County of Los Angeles
Department of Public Health
Medication Calculation Examination
Study Guide

(Medication Calculation Examination is only required for Public Health Nurse positions)

The medication calculation examination consists of 31 questions for Public Health Nurses on commonly used abbreviations, dosage calculations and I.V. rates. You will have one (1) hour in which to complete the examination. A score of 25 is required to pass the examination. The following examples are representative of questions asked on the examination:

1. The order is for 100 mg. The label reads 250 mg./5 ml. You would give _____ ml. (s).

   Answer: 2 ml.

2. The order is for 5 mg. The label reads gr. $^{1}/_{12}$ per tablet. You would give _____ tablet (s).

   Answer: 1 tablet

3. The order is for 30 ml. You would give _____ tablespoon (s).

   Answer: 2 tablespoons

4. The order is for 60 mg. The label reads 80 mg./2 ml. You would give _____ ml. (s).

   Answer: 1.5 or 1 ½ ml.

5. The order is for 600,000 units. The label reads 300,000 units per ml. You would give _____ ml. (s).

   Answer: 2 ml.

6. The order is for 250 mg. The label reads 0.5 Gm. per tablet. You would give _____ tablet (s).

   Answer: ½ or 0.5 tablets

7. The order is 2 mg. The label reads 0.5 mg. per tablet. You would give _____ tablet (s).

   Answer: 4 tablets

8. The order is for gr. X. The label reads gr. 5 per tablet. You would give _____ tablet (s).

Answer: 2 tablets

9. The order is for gr. $^{1}/_{200}$. The label reads gr. $^{1}/_{100}$ per 2 ml. You would give _____ ml. (s).

Answer: 1 ml.

10. The order is for 1,000 ml. of I.V. solution to be infused at 125 ml./hr. You would infuse the solution for _____ hour (s).

Answer: 8 hours

11. The order is for 100 ml./hour of 1.V. solution. The drop factor of the I.V. tubing is 15 gtts./ml. You would infuse the solution at _____ gtts./min.

Answer: 25 gtts./min.

12. The order is for 10,000 units of medication in 1 liter to be infused at 1,000 units/hour. You would infuse _____ ml. (s) per hour.

Answer: 100 ml./hour

13. The order is for 3,000 ml. of I.V. solution to be run over at 24 hour period. The drop factor of the I.V. tubing is 10 gtts./ml. You would infuse _____ gtts./min.

Answer: 20-21 gtts./min.

CONVERSION

1. To convert GRAMS to MILLIGRAMS.
   Multiply grams by 1,000.

   Example: How many mg. in 0.2 gram?
   Answer: 0.2 gram x 1,000 = 200.0 mg.

2. To convert MILLIGRAMS to GRAMS.
   Divide milligrams by 1,000.

   Example: How many grams in 2.0 mg.?
   Answer: 2.0 mg. divided by 1,000 = 0.002 grams

3. To convert GRAMS to GRAINS.
   Multiply grams by 15.

   Example: How many grains in 1.3 grams?
   Answer: 1.3 grams x 15 = 20 grains

4. To convert GRAINS to GRAMS.
   Divide grains by 15.

   Example: How many grams in grains 20?
   Answer: Grains 20 divided by 15 = 1.3 grams

5. To convert GRAINS to MILLIGRAMS.
   Multiply grains by 60.

   Example: How many milligrams in grains $^{1}/_{15}$?
   Answer: $^{1}/_{15}$ x 60 = 4 mg.

6. To convert MILLIGRAMS to GRAINS.
   Divide milligrams by 60.

   Example: How many grains in 4 milligrams?
   Answer: 4 milligrams divided by 60 = grains $^{1}/_{15}$

7. To convert MILLILITERS to MINIMS.
   Multiply milliliters **x** 15.

   Example: How many mimims in 1.3 ml.?
   Answer: 1.3 ml. x 15 = 19.5 or 20 minims

8. To convert OUNCES to DRAMS.
Multiply ounces by 8.

Example: How many drams in 2 ounces?
Answer: Ounces 2 x 8 = 16 drams

9. To convert DRAMS to OUNCES.
Divide drams by 8.

Example: How many ounces in drams 16?
Answer: Drams 16 divided by 8 = 2 ounces

10. To convert OUNCES to MILLILITERS.
Multiply ounces by 30.

Example: How many milliliters in 8 ounces?
Answer: Ounces 8 x 30 = 240.0 ml.

REVIEW

1. Formula: $\frac{D}{H} = X$ Where: D = Desired strength
H = Strength on hand
X = Unknown quantity of drug

Example: The order is for gr. X. The label reads gr. V per tablet. You would give 2 tablets.

$$\frac{D}{H} - \frac{\text{gr. X}}{\text{gr. V}} = X \qquad X = 2$$

2. Formula: $\frac{D}{H} \times Q = X$ Where: D = Desired strength
H = Strength on hand
Q = Total quantity of solution
X = Unknown quantity of drug

Example: The order is for 100 mg. The label reads 250 mg./5 ml.. You would give 2 ml.(s).

D = 100 H = 250 X = 5

$$\frac{100}{250} \times 5 = X$$

$$\frac{2}{5} \times 5 = \frac{10}{5} = 2$$

3. Formula: $\frac{\text{Amount of solution to be infused}}{\text{cc/hr.}} = \text{Number of hours}$

Example: The order is to infuse 1,000 cc at 125 cc. per hour. You would infuse the solution for 8 hours.

$$\frac{\text{Amount of solution to be infused}}{\text{cc/hr}} = \frac{1{,}000 \text{ cc}}{125} = 8$$

4. Formula: $\frac{\text{Amount of solution to be infused}}{\text{Number of hours}} = \text{cc/hr.}$

Example: The order is to infuse 1,000 cc over 8 hours. You would infuse 125 cc's per hour.

$$\frac{\text{Amount of solution to be infused}}{\text{Number of hours}} = \frac{1{,}000 \text{ cc}}{8} = 125 \text{ cc/hr.}$$

5. Formula: $\frac{\text{gtts.}}{\text{min.}} = \frac{\text{Volume x drop factor}}{\text{Infusion time in minutes}}$

Example: The order is to infuse 3,000 ml. of I.V. solution to be run over a 24 hour period. The drop factor of the I.V. tubing is 15 gtts./ml. You would infuse 31 gtts./min.

$$V = \frac{3{,}000}{24} = 125 \text{ cc/hr.}$$

$$\frac{125 \times 15}{60} = \frac{1{,}875}{60} = 31 \text{ gtts./min.}$$

Drip factor = 15
Infusion time in 10 minutes = 60

6. Formula: $\frac{D}{H} \times Q = X$

Where:
D = Desired strength
H = Strength on hand
Q = Total quantity of the solution
X = Unknown quantity of the drug

Example: The order is to administer 10,000 units of a medication in a one liter solution to infuse at 1,000 units/hour. You would infuse 100 cc's/hr.

D = 1,000 units/hr.
H = 10,000 units
Q = 1,000 cc.

$$\frac{1{,}000}{10{,}000} \times 1{,}000 = \frac{1{,}000{,}000}{10{,}000} = 100 \text{ cc}$$

APPROPRIATE EQUIVALENT

15	grains	=	900	mg.	=	1	Gm
10	grains	=	600	mg.	=	0.6	Gm
7 ½	grains	=	450	mg.	=	0.5	Gm
5	grains	=	300	mg.	=	0.3	Gm
4	grains	=	240	mg.	=	0.25	Gm
3	grains	=	180	mg.	=	0.2	Gm
2 ½	grains	=	150	mg.	=	0.15	Gm
2	grains	=	120	mg.	=	0.12	Gm
1 ½	grains	=	75	mg.	=	0.1	Gm
1	grain	=	60	mg.	=	0.06	Gm
¾	grain	=	45	mg.	=	0.05	Gm
2/3	grain	=	40	mg.	=	0.04	Gm
½	grain	=	30	mg.	=	0.03	Gm
1/3	grain	=	20	mg.	=	0.02	Gm
¼	grain	=	15	mg.	=	0.015	Gm
1/6	grain	=	10	mg.	=	0.010	Gm
1/8	grain	=	7.5	mg.	=	0.008	Gm
1/10	grain	=	6	mg.	=	0.006	Gm
1/30	grain	=	2	mg.	=	0.002	Gm
1/60	grain	=	1	mg.	=	0.001	Gm
1/80	grain	=	0.75	mg.	=	0.0008	Gm
1/100	grain	=	0.6	mg.	=	0.0006	Gm
1/120	grain	=	0.5	mg.	=	0.0005	Gm
1/150	grain	=	0.4	mg.	=	0.0004	Gm
1/200	grain	=	0.3	mg.	=	0.0003	Gm
1/250	grain	=	0.24	mg.	=	0.00025	Gm
1/300	grain	=	0.2	mg.	=	0.0002	Gm
1/400	grain	=	0.15	mg.	=	0.00015	Gm
1/600	grain	=	0.1	mg.	=	0.0001	Gm

1	mg.	=	1,000	mcg.
1	kg.	=	2.2	lbs.