Medication Administration Exam Guidelines for LPN

*No cell phones will be permitted during the exam to ensure test security*

1.) Each nursing candidate will have 90 minutes to complete the 3 part exam (1701) consisting of
section A 35 questions, section B 15 questions and section C 10 questions.

2.) Provided for use during the exam will be: Nursing drug handbook, medical dictionary, the
UR/Thompson Health LPN study guide, pencils, calculator, scrape paper and eraser.

3.) The exam will be collected and grades at the end of 90 minutes.

4.) A passing score of 80% or greater must be achieved on each section.

5.) The candidate will have an opportunity to review the exam and be remediated on missed
questions.

6.) In the event of a non-passing grade the candidate will have (1) one additional opportunity to
retake the section of the test they did not pass.

7.) A modified version of the LPN test will be administered for the retest. (The new study guide is
generic and contains the needed information for the retest)

8.) The retest will take place no later than 7 business days from original test date.

9.) A non-passing grade on the 2nd attempt will result in rescinding of the job offer.

Additional Guidelines:

• Staff members who terminate, then reapply within 1 year and have taken the present version
(1701) or an updated version will NOT be required to retake the exam.

• Staff members who terminate, then reapply and have NOT taken the recent version (1701) or
the updated version of the LPN exam will be required to do so.
Principles of Medication Administration:

Safe drug administration depends upon the nurse following the Rights of Medication Administration. Always check allergies prior to administration. Also, be aware of any potential drug/drug or drug/food interactions.

Rights of Medication Administration:

- Right patient
- Right drug
- Right dose
- Right route
- Right time
- Right documentation

Always monitor for response to medication and teach/reinforce to the patient the reasons they are receiving medications.

The nurse must also have a basic understanding of the modes and routes of drug administration. This included the administration of PO, IM, SQ, and IV, buccal, transdermal, rectal, vaginal, ear and eye medications.

Classification of Medications:

- Antibiotics
- Anti-coagulants
- Antihyperlipidemics/Statins
- Antihypertensive agents
- Beta Blockers
- Cardiac medications
- Essential Vitamins
- Hormone Therapy
- Narcotics
- Nitrates
- NSAIDS
- Pain management agents
- Steroids
- Glucose lower agents

Routes of Administration: can affect the absorption of medications into the bloodstream.

- **Oral**: give at consistent times, do not crush, break or open sustained release capsules or tablets.
- **Nasal Drops**: be sure nasal passage is clear of secretions or matter. Tip head forward for sprays and backward for drops. Plug off opposite nostril while administering medication.
- **Ear (Otic) drops**: patient side lying or sitting head tilted with affected ear up. Pull ear backward and upward if adult (child <3 yr. old backward and downward). Push down on the tragus to hold medication in place.
• **Eye (Ophthalmic) drops**: ask patient to look up, gently pull the lower lid down administer the drops into the lower conjunctival sac. Gently apply pressure to the inside bridge of the nose for 1-2 minutes. Promotes absorption.

• **Rectal/ Intravaginal**: patient in left lateral Sims position suppository lubricated and gently inserted. Encourage patient to remain side lying for 30 minutes to help with retention.

• **Buccal/Sublingual**: Sublingual administration is when medication is placed under the tongue to be absorbed by the body. Buccal administration involves placement of the drug between the gums and the cheek.

• **Transdermal**: remove old patch and dispose of it in the toilet with a witness (RN/LPN). Wipe away old medication, before reapplying a new patch. Do Not apply in same area.

• **Injections**:
  - Subcutaneous: (subq) 25-27 gauge, 1/2-5/8” needle. Administer at 45° angle. Obese patient 90° angle. Do not aspirate or rub with heparin or insulin.
  - Intramuscular: (IM) 18-23 gauge, 11/4 -3” needle. NO greater than 3ml per injection site. If blood is aspirated back, medication contaminated, discard get new med.
  - Intravenous: (IV) IV catheter insert directly into vein for fluids, nutrition or medications. Since directly into blood stream, greatest risk of infection.
  - Peripherally inserted Central Catheter: (PICC) only removed by credentialed staff members. This catheter is centrally located either in the RA of the heart or IVC/ SVC (major access). Explain the procedure to the patient, remove catheter slowly, 1-2 “increments to prevent spasm. Warm packs can be used to dilate the vessel for less tension on the line. DO NOT FLUSH with HEPARIN prior to removal.

***Medications with short half- life will be quickly excreted and side effects will be brief.***

**Absorption**- A drug must be absorbed into the bloodstream before it can act in the body. Oral tablets must first disintegrate into smaller particles and dissolve in the gastric juices before being absorbed. Most absorption of oral medication happens in the small intestine. Oral solutions are usually absorbed more quickly since they do not need to disintegrate first. Tablets that are enteric coated or have thick coatings are absorbed slowly to prevent disintegration in the stomach or to provide a timed release of the medication. Drugs given IM must first be absorbed through the muscle. Rectal suppositories must first dissolve to be absorbed through the mucosa. Drugs given IV do not need to be absorbed since they are given directly into the blood. Many factors affect absorption of drugs; such as the dosage form, chemical make-up of the drug, route of administration, interactions with substances in the gastrointestinal tract, and patient characteristics.

**Distribution**- After being absorbed a drug is distributed into the blood and other tissues in the body. Patient variations can affect the amount of a drug that is distributed through the body. In an edematous patient, due to extra fluid weight, a higher dose of medication may be needed. In a dehydrated patient the dose of a drug is distributed into a smaller volume so the dose must be decreased. Patients who are obese need special consideration with some drug dosages since they may not distribute well into fatty tissue. Dosages of these drugs need to be based on lean body mass estimates. An example of a medication like this is digoxin. Remember, with both edema and dehydration the drug dosages need to be recalculated when the fluid status is corrected.

**Metabolism**- The liver metabolizes most drugs. Drug metabolism may be increased, decreased, or unchanged due to liver disease. Patients with liver disease must be monitored closely for desired drug effects or toxicity.
Excretion - Excretion by the kidneys is another way that a drug is eliminated from the body. Patients with decreased renal function need lower doses and maybe longer dosage intervals to avoid drug toxicity.

Other Factors
Patient age: Elderly patients have decreased hepatic and renal perfusion which may result in the need to decrease dosages and/or longer dosage intervals (decreased frequency) to avoid drug toxicity. Decreased GI motility and GI blood flow may also impact absorption.

Drug Therapy in Children
Calculate children’s dosages based on either body weight or body surface area.

Drug Therapy in Children
Calculate children’s dosages based on either body weight or body surface area.
Measure infant doses in a syringe to provide an accurate dose
Administer oral drugs in liquid form to infants.
A child may drink the oral medicine from a medication cup.
Don’t mix the drug with food or formula.
To convert kgs to lbs. = kg X 2.2 = ____ lbs.
To convert lbs. to Kg = lbs.÷ 2.2= ____ kg

Metric System & Common Conversions

<table>
<thead>
<tr>
<th>Unit of Measure</th>
<th>Equals</th>
<th>Also Equals</th>
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<tbody>
<tr>
<td>1 Kilogram (kg)</td>
<td>1000 grams (g)</td>
<td>2.2 pounds (lb.)</td>
</tr>
<tr>
<td>1 Gram (g)</td>
<td>1000 milligrams (mg)</td>
<td>1,000,000 micrograms (meg)</td>
</tr>
<tr>
<td>4 cups</td>
<td>1 liter (L)</td>
<td>1000 milliters (mL)</td>
</tr>
<tr>
<td>2 cups</td>
<td>16 ounces (oz.)</td>
<td>1 pound (lb.)</td>
</tr>
<tr>
<td>1 cup</td>
<td>8 ounces (oz.)</td>
<td>240 milliters (mL)</td>
</tr>
<tr>
<td>1 ounce (oz.)</td>
<td>30 milliters (ml)</td>
<td>450 drops (gtts)</td>
</tr>
<tr>
<td>1 ml = 1 cc</td>
<td>15 drops (gtts)</td>
<td></td>
</tr>
<tr>
<td>1 tablespoon (tbsp.)</td>
<td>15 milliters (mL)</td>
<td></td>
</tr>
<tr>
<td>1 teaspoon (tsp.)</td>
<td>5 millliters (mL)</td>
<td></td>
</tr>
<tr>
<td>1 grain</td>
<td>10 milligrams (mg)</td>
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Dosage Calculations
To calculate correct oral medication dosages follow three steps:

1. Be sure all measures are in the same system and units are in the same size. Don’t forget to convert when necessary.
2. You should consider: what is a reasonable amount of drug or fluid to be administered.
3. Calculate the drug dosage using the formula:

   \[
   \text{Amount to be administered} = \frac{\text{Dosage Ordered}}{\text{Dose Available} \times \text{Quantity Available}}
   \]

   Example: Ordered: Lasix 60 mg IV \hspace{1cm} Available: Lasix 10 mg/mL

   \[
   \text{Desired Dose} \times \text{Quantity Available} = \text{Dose to be given}
   \]

   \[
   60 \text{ mg} \div 10 \text{ mg} \times 1 \text{ mL} = 6 \text{ mL} \]

   Dose to be given = 6 mL

Practice Problems for Oral Medications
1. Ordered: Hydrochlorothiazide 50 mg PO
   Available: Hydrochlorothiazide 25 mg tablet
   Give: ______ Tab(s)

2. Ordered: Lasix 40 mg IV
   Available: Lasix 100 mg in 10 mL
   Give: ______ mL(s)

3. Ordered: Amoxicillin 100 mg PO qid
   Available: 80 mL bottle of Amoxicillin oral Suspension 125 mg per 5 mL
   Give: ______ mL per dose

Effects and Principles of Medication Administration Practice Questions:

1. The nurse is preparing to administer antibiotic drops in a resident’s left ear. In which of these positions should the resident be placed:
   a. Fowlers or Dorsal Recumbent
   b. Sims
   c. Prone
   d. Right side lying

2. A nurse is preparing to administer Quinidine Sulfate to a resident and finds this entry on the medication administration record: Quinidine 200 mg. What initial nursing action is most appropriate?
   a. Administer Quinidine PO with other scheduled medications
   b. Check the physician’s order for the Quinidine in the resident’s chart
   c. Counting the resident’s pulse for a full minute before administering the Quinidine
   d. Give the medication to prevent delay of administration

3. A resident diagnosed with hypothyroidism is started on Levothyroxine Sodium (Synthroid) daily. At which time should Synthroid be scheduled for administration?
   a. At bedtime
   b. With lunch
   c. Before breakfast
   d. Anytime

4. Protamine Sulfate should be kept available for administration to counteract side effects of which
of these drugs?
   a. Digoxin (Lanoxin)
   b. Warfarin sodium (Coumadin)
   c. Heparin
   d. Vitamin K

5. Which of these would not be good practice when administering eye medication?
   a. Hold the dropper more than 2 inches above the eye
   b. Ask the resident to look upward
   c. Place the medication in the lower conjunctival sac
   d. Check the medication order for correct laterality

6. A resident is to receive the non-steroidal anti-inflammatory drug naproxen (Naprosyn). The order should be questioned if the resident has a history of
   a. Glaucoma
   b. Peptic Ulcer
   c. Diabetes
   d. Headaches

7. A nurse should assess a resident started on insulin for side effects including:
   a. Bradycardia
   b. Tremors
   c. Thirst
   d. Pain

8. If a resident takes a drug at intervals shorter than the drug half-life, the resident should be monitored for which of these potential issues?
   a. Drug toxicity
   b. Decreased absorption
   c. Decreased therapeutic effect
   d. Decreased compliance

**Answer Keys**

<table>
<thead>
<tr>
<th>Dosage Calculations:</th>
<th>Effects of Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 50 mg ÷ 25 mg x 1 tablet = 2 tablets</td>
<td>1. D 5.A</td>
</tr>
<tr>
<td>2. 40 mg ÷ 100 mg x 10 mL = 4 mL</td>
<td>2.B 6.B</td>
</tr>
<tr>
<td>3. 100 mg ÷ 124 mg x 5 mL = 4 mL</td>
<td>3. C 7.B</td>
</tr>
<tr>
<td></td>
<td>4. C 8.A</td>
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</tbody>
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**B. Flow Rates**
To calculate the correct flow rate ordered, be sure to follow three simple steps:

- **Step 1**: Be sure all measures are in the same system, and all units are in the same size convert when necessary.
- **Step 2**: Carefully consider: what is a reasonable amount of the drug to administer.
- **Step 3**: Calculate the intravenous drip rate using the formula:

\[
\text{Drip Rate} = \frac{\text{Volume to be infused} \times \text{Drop Factor (gtts/ml)}}{\text{Total Time in Minutes}}
\]

**Example**: Ordered: Infuse 1200 ml of Normal Saline over 6 hours. Drop factor of the infusion set is 15 gtts/ml

Drip Rate: gtts/min

Step 1: Calculate total time in minutes;
6 hours \times 60\text{ mins} = 360\text{ mins}

Drip Rate = Volume to be Infused \times \text{Drop Factor (gtts/ml)}

Total Time in Minutes

\[
\text{Drip Rate} = \frac{1200\text{ ml} \times 15\text{ gtts/ml}}{360\text{ mins}} = 50\text{ gtts/min}
\]

**C. Rounding numbers**

Round to the nearest whole number

- If tenths is 5 or greater, round up; if the tenths is 4 or less, round down.
- Rounding to the 10ths or hundreds would be necessary when calculating parenteral and some oral medications
- If the hundreds is 4 or lower it is dropped, if the hundreds is 5 or greater round the prior number up by one.

When rounding teaspoons; must go to the nearest calibration, i.e. 1.3 tsp. should be written as 1 ¼ tsp.

**Section B**

**Practice Problems for Intravenous Drug Calculations**:

1. Ordered: Ampicillin 500 mg dissolved in 200 ml D5W Drop Factor: 10 gtts/ml
   IV to run for 2 hours
   Drip Rate: gtts/min

2. Ordered: Normal Saline 1200 ml to infuse over 10 hours Drop Factor: 15 gtts/ml
   Drip Rate: gtts/min

3. Ordered: 1000 ml Lactated Ringers IV per 24 hours KVO Drop Factor: 60 gtts/ml
   (Keep Vein Open)
   Drip Rate: gtts/min

4. Ordered: 1500 ml D5NS IV to run for 12 hours Drop Factor: 20 gtts/ml
   Drip Rate: gtts/min

5. Ordered: 1L D5W to run 0900 to 1800 Drop Factor: 10 gtts/ml
   Drip Rate: gtts/min

6. Ordered: 2.5 L NS IV to infuse at 125 ml/h Drop Factor: 20 gtts/ml
   Drip Rate: gtts/min

7. Ordered: Ancef 1 g in 100 cc D5W IV piggy back to Drop Factor: 60 gtts/ml
   infuse over 45 minutes
Drip Rate: gtts/min

8. Ordered: Ampicillin 500 mg in 50 ml of NS to infuse over Drop Factor: 15 gtts/ml over 30 minutes
   Drip Rate: gtts/min

9. Ordered: 500 ml D5LR to infuse over 3 hours Drop Factor: 60 gtts/ml
   Drip Rate: gtts/min

Section B
Intravenous Drug Calculations: Answer Key

1. Drip Rate = \( \frac{200\text{ml} \times 10\text{ gtts/ml}}{120\text{ mins}} \) = 16.66667 or 17 gtts/min

2. Drip Rate = \( \frac{1200\text{ml} \times 15\text{ gtts}}{600\text{ mins}} \) = 30 gtts/min

3. Drip Rate = \( \frac{10000\text{ml} \times 60\text{ gtts/ml}}{1440\text{ mins}} \) = 41.667 or 42 gtts/min

4. Drip Rate = \( \frac{150\text{ml} \times 20\text{ gtts}}{720\text{ mins}} \) = 41.667 or 42 gtts/min

5. Drip Rate = \( \frac{100\text{ml} \times 10\text{ gtts/ml}}{540\text{ min}} \) = 18.518 or 19 gtts/min

6. Drip Rate = \( \frac{125\text{ml} \times 20\text{ gtts/ml}}{60\text{ mins}} \) = 41.667 or 42 gtts/min

7. Drip Rate = \( \frac{100\text{ml} \times 60\text{ gtts}}{45\text{ mins}} \) = 133.333 or 133 gtts/min

8. Drip Rate = \( \frac{50 \times 15\text{ gtts}}{30\text{ mins}} \) = 25 gtts/min

9. Drip Rate = \( \frac{500 \times 60\text{ gtts}}{180} \) = 166.667 or 167 gtts/min