Study Guide with Sample Questions
Dosage Calculation Competency

- Applicants to the LPN-to-Associate Degree "Bridge" Nursing Program must document competency in dosage calculation that is equivalent to the content covered in NUR 135.
- The minimum accuracy rate is 78%, and is the same as the minimum pass rate for traditional four-semester nursing students (those who are not LPNs) who pass NUR 135. The test has 28 questions.
- Applicants to the "bridge" program must take the dosage calculation competency test or be currently enrolled in NUR 135.
- Applicants may take the dosage calculation competency exam once in order to demonstrate competency. If an applicant does not attain at least 78% accuracy, he or she must enroll in and pass NUR 135 before being admitted to the "bridge" program.
- In order to attain an accuracy rate of at least 78%, test-taken must be able to perform the following:
    - Conversions between and within metric, apothecary and common household units of measure used in medication administration;
    - Basic dosage calculation;
    - Pediatric dosag calculation based on weight and body surface area (BSA);
    - I.V. drip rate calculation;
    - Calculation of infusion times;
    - Continuous heparin infusion calculation; and
    - Critical care cafoulations (using an infusion pump or infusion device) including calculating the mU hour rate, the dose per minute or per hour, and the dose based on infusion rate.
- The dosage calculation competency test is given as a proctored assessment in the college's Testing Center, located in the Library in Martin Hall.
    - Test-takers may use a basic calculator that does not store data. Students may NOT use the calculator function on their mobile phones. No other items, such as paper, books, or electronic devices are permitted in the test room.
    - "Scratch" paper will be provided as needed. All paper provided must be returned whether or not the paper was used. For example, if three sheets of paper are provided, three sheets must be returned.
- Test-takers must present photo identification, such as a driver's license, before being permitted to take the test.
- Test-takers must complete the entire test in one sitting. In other words, one may not begin the test and return to finish at a later time. Test-takers should allow at least 90 minutes for completing the test.
- Testing is available in the Martin Hall Test Center from October 1 to October 31 during the test center's regular hours of operation. The test must be started no later than two hours prior to closing time.
- Test-takers will not need an appointment: however, please note the days and hours available for testing, and the time parameters for beginning and completing the test.
- The deadline for taking the test is October 31.
- Lorrie Coe-Meade will grade the test and notify you of test grade results via your college e-mail address.

- The following pages contain sample test questions and answers.

Instructions to ensure a correct answer

1. Round all answers to medication problems to the nearest tenth. Kilogram weights should be rounded immediately, before proceeding with the problem. Otherwise, don't round until you get to the final answer. Answers that are not correctly rounded to the nearest tenth are graded as incorrect. For example, 3.25 is rounded to 3.3.
2. I.V. flow problems are rounded to the nearest whole drop. For example, 33.3 is rounded to 33 drops.
3. If the answer is less than 1, with no whole number before the decimal point, ALWAYS place a zero in front of the decimal. This is a safety issue. An answer on the test not preceded by a zero as appropriate will be graded as an incorrect notation. For example, .7 must be written as 0.7 in order to be considered appropriate notation.
4. If the answer is 1,000 or above indicate the number with a comma.
5. ALWAYS omit terminal zeros. Answer containing terminal zeros violate patient safety standards, and will be graded as an incorrect notation. For example 12.50 must be written as 12.5 in order to be considered appropriate notation.
6. The answer must be labeled in correct terms. In incorrectly labeled answer is considered a wrong answer. For example, 7 mg is not the same as 7 mL.
7. Metric units of measure are expressed indecimals; apothecary units of measure are expressed in fractions. For example, 30 mg = *Yz* gr. Fractions must always be reduced to lowest terms.
8. On the test, circle your ONE final answer. If any answer in the circle in incorrect, the answer is graded an incorrect. Ifno answer is circled, then the question is determined to be unanswered and graded as incorrect.

Conversions

2.2 lb	=	1 kg
1 grain	=	60 mg
t oz	=	30 mL
t dram	=	4 mL
1 t	=	S mL
I T		lS mL

Roman Numerals

1	=	I
5	=	V
IO		X

1 minim		1 gtt
15 minims	=	1 mL
1 mL	=	15 gtt
1 mL		I cc
t ern	=	lO mm
1 inch	=	2.S cm

Sample Problems for Basic Dosage Calculation

1. Order: Amoxicillin 0.25 g p.o. every 8 hours.
   Available: Amoxicillin 125 mg tablets.
   How many tablets will the nurse give per dose?

2. Order: Zofran 8 mg p.o.t.i.d.
   Available: Zofran in a 100 mL bottle labeled 4 mg/tsp.
   How many mL will the nurse administer for each dose?

3. Order: Morphine gr 1/10
   Available: Morphine 10 mg/mL
   How many mL will the nurse give?

Answers at the end of study guide.

Sample Problems for Pediatric Dose Calculation Based on Weight and BSA

4. Give Fortaz 50 mg/kg p.o. t.i.d. to a child who weighs 25.5 kg. Fortaz is available in an oral suspension labeled 100 mg/mL. How many mL would the nurse administer per dose?

5. Give Ceclor 45 mg/kg/day p.o. in 3 divided doses for a patient who weighs 66 pounds. A 75 mL stock medication is labeled Ceclor 125 mg/mL. How many mL would the nurse administer per dose?

6. Give Biaxin for a child whose BSA is 0.55 m^2. The usual adult dose is 500 mg. Biaxin is available in an oral suspension. The 100 Ml bottle is labeled 50 mg/mL. How many mL would the nurse give per dose?

7. Give Phenergan for a child whose BSA is 1.2 m^2. The usual adult dose is 25 mg. How many milligrams would the nurse administer for the dose?

Answers at the end of study guide.

Sample Problems for I.V. Drip Rate Calculations and Infusion Times

8. LR 125 mL/hr via gravity flow using tubing calibrated at 15 gtt/mL. Calculate the flow rate.

9. One liter NS to infuse over 24 hours using a microdrip (gravity flow). Calculate the flow rate.

10. At the change of shift you notice 200 mL left to count in the I.V. bag. The I.V. is infusing at 80 mL/hr. How much longer will the I.V. run? (Express your answer in hours and minutes.)

11. Keflin 2 g in 100 mL DsW IVPB over 20 minutes. The I.V. tubing is 15 gtt/mL. Calculate the flow rate.

Answers at the end of study guide.

Sample Problems for Continuous l.V. Heparin Drip Calculations

12. The physician writes an order for heparin 900 units/hr. The label on the I.V. bag reads: Heparin 10,000 units in 500 mL D_5W. How many mL/hr will deliver the correct dose?

13. Administer Heparin 1,000 units/hr from an l.V. bag mixed 40,000 units in 1 L DsW. How many mL/hr will deliver the correct amount of heparin?

14. The patient's heparin is infusing at 28 mL/hr on an infusion pwnp. The bag of fluid is mixed 20,000 units of heparin in 500 mL D_5W. What hourly dose of heparin is the patient receiving?

15. The patient's heparin drip is infusing at 11 mL/hr on an infusion pwnp. The bag of fluid is mixed 25,000 units of heparin in 250 mL DsW. What hourly dose of heparin is the patient receiving?

Answers at the end of study guide.

Sample Problems for Critical Care Calculations for l.V. Infusions

Calculating the m/hr Rate

16. Give Regular insulin by continuous I.V. infusion at 20 units/hr. The solution is 250 mL NS with 100 units of Regular insulin. What rate on the infusion pump will deliver the correct dose?

17. Administer a Tbeophylline drip at 40 mg/hr 1.V. The solution is 250 mL DsW + Theophylline 500 mg. What rate on the infusion pump will deliver the correct dose?

Calculating the pose per Minute or per Hour

18. Give Tridil 15 mcg/minute. Tridil is mixed 50 mg in 500 mL *Ds*W. What rate on the infusion pump will deliver the correct dose?

19. Give propofol 10 mcg/kg/minute. The infusion is mixed propofol 250 mg in 250 mL DsW. The patient weighs 168 pounds. What rate on the infusion pump will deliver the correct dose?

20. Give Nitroprusside 5 mcg/kg/minute via continuous infusion for a patient weighing 205 lbs. Nitroprusside is available in a solution of 200 mg in 250 mL D_5W. What rate on the infusion pwnp will deliver the correct dose?

Calculating the Dose Based on Infusion Rate

21. Tridil is infusing at 15 mL/hr on an infusion pump. The drug is mixed 50 mg in 500 mL *Ds*W. How many mcg/minute is the patient receiving?

22. A lidocaine drip is infusing at 30 mL/hr on an infusion device. The drug is mixed 2 g in 500 mL DsW. How many mg/minute is the patient receiving?

23. Aminophylline is infusing at 30 mL/hr. The drug is mixed 250 mg in 500 mL D_5W. How many mg/hr is the patient receiving?

Answers at the end of study guide.

Answers in Sample Test Questions

formula: $\frac{\text{desired Amt.} \times \text{quantity}}{\text{have on hand}}$ } $\frac{D \times Q}{H} = X$

1. 0.25g = 250mg ⇒ $\frac{250\text{mg} \times 1\text{tab}}{125\text{mg}} =$ (2 tabs)

2. 1 tsp = 5mL ⇒ $\frac{8\text{mg} \times 5\text{mL}}{4\text{mg}} =$ (10mL)

3. gr 1/10 = 6mg ⇒ $\frac{6\text{mg} \times 1\text{mL}}{10\text{mg}} =$ (0.6mL)

4. 50mg/kg × 25.5 kg = 1,275 mg $\frac{1{,}275\text{mg}}{100\text{mg}} \times 1\text{mL} = 12.75$ → (12.8mL)

5. 66 lbs = 30 kg $\left(\frac{2.2\text{lb}}{1\text{kg}} = \frac{66\text{lb}}{X\text{kg}}\right)$

45mg/kg/day × 30 kg = 1,350 mg/day ÷ 3 doses = 450mg per dose

$\frac{450\text{mg} \times 1\text{mL}}{125\text{mg}} =$ (3.6mL)

6. BSA formula: $\frac{\text{child's BSA } [m^2] \times \text{usual adult dose}}{1.7 m^2} = \text{child's dose}$

$\frac{0.55 m^2 \times 500\text{mg}}{1.7 m^2} = 161.76 \Rightarrow \frac{161.76\text{mg}}{50\text{mg}} \times 1\text{mL} = 3.236$ → (3.2mL)

7. $\frac{1.2 m^2 \times 25\text{mg}}{1.7 m^2} = 17.64 \rightarrow$ (17.6mg)

8. IV flow formula: $\frac{\text{vol to be infused (mL)} \times \text{calibration (gtt/mL)}}{\text{time (minutes)}} = \text{flow rate (gtt/min)}$

$\frac{125\text{mL} \times 15\text{gtt/mL}}{60\text{min}} = 31.25 \Rightarrow$ (31 gtt/min)

9. $\frac{1000\text{mL} \times 60\text{gtt/mL}}{1440\text{min}} = 41.66.. \Rightarrow$ (42 gtt/min)

10. $80\overline{)200}^{2.5}$ = (2 hr and 30 min)

11. $\frac{100\text{mL} \times 15\text{gtt/mL}}{20\text{min}}$ = (75 gtt/min)

12. you desire 900 units/hr, you have 10,000 units in 500mL $\Rightarrow$ $\frac{900\text{units/hr} \times 500\text{mL}}{10{,}000\text{units}}$ = (45 mL/hr)

13. $\frac{1{,}000\text{units/hr} \times 1000\text{mL}}{40{,}000\text{units}}$ = (25 mL/hr)

14. $\frac{20{,}000\text{units}}{500\text{mL}} = \frac{X\text{units}}{28\text{mL/hr}} \Rightarrow X =$ (1,120 units/hr)

15. $\frac{25{,}000\text{units}}{250\text{mL}} = \frac{X\text{units}}{11\text{mL/hr}} \Rightarrow$ (1,100 units/hr)

16. you desire 20 units/hr, you have 100 units in 250mL $\Rightarrow$ $\frac{20\text{units/hr} \times 250\text{mL}}{100\text{units}} \Rightarrow$ (50 mL/hr)

17. $\frac{40\text{mg/hr} \times 250\text{mL}}{500\text{mg}} \Rightarrow$ 20mL/hr

18. @ infusion device is set at hourly rate (whole numbers), so convert mcg/min to mcg/hr ⇒ 15 mcg/min = 900 mcg/hr (15×60)
Ⓑ drug is expressed in mg → convert mcg to mg → 900 mcg/hr = 0.9mg/hr
Ⓒ $\frac{D}{H} \times Q = \frac{0.9\text{mg/hr} \times 500\text{mL}}{50\text{mg}} =$ 9mL/hr

19. a) convert lbs to kg → 168 ÷ 2.2 = 76.36 → 76.4 kg
b) calculate the minute rate → 76.4kg × 10 mcg/kg/min = 764 mcg/min
c) calculate hourly rate → 764 mcg/min × 60min/hr = 45,840 mcg/hr
d) drug is expressed in mg → convert mcg to mg → 45,840 mcg = 45.84mg
e) $\frac{D}{H} \times Q = \frac{45.84\text{mg} \times 250\text{mL}}{250\text{mg}} = 4584 \Rightarrow$ 46mL/hr

20. 205 lbs = 93.18 = 93.2kg
× 5 mcg/kg/min
466 mcg/min
× 60 min/hr
27,960 mcg/hr ⇒ $\frac{27.96\text{mg}}{200\text{mg}} \times 250\text{mL} =$ 34.95
35mL/hr

21. a) convert 50mg to mcg = 50,000mcg

b) use ratio/proportion to solve

$$\frac{50{,}000\text{mcg}}{500\text{mL}} = \frac{x\text{ mcg}}{15\text{mL/hr}} \quad x = 1500\text{ mcg/hr}$$

c) calculate the minute rate

1500 mcg/hr ÷ 60 min/hr = (25 mcg/min)

22. @ 2g = 2000mg

(b) $\frac{2{,}000\text{mg}}{500\text{mL}} = \frac{x\text{mg}}{30\text{mL/hr}}$ $x = 120\text{mg/hr}$

(c) 120mg/hr ÷ 60 min/hr = (2mg/min)

23. $\frac{250\text{mg}}{500\text{mL}} = \frac{x\text{mg}}{30\text{mL/hr}}$ $x =$ (15mg/hr)