

Self - Assessment on Medication Administration

Directions:

The Medication Administration and Calculation Test is designed to validate your knowledge of

- * Principles of drug administration
- * Dosages problems using conversions
- * Dosage problems
- * IV flow rates
- * IV drip rates and
- * Nursing responsibilities associated with some of the commonly used drugs.

Principles of Drug Administration:

Here at UTMB, we use Military Time when administering medications and treatments.

Now days, with the advent of new diseases, new treatments and medications, it is not very unusual to have drugs that sound the same, look the same and belong to the same category of actions.

Examples of these are:

- **Hydroxyzine and Hydralazine.** The former is an anti-anxiety drug while the latter is an anti-hypertensive drug.
- **Percocet and Percodan.** Both are analgesics but one contains acetaminophen and the other has aspirin. The patient may be allergic or is contraindicated to receive aspirin therefore must have Percocet.

Must read the label at all times very carefully.

Medication Documentation:

Documentation must be done immediately after medication administration. Delay could potentially result in forgetting to chart and having the drug be given again by another nurse since there is no signature.

The Five Rights of Drug Administration:

It is **imperative** that every nurse must provide safe drug administration. The **Five Rs** are:

- Right client
- Right drug
- Right dose
- Right time
- Right route

We can add three more to these rights:

- Right documentation
- Right of the patient to know the reason she/he is taking the drug
- Right to refuse to take the medication.

The questions are written in a situational type of format.

For example:

1. Lasix is available in a 10 ml vial labeled 10mg/ml
Calculate the amount to give for 40 mg _____ml
2. The physician orders 1000ml of D₅W to infuse over 8
hours. Using a macrodrip (10gtts/ml), calculate cc/hr
and gtts/min.
_____cc/hr. _____gtt/min.

Conversions and Calculations

Liquid Measure

1 cc. = 1 ml.
30 ml. = 1 oz.
5 ml. = 1 tsp

Metric Measure

60 mg. = 1 grain
2.2 lbs. = 1 kilogram
1000 mcg. = 1 mg.
1000 mg. = 1 Gram

To convert from grams to milligrams	-	multiply by 1000
To convert from milligrams to grams	-	divide by 1000
To convert from pounds to kilograms	-	divide by 2.2
To convert from grains to milligrams	-	multiply by 60
To convert from milligrams to grams	-	divide by 1000
To convert from milligrams to micrograms	-	multiply by 1000
To convert from micrograms to milligrams	-	divide by 1000

Conversions and Calculations (Continued)

Formula for Ratio:

$$\frac{\text{Dose on hand (DH)}}{\text{vehicle (V)}} :: \frac{\text{Desired dose (DD)}}{\text{unknown}}$$

$$\text{Example: } \frac{25 \text{ mg.}}{1 \text{ tab}} :: \frac{50 \text{ mg.}}{x}$$

or

Dose on hand: vehicle :: Desired dose : x

Multiply dose on hand by x and vehicle and desired dose together

$$\begin{aligned} \text{Example: } 25\text{mg: } 1 \text{ tab} &:: 50 \text{ mg} : x \\ 25x &= 50 \\ x &= \frac{50}{25} \end{aligned}$$

Formula for Proportion:

$$\frac{\text{Desired dose (DD)}}{\text{vehicle}} \times \text{vehicle} = \text{unknown vehicle}$$

$$\text{Example: } \frac{50 \text{ mg.}}{25 \text{ mg.}} \times 1 \text{ tab} = x = \frac{50}{25} = 2 \times 1 \text{ tab} = 2 \text{ tabs}$$

Formula for calculating drip rate of IV fluids:

$$\text{ml./hr.} = \frac{\text{total fluids ordered}}{\text{total hours to run}}$$

$$\text{Example: } \text{ml./hr.} = \frac{1000 \text{ ml.}}{8 \text{ hr.}} = 125 \text{ ml./hr.}$$

Formula for calculating drips (gtts.) per minute (min.):

$$\text{gtts./min} = \frac{\text{ml./hr.} \times \text{drip rate administration set}}{60 \text{ min.}}$$

Example:

$$\text{gtts./min} = \frac{125 \text{ ml./hr.} \times \text{drip rate administration set}}{60 \text{ min.}}$$

$$\text{gtts./min} = \frac{125 \times 10}{60} \text{ (macro drip)} = \frac{1250}{60} = \text{gtts./min} = 20.8$$

$$\text{gtts./min.} = \frac{125 \times 60}{60} \text{ (mini or micro drip)} = \frac{7500}{60} = 125 \text{ gtts./min}$$

CONVERSIONS/EQUIVALENTS

PROBLEM SOLVING

Directions: Carefully read the following word problems. Calculate and place the answer in the space provided.

1. When prepared as directed, the 125 mg. Solu-Medrol mix-o-vial provides 125 mg./ml. If the patient is to receive 50 mg., you should give _____ ml.
2. The physician orders 6,000 units of Heparin, and the dose on hand is 10,000 units per cc. The patient should receive _____ ml.
3. The dose ordered is 30 units of Insulin. Using an Insulin syringe and a vial with 100U. /ml. (1000U) insulin, you would give the patient _____ U.
(Be prepared to demonstrate how much you would draw.)

NOTE: Insulin syringe NOT Tuberculin syringe, must be used for administering insulin.

4. Gentamicin 30 mg. I.M. q8h. Gentamicin 10 mg. per ml. is available.
Give _____ ml.
5. Lanoxin 110 mcg. I.V. q12h. Lanoxin 0.5 mg. per 2 ml. is available.
Give _____ ml.
6. Compazine 10 mg. I.M. q6h. Compazine is supplied in a 10-ml. vial containing 5 mg./ml.
Give _____ ml.
7. MSO4 (Morphine) 5 mg. SQ. You have Morphine gr. 1/6 per ml. available.
Give _____ ml.

Problem Solving (Continued)

8. Lasix 30 mg. I.M. stat. Lasix is supplied in a 2 ml vial containing 10 mg. per ml.
Give _____ ml.

9. Digoxin 100 mcg. I.M. qd. The drug is supplied 0.5 mg. per 2 ml.
Give _____ ml.

10. D₅W 1000 ml. plus KCl 30 mEq. at 60 ml. per hr. KCl is supplied in a 10 cc. vial containing 20 mEq. How many ml. of KCl will be added to the liter of D₅W?

11. Codeine gr. 1/4 I.M. q3h. prn. You have Codeine 30 mg. per ml.
Give _____ ml.

12. Streptomycin 200 mg. I.M. q12h. You have Streptomycin 1 Gm. per 2.5 ml.
Give _____ ml.

13. The physician orders 1 tsp. of Tylenol Elixir. You give _____ ml.

14. You are to give Penicillin 4,000,000 U. The label reads 3,000,000 U./cc.
How many cc's would you give?

15. Dr. orders Chloral Hydrate 1 Gm. PO HS. You have 250 mg. capsules.
How many capsules would administer for each dose?

Problem Solving (Continued)

16. Dr. orders 8 oz. of Glucola at 0600 and 4 oz. at 0630. How many ml. would you administer (total) for both doses? _____ml.

17. Dr. orders 2.5 mg./kg. of Gentamicin. The patient weighs 24 lbs. Gentamicin comes in 40 mg./ml. vials. How much would you give?

18. Dr. orders 200 mg./kg. of Ampicillin. The patient weighs 4.4 lbs. Ampicillin comes 125 mg./ml. How much would you give?

19. You have an order for .75 Gm. Orinase PO and the only strength available is 250 mg./tablets. How many tablets would you give?

20. Dr. orders Robinul 0.3 mg. I.M. You have .5 mg./1cc. How many cc's would you give?

21. Dr. orders 0.5 mg. Reserpine. You have 5 mg. per 2 cc's. How many cc's should you give?

22. Dr. orders 400 mg. of a drug. The label on the 4 cc. vial reads 600 mg. How many cc's should you give?

IV SOLUTION PROBLEMS: MACRO and MICRO DRIP RATES

Calculate the following problems. Place the answers in the space provided.

1. Dextran 12% 1000 ml. to be given over 6 hr. Calculate ml./hr. and gtts./min. using a macrodrip rate (10gtts./min.).

ml./hr. = _____ gtts./min. _____

2. Blood plasma 500 ml. to be given over 4 hr. Calculate ml./hr. and gtts./min. using a macrodrip rate (10gtts./ml.).

ml./hr. = _____ gtts./min. _____

3. Dr. orders 500 ml. NS to be given in 10 hours. Calculate ml./hr. and gtts./min. using a macrodrip rate (10gtts./ml.).

ml./hr. = _____ gtts./min. _____

4. Dr. orders 1000 ml. D5W to be given over 4 hours. Calculate ml./hr. and gtts./min. using a microdrip rate (60 gtts./ml.).

ml./hr. = _____ gtts./min. _____

5. Dr. orders 125 ml. NS to be given in 4 hours. Calculate ml./hr. and gtts./min. using a microdrip rate.

ml./hr. = _____ gtts./min. _____

REFERENCES

1. UTMB Nursing Services/Pharmaceutical Services Policy and Procedures On-line at www2.utmb.edu/nursingservice/policies_procedures_frmset.asp
2. Kee, J. L. & Marshall, S. M. (2000). Clinical Calculations: With Calculations to General and Specialty Areas. Philadelphia: W. B. Saunders Company.
3. Mycek, M. J., Harvey, R. A. & Champe, P. C. (2000). Lippincott's Illustrated Reviews:Pharmacology. Philadelphia: Lippincott Williams and Wilkins
4. Mosby's (2001) Nursing Drug Reference. Philadelphia: Mosby

LOCATION OF REFERENCES

1. Available online: www2.utmb.edu/nursingservice/policies_procedures_frmset.asp
- 2.-4. Available on reserve loan basis from The Educational Resource Center.
 - Other references are available from Moody Medical Library.
 - U.T.M.B. Bookstore also has books on "Calculations and Dosages & Solutions."

Answer Sheet

Problem Solving

- | | | |
|------------|-------------|-------------|
| 1. 0.4 ml | 9. 0.4 ml | 17. 0.68 ml |
| 2. 0.6 ml | 10. 15 ml | 18. 3.2 ml |
| 3. 30U | 11. 0.5 ml | 19. 3 tab |
| 4. 3 ml | 12. 0.5 ml | 20. 0.6 cc |
| 5. 0.44 ml | 13. 5 ml | 21. 0.2 cc |
| 6. 2 ml | 14. 1.33 ml | 22. 2.66 cc |
| 7. 0.5 ml | 15. 4 tab | |
| 8. 3 ml | 16. 360 | |

IV Calculation

- 166.66 ml/hr
27.77
- 125 ml/hr
20.8
375
- 50 ml/hr
8.33
- 250 ml/hr
250
- 31.25 ml/hr
31.25 gtt/min