurate measurements and understanding concentrations are vital for efficacy and safety. Therefore, achieving 500 ml as the total volume likely reflects careful adherence to prescribed formulas, ensuring they maintain the integrity of the mouthwash while providing the desired therapeutic properties.

10. What is the flow rate in mL/hr for a 1500mL IV infusion over 12 hours?

A. 125 mL/hr

B. 100 mL/hr

C. 150 mL/hr

D. 200 mL/hr

To determine the flow rate in mL/hr for a 1500mL IV infusion to be completed in 12 hours, the calculation involves dividing the total volume of the infusion by the total time in hours. Start by using the formula for flow rate: Flow rate (mL/hr) = Total Volume (mL) / Total Time (hrs) In this case, the total volume is 1500 mL, and the total time is 12 hours. Plugging these values into the formula gives: Flow rate = 1500 mL / 12 hrs = 125 mL/hr Thus, the correct answer is 125 mL/hr, indicating that in order to administer the entire 1500mL over the period of 12 hours, a constant flow rate of 125 mL/hr is required. This ensures that the infusion is delivered at a consistent pace, aligning with the prescribed treatment schedule.