NURSING 120

College Laboratory Guide

Fall 2011

Student Name_____

College Lab -- Week 1

Objectives - Concept: <u>OXYGENATION : related to alterations in pulmonary ventilation and diffusion</u>

- Use assessment parameters appropriate for determining the characteristics and severity of the major symptoms of respiratory dysfunction.
- Identify the nursing implications of procedures used for diagnostic evaluation of respiratory function.
- Compare and contrast upper and lower respiratory tract infections with regard to cause, incidence, primary prevention, clinical manifestations, and collaborative management.
- Use the nursing process as a framework for care of the pediatric patient with: Otitis media; tonsillitis; croup syndrome.
- Use the nursing process as a framework for care of the adult patient with: pneumonia; tuberculosis
- Describe the nursing process as a framework for the care of the patient with a tracheostomy.
- Demonstrate the procedure for tracheostomy care and suctioning.

Topics covered in readings and theory class:

- <u>Readings: Theory</u>:

OXYGENATION : related to alterations in pulmonary ventilation and diffusion
<u>Exemplar</u>: Care of Patients with Impaired Ventilation – Respiratory Diagnostic Testing
Care of Pediatric and Adult Patients receiving Immunizations

Care of Pediatric with impaired ventilation related to upper respiratory infections
<u>Exemplars</u>: Care of Pediatric & Adult Patients with Tonsillitis
Care of Pediatric Patients with Croup Syndromes

Care of patients with impaired ventilation related to lower respiratory infections
<u>Exemplars</u>: Care of Patients with Pneumonia
Care of Patients with Pulmonary Tuberculosis

Skills/Demonstration/Return Demonstration:
Tracheostomy Care
Assessment: Adventitious breath sounds related to respiratory infections.

Computer-Assisted Learning - Evolve Learning Web sit at http://evolve/elsevier.com/Iggy/.

Videotape

- "Performing Respiratory Assessment" (Springhouse, 2002) – (30 mins) complete questions & discuss

Critical Thinking –
Medication Administration:
Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby.
Ratio & Proportion – Adult and Pediatric Oral and Parenteral Medications – Review

Med-Surg Nursing:
Ignatavicius, Donna & Workman, M. Linda (2010) Critical Thinking Study Guide to accompany Medical-Surgical Nursing Critical Thinking for Collaborative Care
Acid-Base Balance Case Study
Respiratory Tract Assessment Case Study
Care of the patient with tracheostomy

Exemplar: Care of the Patient with pneumonia - (fill in correct response):

1. **List 7 possible causes of Atelectasis:**

2. **List 7 possible clinical manifestations of Atelectasis:**

3. **List 7 nursing interventions that can be used to prevent Atelectasis:**

4. **The diagnosis of hospital-acquired pneumonia is usually associated with the presence of one of three conditions:**

   1.
   2.
   3.

5. **Name three common pathogens that cause community acquired pneumonia:**

   1.
   2.
   3.

6. **Pneumonia tends to occur in patients with one or more of these underlying disorders:**

   1.
   2.
   3.
   4.
   5.

7. **Three complications of pneumonia include:**

   1.
   2
   3

Week 1 Math – Ratio & Proportion

Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby.

Problem

Compute the amount of medication that will be given to administer one dose of the following medication orders by using a proportion to obtain your answers.

Assume all tablets are scored, when necessary. Round all parenteral administration orders that are over 1 mL to one decimal place. Round all parenteral administration orders under 1 mL to two decimal places. Do not include zeros at the end of decimal numbers.

The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

1. Order: Axid 0.3 g p.o. at h.s.
   Supply: Axid 150 mg capsules
   Give: _____ capsules

2. Order: Amoxil 0.25 g p.o. q.8h
   Supply: 80 mL bottle of reconstituted Amoxil oral suspension, 125 mg/5 mL
   Give: _____ mL or _____ teaspoons

3. Order: Augmentin 375 mg p.o. q.8h
   Supply: 75 mL bottle of reconstituted Augmentin, 250 mg/5 mL
   Give: _____ mL

4. Order: Klonopin 500 mcg p.o. t.i.d.
   Supply: Bottle of 100 tablets of Klonopin, 0.5 mg per tablet
   Give: _____ tablet(s)

5. Order: nitroglycerin gr $\frac{1}{100}$ SL stat
   Supply: 0.4 mg and 0.6 mg tablets
   Give: _____ tablet, give _____ tablet(s)

6. Order: vitamin B_{12} 100,000 U IM qd. for 3 days
   Supply: 2 mL vial of vitamin B_{12} with 50,000 U/mL
   Give: _____ mL

7. Order: thiamine HCl 20 mg IM t.i.d.
   Supply: 10 mL multiple dose vial of vitamin B_1 (thiamine HCl) 100 mg/mL
   Give: _____ mL

8. Order: ascorbic acid 150 mg IM qd.
   Supply: 2 mL ampule of vitamin C (ascorbic acid) 250 mg/mL
   Give: _____ mL

9. Order: heparin 7500 U SC q.8h
   Supply: heparin 10,000 U/mL
   Give: _____ mL

10. Order: methylprednisolone acetate 100 mg IM once per week
    Supply: methylprednisolone acetate suspension, 80 mg/mL
    Give: _____ mL

Ratio & Proportion
Answer Section

PROBLEM

1. ANS:
   $0.3\text{ g} = 0.3 \times 1000 = 300\text{ mg}$

   $\frac{300\text{ mg}}{150\text{ mg}} \times 1\text{ capsules} = 2\text{ capsules}$
2. ANS:
   $0.25\text{ g} = 0.25 \times 1000 = 250\text{ mg}$

   $\frac{250\text{ mg}}{125\text{ mg}} \times 5\text{ mL} = 10\text{ mL}$

   $10\text{ mL} = 10 \div 5 = 2\text{ t}$
3. ANS:
   $\frac{375\text{ mg}}{250\text{ mg}} \times 5\text{ mL} = 7.5\text{ mL}$
4. ANS:
   $0.5\text{ mg} = 0.5 \times 1000 = 500\text{ mcg}$

   $\frac{500\text{ mcg}}{500\text{ mcg}} \times 1\text{ tablet} = 1\text{ tablet}$
5. ANS:
   $\text{gr } \frac{1}{100} = \frac{1}{100} \times 60 = 0.6\text{ mg}$
   Select 0.6 mg tablets, and give 1 tablet
6. ANS:
   $\frac{100,000\text{ U}}{50,000\text{ U}} \times 1\text{ mL} = 2\text{ mL}$
7. ANS:
   $\frac{20\text{ mg}}{100\text{ mg}} \times 1\text{ mL} = 0.2\text{ mL}$
8. ANS:
   $\frac{150\text{ mg}}{250\text{ mg}} \times 1\text{ mL} = 0.6\text{ mL}$
9. ANS:
   $\frac{7500\text{ U}}{10,000\text{ U}} \times 1\text{ mL} = 0.75\text{ mL}$
10. ANS:
    $\frac{100\text{ mg}}{80\text{ mg}} \times 1\text{ mL} = 1.25 = 1.3\text{ mL}$

College Lab – Week 2

Objectives: Concept: <u>OXYGENATION : related to alterations in pulmonary ventilation and diffusion</u>

- Discuss the major risk factors for developing obstructive airway and lung problems.
- Use the nursing process as a framework for care of pediatric and adult patients with chronic airflow limitation – asthma.
- Use the nursing process as a framework for care of the adult patient with obstructive lung disease – emphysema and chronic bronchitis.
- Describe self-management strategies for patients asthma, including medications.
- Develop a teaching plan for patients with obstructive airway disease.

Topics covered in readings and theory class: <u>Unit 1B –</u>
<u>OXYGENATION related to alterations in pulmonary ventilation and diffusion</u>

Care of patients with impaired ventilation related to obstructive airway and lung problems.
<u>Exemplars</u>: Care of Adult and Pediatric Patients with Asthma
Care of Adult Patients with Chronic Obstructive Lung Disease
- **Chronic Bronchitis / Emphysema**

Skills/Demonstration

- **Assessment: Breath Sounds (cont'd)**
- **Tracheostomy care and suctioning (cont'd)**
- Nebulizer Treatment - bronchodilators
- Oxygen therapy – T-piece; Trach mist collar; Venti-mask

Computer-Assisted Learning - Evolve Learning Web sit at http://evolve/elsevier.com/Iggy/.

Videotape

- "Pediatric Assessment" (Wiley & Wong, 1996) (from library (20 mins)
- "Pediatric Medication Administration" (from library) (35 mins)

Critical Thinking – Medication Administration

Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby.
Pediatric & adult dosage based on body weight

Med-Surg Nursing:

Ignatavicius, Donna & Workman, M. Linda (2010) Critical Thinking Study Guide to accompany Medical-Surgical Nursing Critical Thinking for Collaborative Care
Care of the patient with noninfectious upper respiratory problems

Week 2:
Exemplar: Care of the Patient with acute and chronic obstructive lung problems: (fill in correct response)

1. Chronic airway inflammation in COPD results in:

2. Define the term emphysema:

3. A genetic risk factor for COPD is:

4. Primary symptoms associated with the progressive disease of obstructive lung disease are:

5. List major factors that determine the clinical course and survival of patients with obstructive lung disease:

6. The single most cost effective intervention to reduce the risk for developing COPD or slow its progression is:

7. List three ways that bronchodilators relieve bronchospasm:

8. Primary causes for an acute exacerbation of COPD are:

9. To help prevent infections in patients with COPD, the nurse should recommend vaccination against two bacterial organisms:

10. The strongest predisposing factor for asthma is:

11. The most common symptoms of asthma include:

12. Complications of asthma include:

Exemplar: Care of the Patient with Emphysema Case Study:

Maria, who has had emphysema for 25 years, is admitted to the hospital with a diagnosis of bronchitis.

1. **During assessment, the nurse notes the presence of a "barrel chest"', which the nurse knows is caused by:**

a. A compensatory expansion of the bronchial airway.
b. A decrease in intrapleural pressure,
c. "air trapping" in the lungs.
d. A progressive increase in vital capacity.

2. **The nurse recognizes the need to be alert for the major presenting symptom of emphysema, which is:**

a. Bradypnea.
b. Dyspnea.
c. Expiratory wheezing.
d. Fatigue.

3. Arterial blood gas measurements that are consistent with a diagnosis of emphysema are:

a. pH 7.32; paO2 70mm Hg; PaCO2 50 mm Hg.
b. pH7.37; PaO2 90 mmHg; PaCO2 42 mm Hg.
c. pH 7.39; PaO2 80 mm Hg; PaCO2 35 mm Hg.
d. pH 7.40; PaO2 85 mmHg; PaCO2 42 mm Hg.

4. Oxygen is prescribed for Maria. The nurse knows that the most effective delivery system is:

a. A rebreathing bag that delivers oxygen at a concentration grater than 60%.
b. An oxygen mask set at 8 L/min.
c. A nasal cannula set at 6l/MIN.
d. A Venturi mask that delivers a predictable oxygen flow at about 24%.

5. In planning care for Maria, which interventions are best to implement? (Select all that apply)

a. Provide rest periods between activities, such as bathing, meals, and ambulation.
b. Place the patient in a supine position after meals to allow for rest.
c. Schedule drug administration around routine activities to increase adherence to Arrange chairs in strategic locations to allow the patient to walk and rest.
d. Encourage the patient to have an annual flue vaccination.

Week 2 Math: Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby. **Pediatric Weight-Based Problems**

Math Problem:

Compute the requested information. Round all parenteral administration orders that are over 1 mL to one decimal place. Round all parenteral administration orders under 1 mL to two decimal places. Do not include zeros at the end of decimal numbers.

The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age condition, reaction, additional medications, and other factors.

Use the following information about a child and his order to compute answers.

A pediatrician has ordered Ampicillin 50 mg/kg/day p.o. divided q.6h for a child who weighs 44 lb.

1. How many kilograms does the child weigh? _____ kg

2. How many milligrams should the child receive per dose? _____ mg

3. How many milligrams should the child receive per day? _____ mg

4. The pharmacy has supplied reconstituted Ampicillin, with a supply dosage of 500 mg/5 mL. How many milliliters should be given per q.6h dose? _____ mL

Use the following information about a child and her order to compute answers.

Mandy, a child who weighs 15 kilograms, is to be given amoxicillin. The recommended dosage of amoxicillin for children is 20 to 40 mg/kg/day p.o. in equally divided doses administered q.8h.

5. What is the recommended range of milligrams of medication for this child per q.8h dose?

   minimum: _____ mg maximum: _____ mg

6. The pediatrician has ordered *amoxicillin 125 mg p.o. q.8h* for Mandy.
   The available supply of amoxicillin is 125 mg/5 mL.
   Is her order within the recommended range for this medication? (yes/no) _____

   If so, how many mL of amoxicillin should be given per q.8h administration? _____ mL

7. How many teaspoonfuls of amoxicillin should be given per q.8h administration? _____ t
   Use the following information about a child and his order to compute answers.

   The recommended dosage of Rocephin is 50 to 100 mg/kg/day divided into two equal doses. The physician has ordered Rocephin 200 mg IM b.i.d. for a child who weighs 5000 g. The Rocephin vial contains 1 g of medication that must be reconstituted with 3.6 mL of diluent to yield 1 g/4 mL

8. Compute the recommended minimum and maximum amount of milligrams that the child should receive per day.

   minimum: _____ mg maximum: _____ mg

9. Compute the recommended minimum and maximum amount of milligrams that the child should receive per dose.

   minimum: _____ mg maximum: _____ mg

10. Is the order within the recommended range? (yes/no) _____
    If so, compute the number of milliliters of Rocephin that should be administered per dose.
    ___mL.

Pediatric & Adult Dosages Based on Body Weight

Answer Section

PROBLEM

1. ANS:
   44 lb = 44 ÷ 2.2 = 20 kg
2. ANS:
   per day, 20 kg × 50 mg/kg = 1000 mg
3. ANS:
   q.6h = every 6 hours, which is given 4 times per day.

   $$\frac{1000 \text{ mg}}{4 \text{ doses}} = 250 \text{ mg per dose}$$
4. ANS:
   $$\frac{250 \text{ mg}}{500 \text{ mg}} \times 5 \text{ mL} = 2.5 \text{ mL}$$
5. ANS:
   q.8h = every 8 hours, which is given 3 times per day.
   per day minimum
   $$\frac{300 \text{ mg}}{3 \text{ doses}} = 100 \text{ mg per dose}$$
   per day maximum
   $$\frac{600 \text{ mg}}{3 \text{ doses}} = 200 \text{ mg per dose}$$
6. ANS:
   Yes, 125 mg per dose is within 100 mg to 200 mg per dose.
   $$\frac{125 \text{ mg}}{125 \text{ mg}} \times 5 \text{ mL} = 5 \text{ mL}$$
7. ANS:
   5 mL = 1 t
8. ANS:
   5000 g = 5000 ÷ 1000 = 5 kg
   per day, minimum
   5 kg × 50 mg/kg = 250 mg
   per day, maximum
   5 kg × 100 mg/kg = 500 mg

9. ANS:
per dose, minimum

$$\frac{250\text{ mg}}{2\text{ doses}} = 125\text{ mg per dose}$$

per dose, maximum

$$\frac{500\text{ mg}}{2\text{ doses}} = 250\text{ mg per dose}$$

10. ANS:
Yes, the ordered amount of 200 mg per dose, b.i.d. is within the recommended range of 125 mg to 250 mg per dose, given twice per day.

$$\frac{200\text{ mg}}{1000\text{ mg}} \times 4\text{ mL} = 0.8\text{ mL}$$

College Lab – Week 3

Objectives – Unit IIIA - <u>OXYGENATION –</u>
<u>related to alterations in cardiovascular tissue perfusion and cardiac output</u>

- Evaluate patients at risk for cardiovascular problems.
- Perform focused cardiovascular assessment on patients at risk for CV disease.
- Describe the pathophysiology, risk factors, and clinical manifestations in patients with altered cardiovascular tissue perfusion.
- Implement the nursing process for adult patients with altered cardiovascular tissue perfusion related to cardiovascular risk factors and hypertension.
- Discuss the indications, intended effects, and nursing implications of medications in the care of adult patients with altered cardiovascular tissue perfusion related to cardiovascular risk factors and hypertension.
- Describe a medication teaching plan for the patient with hypertension.

Topics covered in readings and theory class:

- <u>Readings: Theory</u>:

<u>Alterations in cardiovascular tissue perfusion and cardiac output</u>

Care of patient with impaired cardiovascular tissue perfusion – Cardiovascular Risk Factors
<u>Exemplar</u>: Care of Patient with Impaired Cardiovascular tissue Perfusion – Hypertension

Skills/Demonstration

- IV flush; primary IV tubing set up and function; secondary IV tubing setup and function

Assessment: Cardiac

Computer-Assisted Learning - Evolve Learning Web sit at http://evolve/elsevier.com/Iggy/.

Videotape
Performing Cardiac Assessment – (Springhouse, 2003) (35mins) – complete NCLEX questions.

Critical Thinking – Medication Administration
Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby.
Chap 14 – IV Solutions and IV Flow Rate Calculations

Med-Surg Nursing:
Ignatavicius, Donna & Workman, M. Linda (2010) Critical Thinking Study Guide to accompany Medical-Surgical Nursing Critical Thinking for Collaborative Care

Care of the patient with cardiovascular risk factors
Care of the patient with hypertension

Week 3: Exemplar: Care of the Patient with cardiovascular risk factors – hypertension:

1. **Blood pressure is the product of _____ multiplied by _____.**

2. **Cardiac output is the product of _____ multiplied by _____.**

3. **Prolonged hypertension can cause significant damage to blood vessels in four "target organs":**

4. **List serious consequences prolonged, uncontrolled hypertension on the body and its systems:**

5. **Give examples of conditions that can trigger a hypertensive emergency in which blood pressure must be immediately lowered:**

6. **List 7 modifiable risk factors for coronary artery disease:**

7. **Management of coronary artery disease requires a therapeutic range pf cholesterol and lipoproteins. An acceptable blood level of total cholesterol is _____, with an LDL/HDL ratio of _____ . The desired level pf LDL should be _____ mg/dL, and the HDL level should be greater than _____ mg/dL. Triglycerides should be less than _____mg/dL.**

Case Study: George, a 45 year old has primary hypertension after serial blood pressure readings average 150/98.

1. **Renal pathology associated with hypertension can be identified by:**

a. Urine output greater than 2,000 mL in 24 hours.
b. A urine specific gravity of 1.005.
c. Hyponatremia and decreased urine osmolality.
d. Increased blood urea nitrogen and creatinine levels.

2. **Health education for George includes advising him to:**

a. Adhere to his dietary regimen.
b. Become involved in a regular of exercise.
c. Take all medication as prescribed.
d. Do all of the above**.**

3. **George was prescribed the following angiotensin-converting enzyme (ACE) inhibitor, which has a rapid onset of action within 15 minutes.**

a. Ramipril (Altace)
b. Captopril (Capoten)
c. Benazepril (Lotensin)
d. Enalapril (Vasotec)

4. **An example of a potassium-sparing diuretic tat might be prescribed later in the treatment of hypertension includes:**

a. Spironolactone (Aldactone)
b. Hydrochlorthiazide (HCTZ)
c. Metolazone (Zaroxolyn)
d. Furesomide (Lasix)

5. **The nurse is assessing for postural hypotension recognizes that the following is a positive sign:**

a. A heart rate of 5 to 20 beats per minute (bpm) above the resting rate
b. A n unchanged diastolic blood pressure
c. An increase of 10mm Hg reading
d. An decrease of 5 mm Hg reading

Care of the patient with coronary artery disease:

1. **An example of a beta blocker, administered to decrease automaticity, is frequently prescribed for patients with coronary artery disease includes:**

a. Diltiazem (Cardizem)
b. Amiodarone (Cordarone)
c. Metoprolol (Lopressor)
d. Propafenone (Rythmol)

2. **A non-modifiable risk factor for atherosclerosis is:**

a. Stress
b. Obesity
c. Positive family history
d. Hyperlipidemia

3. **The first heart sound is generated by:**

a. Closure of the aortic valve
b. Closure of the atrioventricular valves
c. Opening of the atrioventricular vales
d. Opening of the pulmonic valve

Match the terminology associated with coronary atherosclerosis in column II with its function/characteristic listed in column I:

Column I:

1. **_____ A principal blood lipid**
2. **_____ A risk factor that causes pulmonary damage**
3. **_____ The functional lesion of atherosclerosis**
4. **_____ Biochemical substances, soluble in fat, that accumulate within a blood vessel.**
5. **_____ A risk factor that is endocrine in origin.**
6. **_____ A risk factor associated with type A personality**
7. **_____ A risk factor related to weight gain.**
8. **_____ A recommended dietary restriction that is a risk factor for heart disease**
9. **_____ A symptom of myocardial ischemia**
10. **_____ A lifestyle habit that is considered a modifiable risk factor for heart disease**

Column II

a. **Atheroma**
b. **Obesity**
c. **Chest pain**
d. **Cholesterol**
e. **Inactivity**
f. **Lipids**
g. **Smoking**
h. **Diabetes**
i. **fat**
j. **stress**

Week 3 Math – Calculating IV Solution Rates

IV Solutions & IV Flow Rate Calculations

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. A patient's order for IV fluid states that NS is to be infused. Which of the following IV fluids should be given?
   a. 0.9% Sodium Chloride
   b. 0.45% Sodium Chloride
   c. 0.225% Sodium Chloride
   d. 5% Dextrose

2. A patient's order for IV fluid states the D_5W is to be infused. Which of the following IV fluids should be given?
   a. 5% Dextrose with Normal Saline
   b. 5% Dextrose with Lactated Ringer's Solution
   c. 5% Dextrose with 0.45% Sodium Chloride
   d. 5% Dextrose

3. A patient's order for IV fluid states that D_5NS is to be infused. Which of the following IV fluids should be given?
   a. 5% Dextrose
   b. 0.9% Sodium Chloride
   c. 5% Dextrose with 0.9% Sodium Chloride
   d. Lactated Ringer's Solution

4. A patient's order for IV fluid states that D_5LR is to be infused. Which of the following IV fluids should be given?
   a. 5% Dextrose with Lactated Ringer's Solution
   b. 5% Dextrose and 0.45% Sodium Chloride with 20 mEq KCl/L
   c. 5% Dextrose with 0.225% Sodium Chloride
   d. 0.45% Sodium Chloride

5. What is the ratio of the weight of dextrose to the volume of IV fluid in D_5W?
   a. 5 grams of dextrose to 1 liter of IV fluid
   b. 5 milligrams of dextrose to 1 milliliter of IV fluid
   c. 5 milligrams of dextrose to 1 liter of IV fluid
   d. 5 grams of dextrose to 100 mL of IV fluid

6. What is the ratio of the weight of sodium chloride to the volume of IV fluid in NS?
   a. 0.9 grams of sodium chloride to 100 mL of IV fluid
   b. 0.009 grams of sodium chloride to 1 milliliter of IV fluid
   c. 0.9 grams of sodium chloride to 1 liter of IV fluid
   d. 0.9 milligrams of sodium chloride to 100 mL of IV fluid

Guide for calculating IV rate in mL/hr and gtts/min:

IV Amount	Time	Rate per Hour	Amount/T x drip factor* = gtts/min
• Drip factor for large volume IV = 15 gtts/mL; for Blood: 10 gtts/mL			
1000mL	**12 hrs**	**83 mL/hr**	**83/60 x 15 = 20.8 or 21 gtts/min**
1000mL	**10 hrs**	**100mL/hr**	**100/60 x 15 = 25 gtts/min**
1000mL	**8 hrs**	**125 mL/hr**	**125/60 x 15 = 31 gtts/min**
1000 mL	**7 hrs**	**143 mL/hr**	**143/60 x 15 = 36 gtts/min**

Problem

The following IV orders will be regulated by electronic infusion devices. Calculate the flow rates of the IV fluids in mL/h. The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

7. 1200 mL $D_{10}W$ IV to infuse in 10 hours by infusion pump Flow rate: _____ mL/h
8. 1.5 L $D_5 \frac{1}{2}$NS IV to infusion 20 hours by controller Flow rate: _____ mL/h

The following IV orders will be regulated manually. Calculate the flow rate of the IV fluid in gtt/min.

9. 1 L NS IV to infuse in 10 hours
   The drop factor is 10 gtt/mL. Flow rate: _____ gtt/min
10. 1000 mL D_5W IV to infuse in 8 hours
    The drop factor is 20 gtt/mL. Flow rate: _____ gtt/min

IV Solutions & IV Flow Rate Calculations

Answer Section

MULTIPLE CHOICE

1. ANS: A
2. ANS: D
3. ANS: C
4. ANS: A
5. ANS: D
6. ANS: A

PROBLEM

7. ANS:

$$\frac{\text{mL}}{\text{h}} = \frac{1200\,\text{mL}}{10\,\text{h}} = 120\,\text{mL/h}$$

8. ANS:

$$1.5\,\text{mL} = 1.5 \times 1000 = 1500\,\text{mL}$$

$$\frac{\text{mL}}{\text{h}} = \frac{1500\,\text{mL}}{20\,\text{h}} = 75\,\text{mL/h}$$

9. ANS:

$$\frac{1000\,\text{mL}}{10\,\text{h}} = 100\,\text{mL/h}$$

$$\frac{\text{mL/h}}{\text{drop factor constant}} = \text{gtt/min}$$

$$\frac{100\,\text{mL}}{6\,\text{h}} = 16.6 = 17\,\text{gtt/min}$$

10. ANS:

$$\frac{1000\,\text{mL}}{8\,\text{h}} = 125\,\text{mL/h}$$

$$\frac{\text{mL/h}}{\text{drop factor constant}} = \text{gtt/min}$$

$$\frac{125\,\text{mL/h}}{3} = 41.6 = 42\,\text{gtt/min}$$

College Lab – Week 4

Objectives - Concept: <u>OXYGENATION –</u>
<u>related to alterations in cardiovascular tissue perfusion and cardiac output</u>

- Use the nursing process as a framework for care of the patient with angina pectoris.
- Describe the nursing care of the patient who has had percutaneous coronary interventional procedure for treatment of coronary artery disease.
- Discuss the indications, intended effects, and nursing implications of medications in the care of adult patients with altered cardiovascular tissue perfusion related to angina.
- Use the nursing process as a framework for care of patients with heart failure.

Topics covered in readings and theory class:

<u>Theory: UNIT IIB - OXYGENATION – related to alterations in cardiovascular tissue perfusion and cardiac output</u>

Care of Patients with impaired cardiovascular tissue perfusion related to decreased coronary perfusion

<u>Exemplar:</u> Care of patients with decreased coronary perfusion undergoing diagnostic and interventional collaborative care

<u>Theory: UNIT IIC - OXYGENATION – related to alterations in cardiovascular tissue perfusion and cardiac output</u>

Care of Patients with impaired cardiovascular tissue perfusion related to decreased cardiac output.

<u>Exemplar</u>: Care of patients with impaired cardiovascular tissue perfusion and decreased cardiac output related to Heart Failure.

<u>Skills/Demonstration</u>:

- IV flush; primary IV tubing set up and function; secondary IV tubing setup and function (cont'd)

Assessment: Cardiac / Peripheral vascular/peripheral pulses
Role Play case studies: Deep vein thrombosis; pulmonary embolus

Computer-Assisted Learning - Evolve Learning Web sit at http://evolve/elsevier.com/Iggy/.

Critical Thinking – Medication Administration:

Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby.
Intravenous Solution – Intravenous Heparin Therapy dosage protocol and calculation—

Med-Surg Nursing:
Ignatavicius, Donna & Workman, M. Linda (2010) Critical Thinking Study Guide to accompany Medical-Surgical Nursing Critical Thinking for Collaborative Care

Care of the patient with Angina undergoing treatment of coronary artery disease.
Care of the patient with heart failure.

Week 4: Care of the patient with alterations in cardiovascular tissue perfusion and cardiac output

Examining associations: Read each analogy, then add the best response in the space provided:

1. **The pulmonary artery : lungs :: Aorta : .**

2. **Epicardium : outer layer of cells ling the heart :: : the heart muscle itself.**

3. **Apical area of the heart : fifth intercostals space :: Erb's point : .**

4. **The first heart sound : closure of the mitral and tricuspid valves :: the second heart sound : closure of .**

5. **Murmurs : malfunctioning valves :: friction rubs : .**

Exemplar: Care of the Patient with Chest Pain

Mr. Anderson, a 45-year old executive with a major oil firm. Lately he has experienced frequent episodes of chest pressure that are relieved with rest. Today his pain was not relieved with rest. His wife called 911 and he is being evaluated in the ED.

1. **Lumen narrowing with atherosclerosis is caused by:**

a. Atheroma formation on the intima.
b. Scarred endothelium.
c. Thrombus formation.
d. All of the above.

2. **The pain of angina pectoris is produced primarily by:**

a. Coronary vasoconstriction.
b. Movement of thromboemboli.
c. Myocardial ischemia.
d. The presence of atheromas.

3. **Mr. Anderson received sublingual nitroglycerin immediately ipon arrival to the ED. The nurse informs him that this medication should work within:**

a. 3 to 4 minutes.
b. 10 to 15 minutes.
c. 30 minutes.
d. 60 minutes.

4. **Mr. Anderson is given a beta-adrenergic blocker orally. This medication administration is based on the scientific rationale supporting this drug's ability to:**

a. Block sympathetic impulses to the heart.
b. Elevate blood pressure.
c. Increase myocardial contractility.
d. Induce bradycardia.

5. **Mr. Anderson is deemed a candidate for percutaneous coronary angioplasty (PRCA) based on the extent of the coronary blockage. The procedure is performed on patients who:**

a. Have compromised left ventricular function.
b. Have had angina for more than 3 years.
c. Have at lest 70% occlusion of a major coronary artery.
d. Have questionable left ventricular function.

Exemplar: Care of the Patient with Heart Failure

Match the type of ventricular heart failure listed in Column II with its associated pathophysiology in Column I by placing either an "a"' or "b" :

Column I	**Column II**
1. _____ Fatigability	**a. Left-sided heart failure**
2. _____ Dependent edema	**b. Right-sided heart failure**
3. _____ Pulmonary congestion predominates	
4. _____ Distended neck veins	
5. _____ Ascites	
6. _____ Dyspnea from fluid in alveoli	
7. _____ Orthopnea	
8. _____ Hepatomegly	
9. _____ Cough that may be blood-tinged	
10. _____ Nocturia	

Multiple Choice:

1. **The dominant function in cardiac failure is:**

a. Ascites.
b. Hepatomegaly.
c. Inadequate tissue perfusion.
d. Nocturia.

2. **On assessment, the nurse knows that the presence of pitting edema indicates fluid retention of at least:**

a. 4 lb.
b. 6 lb.
c. 8 lb.
d. 10 lb.

3. **The diagnosis of heart failure is usually confirmed by:**

a. Chest x-ray.
b. An echocardiogram.
c. An electrocardiogram.
d. Ventriculogram

4. **A key diagnostic laboratory test for heart failure is the:**.

a. Blood urea nitrogen (BUN).
b. Complete blood count (CBC).
c. B-type natriuretic peptide. (BNP).
d. Serum electrolyte counts.

5. **The goal of collaborative care for heart failure includes (Circle all that are correct):**

a. Decreasing oxygen needs of the heart.
b. Increasing cardiac output by strengthening muscle contraction.
c. Reducing the amount of circulating blood.
d. Increasing cardiac output by decreasing peripheral vascular resistance.

6. **The patient in congestive heart failure is often prescribed Digoxin, cardiac glycoside that strengthens cardiac contraction and increases vagal tone. The nurse knows to check the Digoxin level prior to initiating or continuing Digoxin. A therapeutic digoxin level should be within:**

a. 0.25 to 0.35 mg/mL
b. 0.30 to 4.0 mg/mL
c. 0.5 to 20. Mg/mL
d. 2.5 to 4.9 mg/mL

Week 4 - Intravenous Heparin Therapy dosage protocol and calculation.

Problem

Complete the following advanced IV calculations. The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

Compute the "watch count" flow rate for the following questions.

1. 1 L D_5W with 10,000 U heparin to infuse at 1000 U/h
   The drop factor is 20 gtt/mL. Flow rate: _____ gtt/min

2. 1000 mL $\frac{1}{2}$NS with 10,000 U heparin to infuse at 750 U/h
   The drop factor is 12 gtt/mL. Flow rate: _____ gtt/min

3. One of your patients has an IV that is flowing at a rate of 10 gtt/min. The IV bag contains a solution of 500 mL NS with 20,000 U of heparin. The drop factor is 15 gtt/mL.

   How many units is the patient receiving per 24 hours? _____ U/24h

The following questions refer to your patient who is on IV heparin therapy according to the "Standard Weight Based Heparin Protocol" noted below. The patient weighs 144 pounds. On admission the patient's APTT is 30 seconds. You initiate IV heparin therapy at 1130 on 06/06/XX. Record your answers in the spaces below unless provided with the "Standard Weight Based Heparin Protocol Worksheet" by your instructor.

Standard Weight Based Heparin Protocol	
For all patients on heparin drips:	
1. Weight in KILOGRAMS. Required for order to be processed: _____ kg	
2. Heparin 25,000 U in 250 mL of 1/2 NS. Boluses to be given as 1000 U/mL.	
3. APTT q.6h or 6 hours after rate change; qd. after two consecutive therapeutic APTTs.	
4. CBC initially and repeat every _____ day(s).	
5. Obtain APTT and PT/INR on day one prior to initiation of therapy.	
6. Guaiac stool initially then every _____ day(s) until heparin discontinued. Notify if positive.	
7. Neuro checks every _____ hours while on heparin. Notify physician of any changes.	
8. D/C APTT and CBC once heparin drip is discontinued unless otherwise ordered.	
9. Notify physician of any bleeding problems.	
10. Bolus with 80 U/kg. Start drip at 18 U/kg/h.	
11. If APTT is < 35 secs:	Rebolus with 80 U/kg and increase rate by 4 U/kg/h
12. If APTT is 36–44 secs:	Rebolus with 40 U/kg and increase rate by 2 U/kg/h
13. If APTT is 45–75 secs:	Continue current rate
14. If APTT is 76–90 secs:	Decrease rate by 2 U/kg/h
15. If APTT is > 90 secs:	Hold heparin for 1 hour and decrease rate by 3 U/kg/h

4. What is the patient's weight as measured in kilograms? (Round to the nearest 10 kg.)

   _____ kg

   What does the protocol/sample orders indicate for the standard bolus dosage of heparin for this patient?

   _____ U/kg

5. Calculate the dosage of heparin that should be administered for the bolus for this patient.

   _____ U

   What does the protocol indicate as the required solution concentration (supply dosage) of heparin to use for the bolus?

   _____ U/mL

   Calculate the dose volume of heparin that should be administered for the bolus for this patient.

   _____ mL

6. What does the protocol/sample orders indicate for the initial infusion rate for this patient?

   _____ U/kg/h

   Calculate the dosage of heparin this patient should receive each hour.

   _____ U/h

   What does the protocol/sample orders indicate as the required solution concentration (supply dosage) of heparin to use for the initial infusion?

   _____ U/mL

Calculate the heparin solution volume this patient should receive each hour to provide correct infusion for the patient's weight.

_____ mL/h

7. According to the protocol/sample orders, how often should the patient's APPT be checked?

   q.h

   At 1730, the patient's APPT id 38 seconds, Rebolus with heparin

   _____ U (_____ mL)

   How much should you change the infusion rate?

   _____ increase or _____ decrease heparin _____ U/h and _____ ml/h

   The new infusion rate will be heparin _____ mL/h.

8. At 2345, the patient's APPT is 46 seconds. What should you do now?

9. At 0600 0n 06/07/XX, the patient's APPT is 50 seconds, what should you do now?

   When should the APPT be checked again? _____ (hours) on _____ (date)

IV Heparin - Answer Section

PROBLEM

1. ANS:

$$\frac{10,000\ \text{U}}{1000\ \text{mL}} = \frac{1000\ \text{U/h}}{\text{X mL/h}}$$

$$10,000\,\text{X} = 1,000,000$$

$$\frac{10,000\,\text{X}}{10,000} = \frac{1,000,000}{10,000}$$

$$\text{X} = 100\ \text{mL/h}$$

$$\frac{\text{mL/h}}{\text{drop factor constant}} = \text{gtt/min}$$

$$\frac{100\ \text{mL/h}}{3} = 33.3 = 33\text{gtt/min}$$

2. ANS:

$$\frac{10,000\ \text{U}}{1000\ \text{mL}} = \frac{750\ \text{U/h}}{\text{X mL/h}}$$

$$10,000\text{X} = 750,000$$

$$\frac{10,000\text{X}}{10,000} = \frac{750,000}{10,000}$$

$$\text{X} = 75\ \text{mL}$$

$$\frac{75\ \text{mL/h}}{5} = 15\ \text{gtt/min}$$

3. ANS:

$$\frac{\text{V}}{\text{T}} \times \text{C} = \text{R}$$

$$\frac{\text{V}}{60\ \text{min}} \times \frac{15\ \text{gtt}}{1\ \text{mL}} = \frac{10\ \text{gtt}}{\text{min}}$$

$$\frac{\text{V}}{60} \times \frac{15}{1} = \frac{10}{1}$$

$$\frac{\text{V}}{4} = \frac{10}{1}$$

$$\text{V} = 40\ (40\ \text{mL}/60\ \text{min} = 40\ \text{mL/h})$$

Patient is receiving 40 mL/hour.

$$\frac{20,000\ \text{U}}{500\ \text{mL}} = \frac{\text{X U/h}}{40\ \text{mL/h}}$$

$$500\text{X} = 800,000$$

$$\frac{500\text{X}}{500} = \frac{800,000}{500}$$

$$\text{X} = 1600\ \text{U/h}$$

$$\frac{1600\ \text{U/h}}{1\ \text{h}} = \frac{\text{X U}}{24\ \text{h}}$$

$$\text{X} = 38,400$$

The patient is receiving 38,400 U/24 h.

4. ANS:
   $144\ \text{lb} \div 2.2 = 65.5\ \text{kg} = 70\ \text{kg}$

   80 U/kg
5. ANS:
   $80\ \text{U/kg} \times 70\ \text{kg} = 5600\ \text{U}$

   1000 U/mL

   $\frac{5600\ \text{U}}{1000\text{U}} \times 1\ \text{mL} = 5.6\ \text{mL}$
6. ANS:
   18 U/kg/h

   $18\ \text{U/kg/h} \times 70\ \text{kg} = 1260\ \text{U/h}$

   $\frac{25,000\ \text{U}}{250\ \text{mL}} = 100\ \text{U/mL}$

   $\frac{1260\ \text{U/h}}{100\ \text{U}} \times 1\ \text{mL} = 12.6\ \text{mL/h} = 13\ \text{mL/h}$
7. ANS:
   6 h

   $40\ \text{U/kg} \times 70\ \text{kg} = 2800\ \text{U or } 2.8\ \text{mL}$

   Increase rate by 2 U/kg/h

   $2\ \text{U/kg/h} \times 70\ \text{kg} = 140\ \text{U/h}$

   Increase $\frac{140\ \text{U/h}}{100\ \text{U}} \times 1\ \text{mL} = 1.4\ \text{mL/h}$

   $12.6\ \text{mL/h} + 1.4\ \text{mL/h} = 14\ \text{mL/h}$
8. ANS:
   Maintain rate at 14 mL/h
9. ANS:
   Maintain rate at 14 mL/h. Recheck APPT at 0600 on 06/08/XX

College Lab * – Week 5

***Although there is no formal college lab at Week 5, the following college lab study guide is included for your use.**

Objectives:

- Use the nursing process as a framework for care of the patient with deep vein thrombosis.
- Describe the nursing care of the patient with pulmonary embolism receiving heparin therapy.
- Discuss the indications, intended effects, and nursing implications of heparin and warfarin.
- Use the nursing process as a framework for care of patients with peripheral vasculalr disease.

Readings: Unit IIID – Concept: OXYGENATION – related to alterations in cardiovascular tissue perfusion and cardiac output

Care of Patients with impaired cardiovascular tissue perfusion related to peripheral vascular dysfunction

Exemplars: Care of patients with impaired cardiovascular tissue perfusion related to venous thrombosis

Care of patients with impaired cardiovascular tissue perfusion related to pulmonary embolism.

Unit IIIE - OXYGENATION – related to alterations in cardiovascular tissue perfusion and cardiac output

Care of Patients with impaired cardiovascular tissue perfusion related to peripheral vascular dysfunction

Exemplar: Care of patients with impaired cardiovascular tissue perfusion related to Peripheral Arterial Occlusion.

Skills/Demonstration:

- IV flush; primary IV tubing set up and function; secondary IV tubing setup and function (cont'd)

Assessment: Cardiac / Peripheral vascular/peripheral pulses

Role Play case studies: patients with peripheral arterial problems

Computer-Assisted Learning - Evolve Learning Web sit at http://evolve/elsevier.com/Iggy/.

Critical Thinking – Medication Administration

Brown, M. and Mulholland, J.A. (2008) Drug Calculations. (8th ed.) St. Louis: Elsevier Mosby.
Intravenous Solution – Intravenous Heparin Therapy dosage protocol and calculation—

Med-Surg Nursing:

Ignatavicius, Donna & Workman, M. Linda (2010) Critical Thinking Study Guide to accompany Medical-Surgical Nursing Critical Thinking for Collaborative Care

Care of the Patient with venous thrombosis
Care of the patient with pulmonary embolism
Care of the patient with peripheral vascular problems

Week 5 – Care of the patient with <u>alterations in cardiovascular tissue perfusion and cardiac output related to venous thrombosis, pulmonary embolism, and peripheral vascular problems.</u>

<u>Examplar: Care of the Patient with Venous thrombosis and Pulmonary Embolism:</u>

Clinical Decision-making Guide: Chapter 34:

Page 275: Questions 1-42; 53, 54, 59, 63.

Answers page 700.

1. **A significant cause of venous thrombosis is:**

a. Altered blood coagulation.
b. Stasis of blood.
c. Vessel wall injury.
d. All of the above.

2. **Clinical manifestations of deep vein obstruction include:**

a. Edema and limb pain.
b. Ankle engorgement.
c. Leg circumference difference.
d. All of the above.

3. **When administering heparin anticoagulant therapy, te nurse needs to monitor the clotting time to make certain that it is within the therapeutic range of:**

a. One to two times the normal control.
b. Two to three times the normal control.
c. 3.5 times the normal control.
d. 4.5 times the normal control.

4. **When caring for a patient who has started anticoagulant therapy with warfarin (Coumadin), the nurse knows not to expect therapeutic benefits for:**

a. At least 12hours.
b. The first 24 hours.
c. 2 to 3 days.
d. 3 to 5 days.

5. **List the classic triad (Virchow's) of factors associated with the development of venous thromboembolism:**

Exemplar: Care of the Patient with peripheral vascular disease:

1. **The most important factor in regulating the caliber of blood vessels, which determines resistance to flow, is:**

a. Hormonal secretion.
b. Independent arterial wall activity.
c. The influence of circulating chemicals.
d. The sympathetic nervous system.

2. **Clinical manifestations of acute venous insufficiency include all of the following except:**

a. Cool and cyanotic skin.
b. Initial absence of edema.
c. Sharp pain that may be relieved by the elevation of the extremity.
d. Numbness and tingling in the affected extremity.

3. **Probably the strongest risk factor for the development of atherosclerotic lesions is:**

a. Cigarette smoking.
b. Lack of exercise.
c. Obesity.
d. Stress.

4. **The hallmark symptom of peripheral arterial occlusive disease is:**

5. **List six clinical symptoms associated with acute arterial embolism:**

Matching:

Match t he type of vessel insufficiency listed in column II with its associated symptom listed in column I:

Column I	Column II
1. ____Intermittent claudication.	a. Arterial insufficiency.
2. ____Paresthesia.	b. Venous insufficiency.
3. ____Dependent rubor.	
4. ____Cold, pale extremity.	
5. ____Ulcers of lower legs and ankles.	
6. ____Muscle fatigue and cramping.	
7. ____Diminished or absent pulses.	
8. ____Reddish-blue discoloration with dependency.	

IV Heparin Therapy

<u>Heparin Medication Dosage Administration Questions - - for practice</u>:

Bolus by Body weight:

5. A patient with deep vein thrombosis who weighs 163 pounds is ordered to have a heparin bolus of 80 units per kg followed by an infusion. Calculate the dosage of the heparin bolus to be administered.

6. A patient with a pulmonary embolism who weights 209 pounds is ordered to have a heparin bolus of 90 units per kg followed by an infusion. Calculate the dosage of the heparin bolus to be administered.

Flow Rate:

1. The physician orders a continuous infusion of 25,000 units of heparin in 250 mL of D_5W at 600 units per hour. Please calculate the flow rate?

Ratio and proportion (extremes by the means):

2. An order read heparin 40,000 units in 1 L of D5W to infuse at 1,000 units/her. Calculate the flow rate.

Units Per Hour:

3. A patient is receiving 20,000 units of heparin in 1,000 mL of D5W by continuous infusion at 30mL/hr. What heparin dose is he receiving?

4. A patient is receiving 25,000 units of heparin in 500 mL NS by continuous infusion at 18 mL/hr. What heparin dose is he receiving?

ANSWER KEY: <u>Try working the problem before checking the key</u>

Bolus by Body weight:

5. A patient with deep vein thrombosis who weighs 163 pounds is ordered to have a heparin bolus of 80 units per kg followed by an infusion. Calculate the dosage of the heparin bolus to be administered.

Step 1 – convert pounds to kilograms:

163 / 2.2 = 74 kgs.

Step 2 – calculate dose in units: 74 x 80 = 5920units

Step 3 – calculate mL dosage 1000U : 1ml :: 5920 u : X mL
1000U x XmL = 5920U
X mL = 5920 / 1000 = 5.9 mL bolus

6. A patient with a pulmonary embolism who weights 209 pounds is ordered to have a heparin bolus of 90 units per kg followed by an infusion. Calculate the dosage of the heparin bolus to be administered.

Step 1 – Convert pounds to kgs 209 / 2.2 = 95 kg

Step 2 – Calculate dose in units: 95 x 90 = 8,550 units

Step 3 – Calculate mL dosage 1000U : 1 mL :: 8,550u : X mL
1000U x XmL = 8,550U
XmL = 8.55mL

Flow Rate:

1. The physician orders a continuous infusion of 25,000 units of heparin in 250 mL of D_5W at 600 units per hour. Please calculate the flow rate?

Ratio and proportion:

25,000 units : 250 mL :: 600 units : x mL (answer should be in mL/hr – using infusion pump)

25,000 u x X = 600 units/hr x 250 mL

25,000 uX = 150,000

X = 150,000 / 25,000 = **6 mL/hr**

2. An order read heparin 40,000 units in 1 L of D5W to infuse at 1,000 units/her. Calculate the flow rate.

40,000 U : 1000 mL :: 1,000U x X mL

40,000U x X = 1000mL x 1,000u

40,000 U = 1,000,000

XmL = 1,000,000 / 40,000 = **25mL/hr**

Units Per Hour:

3. A patient is receiving 20,000 units of heparin in 1,000 mL of D5W by continuous infusion at 30mL/hr. What heparin dose is he receiving?

20,000 u : 1,000 :: XU : 30mL
1,000mL x XU = 20,000U x 30mL
1,000 x XU = 600,000
XU = 600,000 / 1,000 = **600units/hr**

4. A patient is receiving 25,000 units of heparin in 500 mL NS by continuous infusion at 18 mL/hr. What heparin dose is he receiving?

25,000u : 500 mL :: XU : 18 mL/hr
500mL X = 25,000U x 18 mL/hr
500mL X = 450,000U
xU = 450,000 / 500 = **900units per hour**

General Math Review

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. A patient's order for IV fluid states the D_5W is to be infused. Which of the following IV fluids should be given?
   a. 5% Dextrose with Normal Saline
   b. 5% Dextrose with Lactated Ringer's Solution
   c. 5% Dextrose with 0.45% Sodium Chloride
   d. 5% Dextrose

____ 2. A patient's order for IV fluid states that D_5NS is to be infused. Which of the following IV fluids should be given?
   a. 5% Dextrose
   b. 0.9% Sodium Chloride
   c. 5% Dextrose with 0.9% Sodium Chloride
   d. Lactated Ringer's Solution

____ 3. What is the ratio of the weight of dextrose to the volume of IV fluid in D_5W?
   a. 5 grams of dextrose to 1 liter of IV fluid
   b. 5 milligrams of dextrose to 1 milliliter of IV fluid
   c. 5 milligrams of dextrose to 1 liter of IV fluid
   d. 5 grams of dextrose to 100 mL of IV fluid

Completion
Complete each sentence or statement.

Convert each of the given quantities to the equivalent unit indicated. Your answers must be in the proper form for the metric, household, or apothecary system measurement requested in the question.

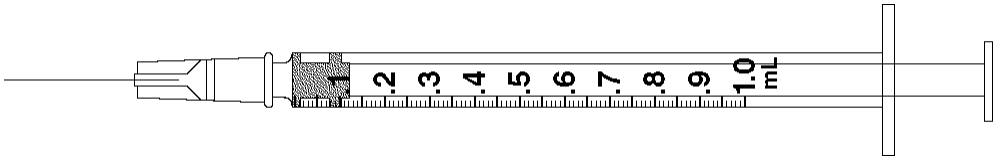
Convert each of the given quantities to the equivalent unit indicated.

4. 3500 g = _____ kg
5. 125 mg = _____ g
6. 250 mcg = _____ mg
7. gr $\frac{1}{4}$ = _____ mg
8. 15 t = _____ mL

Short Answer

Draw an arrow to point to the volume that corresponds to the dose to be administered with the given equipment.

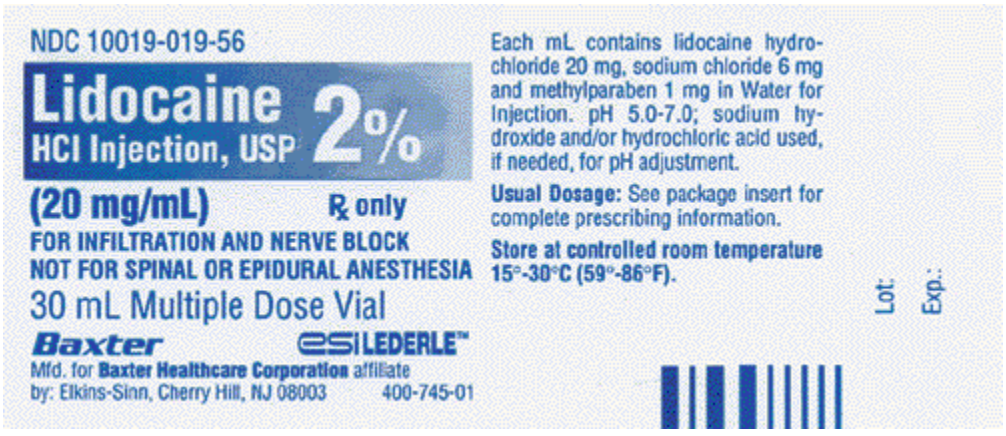
9. Administer 0.75 mL



Identify the following, using the given label.

10. Dosage strength: _____

Identify the following, using the given label.



11. The supply dosage is _____ g per _____ mL.

Compute the amount of medication you will give to administer one dose of the following medication orders. Assume all tablets are scored, when necessary. The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

12. Order: Axid 0.15 g p.o. b.i.d.
    Supply: Bottle containing 60 capsules of Axid, 150 mg per capsule
    Give: _____ capsule(s)

Compute the amount of medication that will be given to administer one dose of the following medication orders. Round all parenteral administration orders that are over 1 mL to one decimal place. Round all parenteral administration orders under 1 mL to two decimal places. Do not include zeros at the end of decimal numbers. The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

13. Order: Librium 30 mg IM q.6h p.r.n., anxiety
    Supply: Librium 100 mg/2 mL
    Give: _____ mL

Problem

Complete the following.

14. Arrange the following fractions from *smallest* to *largest:* $\frac{7}{16}, \frac{3}{16}, \frac{5}{16}$

Perform the indicated operations. Reduce fractions in answers to lowest terms.

15. $2\frac{1}{2} \div \frac{3}{4}$

	Decimal	Fraction	Percent	Ratio
1.	0.05			
2.		$\frac{1}{8}$		
3.			45%	
4.				3:10

16. Complete row 3 in the table above.

Solve for X. Round answers to two decimal places.

17. $\frac{X}{5} = \frac{1}{8}$

Compute the amounts of solutes and solvents for the following solutions.

18. 200 mL of 50% betadine solution using stock betadine and NS

    _____ mL stock betadine solution _____ mL NS

Explain how you would prepare the following formulas for the indicated time periods using the given supplies.

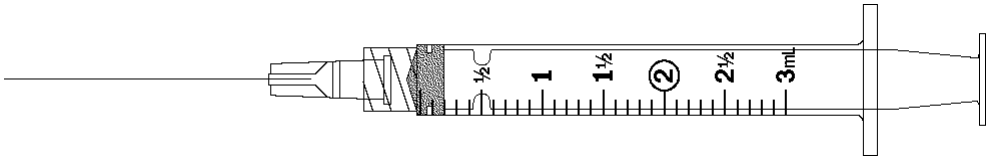
19. Give 90 mL of $\frac{1}{2}$ strength Enfamil orally every 4 hours for one day.
    Available supply is 6-ounce cans of Enfamil.

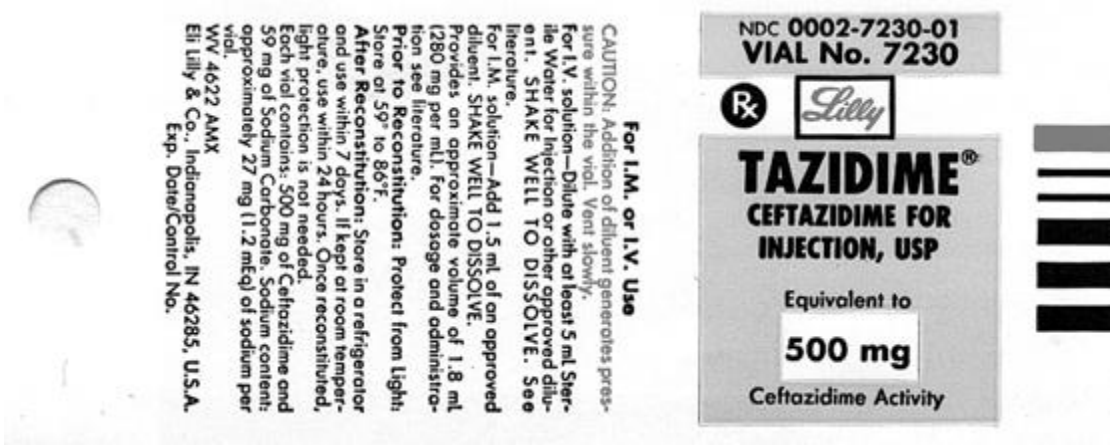
Use the following information:
A nurse needs to prepare $\frac{1}{4}$ strength Enfamil for several infants in the nursery. The supply is 8-ounce cans of Enfamil.

20. How much sterile water should be mixed with each 8-ounce can of Enfamil in order to prepare the $\frac{1}{4}$ strength solution?

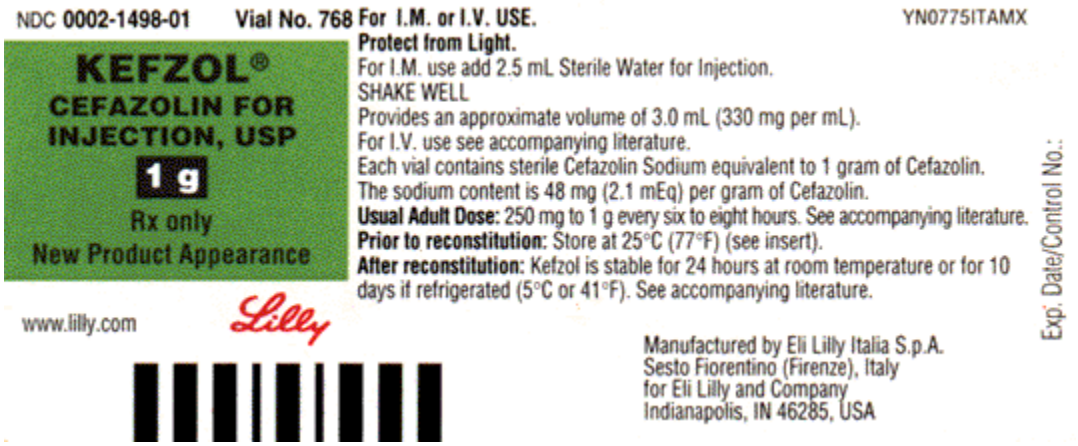
For questions 11 through 15, specify the amount of diluent to add and the resulting solution concentration. Calculate the amount to give and indicate the dose with an arrow on the accompanying syringe. Finally, make a reconstitution label, if required.

21. Order: *Tazidime 300 mg IM q.6h*
    Reconstitute with _____ mL diluent for a total solution volume of _____ mL with a concentration of _____ mg/mL.
    Give: _____ mL





22. Order: *Kefzol 150 mg IM q.8h*
Reconstitute with _____ mL diluent for a total solution volume of _____ mL with a concentration of _____ mg/mL.
Give: _____ mL



Compute the amount of medication that will be given to administer one dose of the following medication orders. Round all parenteral administration orders that are over 1 mL to one decimal place. Round all parenteral administration orders less than 1 mL to two decimal places. Do not include zeros at the end of decimal numbers. The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

23. Order: *Claforan 1 g IM q.12h*
Supply: Vial containing 6 mL of reconstituted Claforan, 330 mg/mL
Give: _____ mL

24. Order: *cefazolin sodium 750 mg IM q.8h*
    Supply: 1 g vial of cefazolin sodium with instructions to add 2.5 mL of diluent to produce 3 mL of medication supplying 330 mg/mL
    Give: _____ mL

Compute the amount of medication that will be given to administer one dose of the following medication orders by using a proportion to obtain your answers.

Assume all tablets are scored, when necessary. Round all parenteral administration orders that are over 1 mL to one decimal place. Round all parenteral administration orders under 1 mL to two decimal places. Do not include zeros at the end of decimal numbers.

The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

25. Order: Amoxil 125 mg po. q.8h
    Supply: Bottle of Amoxil (powdered medication) with the instructions to add 12 mL of water to obtain a pediatric oral suspension of 50 mg/mL
    Give: _____ mL

26. Order: Augmentin 375 mg po. q.8h
    Supply: 75 mL bottle of reconstituted Augmentin, 250 mg/5 mL
    Give: _____ mL

27. Order: thiamine HCl 20 mg IM t.i.d.
    Supply: 10 mL multiple dose vial of vitamin B_1 (thiamine HCl) 100 mg/mL
    Give: _____ mL

28. Order: heparin 7500 U SC q.8h
    Supply: heparin 10,000 U/mL
    Give: _____ mL

Compute the requested information. Round all parenteral administration orders that are over 1 mL to one decimal place. Round all parenteral administration orders under 1 mL to two decimal places. Do not include zeros at the end of decimal numbers.

The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age condition, reaction, additional medications, and other factors.

Use the following information about a child and his order to compute answers.

A pediatrician has ordered Ampicillin 50 mg/kg/day p.o. divided q.6h for a child who weighs 44 lb.

29. How many teaspoons should the child's parent administer per dose? _____ t

Use the following information about a child and his order to compute answers.

The recommended dosage of Rocephin is 50 to 100 mg/kg/day divided into two equal doses. The physician has ordered Rocephin 200 mg IM b.i.d. for a child who weighs 5000 g. The Rocephin vial contains 1 g of medication that must be reconstituted with 3.6 mL of diluent to yield 1 g/4 mL.

30. Compute the recommended minimum and maximum amount of milligrams that the child should receive per day.

minimum: _____ mg maximum: _____ mg

Calculate the weight of solutes in the following IV solutions, and identify the solutes.

31. 1 liter of NS contains _____ of _____
(weight) (solute)

The following IV orders will be regulated by electronic infusion devices. Calculate the flow rates of the IV fluids in mL/h. The problems and drug orders are presented for practice only, and actual prescribed dosages will vary according to a patient's age, condition, reaction, additional medications, and other factors.

32. 2 L D_5W IV to infuse in 24 hours by infusion pump Flow rate: _____ mL/h

The following IV orders will be regulated manually. Calculate the flow rate of the IV fluid in gtt/min.

33. 50 mL NS with antibiotic IV to infuse in 20 minutes
The drop factor is 20 gtt/mL. Flow rate: _____ gtt/min

A patient's IV flow needs to be checked frequently so that any adjustments in rate will be small. The allowable percent of change varies according to the institution's policy, patient's condition, and other factors. *For this problem set only,* assume that the patient's flow rate may be reset if the maximum variation from the physician's order is not more than 25%. Compute the percent of variation before resetting IV flow rates, and indicate either the new flow rate you will set or the appropriate action you will take.

The following IV order will be regulated manually.

1000 mL D_5W IV to infuse in 8 hours

The drop factor is 15 gtt/mL.

34. After 6 hours, 200 mL of IV fluid remains. If necessary and if allowable, reset the IV so that it is completed on time.

    What would the adjusted rate have to be? Adjusted rate, is allowable: _____ gtt/min

Determine the BSA for each of the following children using the BSA computation formulas given in the textbook. Include two decimal places with your answers.

35. Tommy, who is 35 inches tall and weighs 40 lbs

Compute the daily rate of pediatric maintenance fluids for the following children, using the following guidelines:

100 mL/kg/day for the first 10 kg of body weight
50 mL/kg/day for the next 10 kg of body weight
20 mL/kg/day for each kg above 20 kg of body weight

36. Reggie, who weighs 24 kg _____ mL/day

37. A patient's order for Pepcid states that she should receive an IV bolus of 20 mg Pepcid diluted in NS to a total volume of 10 mL which is to be injected over 2 minutes. The supply is Pepcid 10 mg/mL.

    Compute the volume of Pepcid and the volume of NS.

    Pepcid: _____ mL NS: _____ mL

The following questions refer to your patient who is on IV heparin therapy according to the "Standard Weight Based Heparin Protocol" noted below. The patient weighs 144 pounds. On admission the patient's APTT is 30 seconds. You initiate IV heparin therapy at 1130 on 06/06/XX. Record your answers in the spaces below unless provided with the "Standard Weight Based Heparin Protocal Worksheet" by your instructor.

Standard Weight Based Heparin Protocol	
For all patients on heparin drips:	
1. Weight in KILOGRAMS. Required for order to be processed: _____ kg	
2. Heparin 25,000 U in 250 mL of 1/2 NS. Boluses to be given as 1000 U/mL.	
3. APTT q.6h or 6 hours after rate change; q.d. after two consecutive therapeutic APTTs.	
4. CBC initially and repeat every _____ day(s).	
5. Obtain APTT and PT/INR on day one prior to initiation of therapy.	
6. Guaiac stool initially then every _____ day(s) until heparin discontinued. Notify if positive.	
7. Neuro checks every _____ hours while on heparin. Notify physician of any changes.	
8. D/C APTT and CBC once heparin drip is discontinued unless otherwise ordered.	
9. Notify physician of any bleeding problems.	
10. Bolus with 80 U/kg. Start drip at 18 U/kg/h.	
11. If APTT is < 35 secs:	Rebolus with 80 U/kg and increase rate by 4 U/kg/h
12. If APTT is 36–44 secs:	Rebolus with 40 U/kg and increase rate by 2 U/kg/h
13. If APTT is 45–75 secs:	Continue current rate
14. If APTT is 76–90 secs:	Decrease rate by 2 U/kg/h
15. If APTT is > 90 secs:	Hold heparin for 1 hour and decrease rate by 3 U/kg/h

38. According to the protocol/sample orders, how often should the patient's APPT be checked?

    q._____h

    At 1730, the patient's APPT id 38 seconds, Rebolus with heparin

    _____ U (_____ mL)

    How much should you change the infusion rate?

    _____ increase or _____ decrease heparin _____ U/h and _____ ml/h

    The new infusion rate will be heparin _____ mL/h.

General Review
Answer Section

MULTIPLE CHOICE

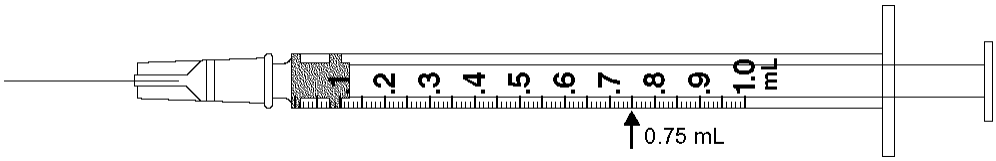
1. ANS: D
2. ANS: C
3. ANS: D

COMPLETION

4. ANS: 3500 g = 3500 ÷ 1000 = 3.5 kg
5. ANS: 125 mg = 125 ÷ 1000 = 0.125 mg
6. ANS: 250 mcg = 250 ÷ 1000 = 0.25 mg
7. ANS: gr $\frac{1}{4} = \frac{1}{4} \times 60 = 15\,\text{mg}$
8. ANS: 15 t = 15 × 5 = 75 mL

SHORT ANSWER

9. ANS:



10. ANS:
    6.5 mg per capsule
11. ANS:
    2% = 2 g per 100 mL
12. ANS:
    $0.15\,\text{g} = 0.15 \times 1000 = 150\,\text{mg}$

    $\frac{150\,\text{mg}}{150\,\text{mg}} \times 1\ \text{capsule} = 1\ \text{capsule}$
13. ANS:
    $\frac{30\,\text{mg}}{100\,\text{mg}} \times 2\,\text{mL} = 0.6\,\text{mL}$

PROBLEM

14. ANS:
    $\frac{3}{16}, \frac{5}{16}, \frac{7}{16}$

15. ANS:

$$2\frac{1}{2} \div \frac{3}{4} = \frac{5}{2} \div \frac{3}{4} = \frac{5}{\cancel{2}_{1}} \times \frac{\overset{2}{\cancel{4}}}{3} = \frac{10}{3} = 3\frac{1}{3}$$

16. ANS:

0.45, $\frac{9}{20}$, 9:20

17. ANS:

$$\frac{X}{5} = \frac{1}{8}$$

$$8X = 5$$

$$\frac{8X}{8} = \frac{5}{8}$$

$$X = \frac{5}{8}$$

Change $\frac{5}{8}$ to a decimal:

$$8\overline{)5.000}\quad 0.625$$

$$\underline{48}$$

$$20$$

$$\underline{16}$$

$$40$$

Rounded to two decimal places, X = 0.63

18. ANS:

D x Q = 50% x 200 mL = 100 mL stock betadine solution

200 mL − 100 mL = 100 mL NS

19. ANS:

$90\text{ mL} = \frac{90}{30} = 3$ ounces per administration every 4 hours = 6 administrations for one day

3 x 6 = 18 ounces total for the six administrations

$D \times Q = \frac{1}{2} \times 18 = 9$ ounces ($1\frac{1}{2}$ cans) of Enfamil

18 ounces − 9 ounces = 9 ounces sterile water

Give 3 ounces of the solution per administration.

20. ANS:

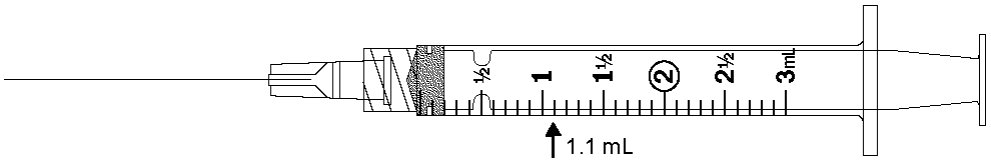
$\frac{1}{4}$ strength = 1 part Enfamil to 4 parts of solution

4 parts solution − 1 part Enfamil = 3 parts sterile water
3 parts sterile water = 3 x 8 = 24 ounces of sterile water.

21. ANS:

Reconstitute with 1.5 mL diluent for a total solution volume of 1.8 mL with a concentration of 280 mg/mL.

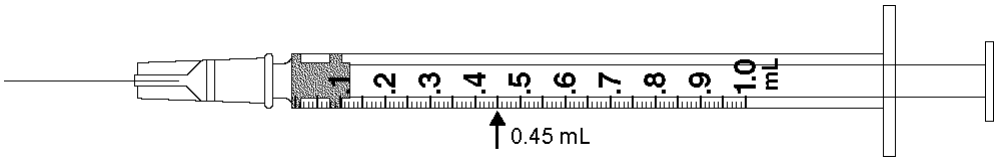
$$\frac{300\text{ mg}}{280\text{ mg}} \times 1\text{ mL} = 1.07\text{ mL} = 1.1\text{ mL}$$



22. ANS:

Reconstitute with 2.5 mL diluent (sterile water for injection) for a total solution volume of 3 mL with a concentration of 330 mg/mL.

$$\frac{150\text{ mg}}{300\text{ mg}} \times 1\text{ mL} = 0.454\text{ mL} = 0.45\text{ mL}$$



23. ANS:

$1\text{ g} = 1000\text{ mg}$

$$\frac{1000\text{ mg}}{330\text{ mg}} \times 1\text{ mL} = 3.03 = 3\text{ mL}$$

24. ANS:

$$\frac{750\text{ mg}}{330\text{ mg}} \times 1\text{ mL} = 2.27 = 2.3\text{ mL}$$

25. ANS:

$$\frac{125\text{ mg}}{50\text{ mg}} \times 1\text{ mL} = 2.5\text{ mL}$$

26. ANS:

$$\frac{375\text{ mg}}{250\text{ mg}} \times 5\text{ mL} = 7.5\text{ mL}$$

27. ANS:

$$\frac{20\text{ mg}}{100\text{ mg}} \times 1\text{ mL} = 0.2\text{ mL}$$

28. ANS:

$$\frac{7500\text{ U}}{10,000\text{ U}} \times 1\text{ mL} = 0.75\text{ mL}$$

29. ANS:

$$2.5\text{ mL} = 2.5 \div 5 = \frac{1}{2}\text{ t}$$

30. ANS:

$5000\ g = 5000 \div 1000 = 5\ kg$

per day, minimum

$5\ kg \times 50\ mg/kg = 250\ mg$

per day, maximum

$5\ kg \times 100\ mg/kg = 500\ mg$

31. ANS:

NS = 0.9% sodium chloride

= 0.9 g sodium chloride per 100 mL of solution

$$\frac{0.9\ g}{100\ mL} = \frac{X\ g}{1000\ mL}$$

$$100X = 900$$

$$\frac{100X}{100} = \frac{900}{100}$$

$$X = 9\ g$$

1 liter of NS contains 9 g of sodium chloride

32. ANS:

2 L = 2000 mL

$$\frac{mL}{h} = \frac{2000\ mL}{24\ h} = 83.3 = 83\ mL/h$$

33. ANS:

$$\frac{V}{T} \times C = R$$

$$\frac{50\ mL}{20\ min} \times \frac{20\ gtt}{mL} = 50\ gtt/min$$

34. ANS:

$$\frac{mL}{h} = \frac{200\ mL}{2\ h} = 100\ mL/h$$

$$\frac{mL/h}{\text{drop factor constant}} = \frac{100\ mL/h}{4} = 25\ gtt/min$$

or,

$$\frac{V}{T} \times C = R$$

$$\frac{200\ mL}{120\ min} \times \frac{15\ gtt}{mL} = 25\ gtt/min$$

35. ANS:

$$\text{BSA} = \sqrt{\frac{35 \times 40}{3131}}$$

$$= \sqrt{0.447}$$

$$= 0.668 = 0.67\ \text{m}^2$$

36. ANS:

10 kg × 100 mL/kg = 1000 mL per day for the first 10 kg

10 kg × 50 mL/kg = 500 mL per day for the next 10 kg

4 kg × 20 mL/kg = 80 mL per day for the remaining 4 kg

= 1580 mL per day

37. ANS:

$$\frac{D}{H} \times Q = X$$

$$\frac{20\ \text{mg}}{10\ \text{mg}} \times 1\ \text{mL} = 2\ \text{mL of the supplied Pepcid solution}$$

10 mL total IV solution − 2 mL Pepcid solution − 8 mL NS.

38. ANS:

6 h

40 U/kg × 70 kg = 2800 U or 2.8 mL

Increase rate by 2 U/kg/h

2 U/kg/h × 70 kg = 140 U/h

$$\text{Increase } \frac{140\ \text{U/h}}{100\ \text{U}} \times 1\ \text{mL} = 1.4\ \text{mL/h}$$

12.6 mL/h + 1.4 mL/h = 14 mL/h

Answers to Critical Thinking and Case Study Questions:

Week 1 Answers:

1. **List 7 possible causes of Atelectasis:**

Effects of anesthesia or analgesia; supine positioning; chest wall splinting because of pain; abdominal distention; abdominal obesity; retained secretions; reduced lung volumes due to musculoskeletal or neurologic disorders.

2. **List 7 possible clinical manifestations of Atelectasis:**

Dyspnea, cough, sputum production, tachycardia; tachypnea; pleural pain; central cyanosis

3. **List 7 nursing interventions that can be used to prevent Atelectasis:**

Frequent turning; early mobilization; coughing & deep breathing; incentive spirometry; suctioning; postural drainage; aerosol nebulizer treatments; chest percussion.

4. **The diagnosis of hospital-acquired pneumonia is usually associated with the presence of one of three conditions:**

   1. **Impaired host defenses**
   2. Inoculum of organisms that reach the lower respiratory tract.
   3. Presence of a highly virulent organism.

5. **Name three common pathogens that cause community acquired pneumonia:**

   1. Streptococcus pneumoniae
   2. Haemophilus influenza
   3. Staphylococcus aureus

6. **Pneumonia tends to occur in patients with one or more of these underlying disorders:**

   1. Alcoholism; 2. COPD; 3. AIDS; 4. diabetes mellitus;
   5. heart failure

7. **Three complications of pneumonia include:**

   1. Hypotension
   2 Shock
   3 Respiratory failure

Week 2 Answers:

1. **Chronic airway inflammation in COPD results in:**

Chronic inflammation that results in the following: increased goblet cells and enlarged submucosal glands (proximal airways), inflammation and airway narrowing (peripheral airways), and a narrowing of the airway lumen.

2. **Define the term emphysema:**

Emphysema is an abnormal distention of the air spaces, beyond the terminal bronchioles, that results in destruction of the walls of the alveoli.

3. **A genetic risk factor for COPD is:**

A deficiency in alpha-antitrypsin, an enzyme inhibitor that protects the lungs.

4. **Primary symptoms associated with the progressive disease of obstructive lung disease are:**

Chronic cough, sputum production, and dyspnea on exertion.

5. **List major factors that determine the clinical course and survival of patients with obstructive lung disease:**

History of cigarette smoking; passive smoking exposure; age; rate of decline in FEV1; hypoxemia; weight loss; reversibility of airflow obstruction; pulmonary artery pressure; and resting heart rate.

6. **The singe most cost effective intervention to reduce the risk for developing COPD or slow its progression is:**

Cessation of smoking

7. **List three ways that bronchodilators relieve bronchospasm:**

Alter smooth muscle tone; reduce airway obstruction; improve alveolar ventilation.

8. **Primary causes for an acute exacerbation of COPD are:**

Tracheobronchial infection; air pollution.

9. **To help prevent infections in patients with COPD, the nurse should recommend vaccination against two organisms:**

Streptococcus pneumoniae; Haemophilus influenzae

10. **The most common symptoms of asthma include:**

Allergy; cough; wheezing; dyspnea

11. **Complications of asthma include:**

Status asthmaticus; respiratory failure; pneumonia, Atelectasis

<u>Emphysema Case Study: (correct answers highlighted):</u>

Maria, who has had emphysema for 25 years, is admitted to the hospital with a diagnosis of bronchitis.

1. During assessment, the nurse notes the presence of a "barrel chest"', which the nurse knows is caused by:
   a. A compensatory expansion of the bronchial airway.
   b. A decrease in intrapleural pressure,
   c. Air trapping" in the lungs.*
   d. A progressive increase in vital capacity.

2. The nurse recognizes the need to be alert for the major presenting symptom of emphysema, which is:
a. Bradypnea.
b. **Dyspnea**.*
c. Expiratory wheezing.
d. Fatigue.

3. Arterial blood gas measurements that are consistent with a diagnosis of emphysema are:
a. pH 7.32; paO2 70mm Hg; PaCO2 50 mm Hg.*
b. pH7.37; PaO2 90 mmHg; PaCO2 42 mm Hg.
c. pH 7.39; PaO2 80 mm Hg; PaCO2 35 mm Hg.
d. pH 7.40; PaO2 85 mmHg; PaCO2 42 mm Hg.

4. Oxygen is prescribed for Maria. The nurse knows that the most effective delivery system is:
a. A rebreathing bag that delivers oxygen at a concentration grater than 60%.
b. An oxygen mask set at 8 L/min.
c. A nasal cannula set at 6l/MIN.
d. A Venturi mask that delivers a predictable oxygen flow at about 24%.*

5. In planning care for Maria, which interventions are best to implement? (Select all that apply)

a. Provide rest periods between activities, such as bathing, meals, and ambulation.*
b. Place the patient in a supine position after meals to allow for rest.
c. Schedule drug administration around routine activities to increase adherence to drug therapy.*
d. Arrange chairs in strategic locations to allow the patient to walk and rest.*
e. Encourage the patient to have an annual flu vaccination. *

Week 3 Answers:

Week 3: Exemplar: Care of the Patient with cardiovascular risk factors – hypertension.

1. **Blood pressure is the product of cardiac output (CO) multiplied by peripheral resistance (PVR).**

2. **Cardiac output is the product of heart rate (HR) multiplied by stroke volume (SV).**

3. **Prolonged hypertension can cause significant damage to blood vessels in four "target organs":**

   Heart, kidneys, brain, eyes

4. **List serious consequences prolonged, uncontrolled hypertension on the body and its systems:**

Myocardial infarction, heart failure, renal failure, stroke, impaired vision, left ventricular hypertrophy.

5. **Give examples of conditions that can trigger a hypertensive emergency in which blood pressure must be immediately lowered:**

Acute myocardial infarction, a dissecting aortic aneurysm, intracranial hemorrhage, hypertension associated with pregnancy.

6. **List 7 modifiable risk factors for coronary artery disease:**

   Hyperlipidemia, cigarette smoking, obesity, hypertension, diabetes mellitus, metabolic syndrome, physical inactivity.

7. **Management of coronary artery disease requires a therapeutic range of cholesterol and lipoproteins.**
   An acceptable blood level of total cholesterol is less than 200 mg/dL, with an LDL/HDL ratio of 3.5 to 1. T
   The desired level of LDL should be less than 100 mg/dL, and
   the HDL level should be greater than 60 mg/dL.
   Triglycerides should be less than 150 mg/dL.

Case Study: George, a 45 year old has primary hypertension after serial blood pressure readings average 150/98.

1. Renal pathology associated with hypertension can be identified by:

e. Urine output greater than 2,000 mL in 24 hours.
f. A urine specific gravity of 1.005.
g. Hyponatremia and decreased urine osmolality.
h. Increased blood urea nitrogen and creatinine levels.*

6. Health education for George includes advising him to:

e. Adhere to his dietary regimen.
f. Become involved in a regular of exercise.
g. Take all medication as prescribed.
h. Do all of the above.*

7. George was prescribed the following angiotensin-converting enzyme (ACE) inhibitor, which has a rapid onset of action within 15 minutes.

e. Altace
f. Capoten*
g. Lotensin
h. Vasotec

8. An example of a potassium-sparing diuretic tat might be prescribed later in the treatment of hypertension includes:

e. Spironolactone (Aldactone)*
f. Mykrox
g. Zaroxolyn
h. Furesomide (Lasix)

9. The nurse is assessing for postural hypotension recognizes that the following is a positive sign:

e. A heart rate of 5 to 20 beats per minute (bpm) above the resting rate
f. A n unchanged diastolic blood pressure
g. An increase of 10mm Hg reading*
h. An decrease of 5 mm Hg reading

Care of the patient with coronary artery disease:

4. **An example of a beta blocker, administered to decrease automaticity, is frequently prescribed for patients with coronary artery disease includes:**

e. Cardizem
f. Cordarone
g. Metoprolol (Lopressor)*
h. Rythmol

5. **A non-modifiable risk factor for atherosclerosis is:**

e. Stress
f. Obesity
g. Positive family history*
h. Hyperlipidemia

6. **The first heart sound is generated by:**

e. Closure of the aortic valve
f. Closure of the atrioventricular valves*
g. Opening of the atrioventricular vales
h. Opening of the pulmonic valve

Match the terminology associated with coronary atherosclerosis in column II with its function/characteristic listed in column I:

Column I:

1. **d - A principal blood lipid**
2. **g - A risk factor that causes pulmonary damage**
3. **a - The functional lesion of atherosclerosis**
4. **f - Biochemical substances, soluble in fat, that accumulate within a blood vessel.**
5. **h - A risk factor that is endocrine in origin.**
6. **j - A risk factor associated with type A personality**
7. **b - A risk factor related to weight gain.**
8. **i - A recommended dietary restriction that is a risk factor for heart disease**
9. **c - A symptom of myocardial ischemia**
10. **e - A lifestyle habit that is considered a modifiable risk factor for heart disease**

Column II

a. Atheroma	**e. Inactivity**	**i. Fat**
b. Obesity	**f. Lipids**	**j. stress**
c. Chest pain	**g. Smoking**	
d. cholesterol	**h. diabetes mellitus**	

Week 4 Answers:

Examining associations: Read each analogy, then add the best response in the space provided:

6. **The pulmonary artery : lungs :: Aorta : arterial system through the body .**

7. **Epicardium : outer layer of cells lining the heart :: Myocardium : the heart muscle itself.**

8. **Apical area of the heart : fifth intercostal space :: Erb's point : 3rd intercostal space.**

9. **The first heart sound : closure of the mitral and tricuspid valves :: the second heart sound : closure of the aortic and pulmonic valve.**

10. **Murmurs : malfunctioning valves :: friction rubs : abrasion of the pericardial surfaces.**

Exemplar: Care of the Patient with Chest Pain

Mr. Anderson, a 45-year old executive with a major oil firm. Lately he has experienced frequent episodes of chest pressure that are relieved with rest. Today his pain was not relieved with rest. His wife called 911 and he is being evaluated in the ED.

6. Lumen narrowing with atherosclerosis is caused by:

e. Atheroma formation on the intima.
f. Scarred endothelium.
g. Thrombus formation.
h. All of the above.*

7. The pain of angina pectoris is produced primarily by:

e. **Coronary vasoconstriction**.*
f. Movement of thromboemboli.
g. Myocardial ischemia.
h. The presence of atheromas.

8. Mr. Anderson received sublingual nitroglycerin immediately ipon arrival to the ED. The nurse informs him that this medication should work within:

e. 3 to 4 minutes.*
f. 10 to 15 minutes.
g. 30 minutes.
h. 60 minutes.

9. **Mr. Anderson is given a beta-adrenergic blocker orally. This medication administration is based on the scientific rationale supporting this drug's ability to:**

e. **Block sympathetic impulses to the heart**.*
f. Elevate blood pressure.
g. Increase myocardial contractility.
h. Induce bradycardia.

10. Mr. Anderson is deemed a candidate for percutaneous coronary angioplasty (PRCA) based on the extent of the coronary blockage. The procedure is performed on patients who:

e. Have compromised left ventricular function.
f. Have had angina for more than 3 years.
g. Have at lest 70% occlusion of a major coronary artery.*
h. Have questionable left ventricular function.

Exemplar: Care of the Patient with Heart Failure

Match the type of ventricular heart failure listed in Column II with its associated pathophysiology in Column I by placing either an "a"' or "b" :

Column I	**Column II**
1. __a__ Fatigability	**a. Left-sided heart failure**
2. __b__ Dependent edema	**b. Right-sided heart failure**
3. __a__ Pulmonary congestion predominates	
4. __b__ Distended neck veins	
5. __b__ Ascites	
6. __a__ Dyspnea from fluid in alveoli	
7. __a__ Orthopnea	
8. __b__ Hepatomegly	
9. __a__ Cough that may be blood-tinged	
10. __b__ Nocturia	

Multiple Choice:

7. The dominant function in cardiac failure is:

e. Ascites.
f. Hepatomegaly.
g. **Inadequate tissue perfusion**.*
h. Nocturia.

8. On assessment, the nurse knows that the presence of pitting edema indicates fluid retention of at least:

e. 4 lb.
f. 6 lb.
g. 8 lb.
h. 10 lb.*

9. The diagnosis of heart failure is usually confirmed by:

e. Chest x-ray.
f. An echocardiogram.*
g. An electrocardiogram.
h. Ventriculogram

10. **A key diagnostic laboratory test for heart failure is the:**.

e. Blood urea nitrogen (BUN).
f. Complete blood count (CBC).
g. B-type natriuretic peptide. (BNP).*
h. Serum electrolyte counts.

11. The goal of collaborative care for heart failure includes (Circle all that are correct):

e. Decreasing oxygen needs of the heart.*
f. Increasing cardiac output by strengthening muscle contraction.*
g. Reducing the amount of circulating blood.*
h. **Increasing cardiac output by decreasing peripheral vascular resistance**.*

12. The patient in congestive heart failure is often prescribed Digoxin, cardiac glycoside that strengthens cardiac contraction and increases vagal tone. The nurse knows to check the Digoxin level prior to initiating or continuing Digoxin. A therapeutic digoxin level should be within:

e. 0.25 to 0.35 mg/mL
f. 0.30 to 4.0 mg/mL
g. **0.5 to 2.0 mg/mL***
h. 2.5 to 4.9 mg/mL

Week 5 Answers – Care of the patient with <u>alterations in cardiovascular tissue perfusion and cardiac output related to venous thrombosis, pulmonary embolism, and peripheral vascular problems.</u>

<u>Examplar: Care of the Patient with Venous thrombosis and Pulmonary Embolism:</u>

Clinical Decision-making Guide: Chapter 34:

Page 275: Questions 1-42; 53, 54, 59, 63.

Answers page 700.

6. A significant cause of venous thrombosis is:

a. Altered blood coagulation.
b. Stasis of blood.
c. Vessel wall injury.
d. All of the above.*

7. Clinical manifestations of deep vein obstruction include:

a. Edema and limb pain.
b. Ankle engorgement.
c. Leg circumference difference.
d. **All of the above**.*

8. When administering heparin anticoagulant therapy, te nurse needs to monitor the clotting time to make certain that it is within the therapeutic range of:

a. 1 to 1.5 times the normal control.
b. 1.5 to 2.5 times the normal control.*
c. 3.5 times the normal control.
d. 4.5 times the normal control.

9. When caring for a patient who has started anticoagulant therapy with warfarin (Coumadin), the nurse knows not to expect therapeutic benefits for:

a. At least 12hours.
b. The first 24 hours.
c. 2 to 3 days.
d. 3 to 5 days.*

10. List the classic triad (Virchow's) of factors associated with the development of venous thromboembolism: venous stasis, vessel wall injury, altered blood coagulation.

Exemplar: Care of the Patient with peripheral vascular disease:

6. **The most important factor in regulating the caliber of blood vessels, which determines resistance to flow, is:**

e. Hormonal secretion.
f. Independent arterial wall activity.
g. The influence of circulating chemicals.
h. The sympathetic nervous system.*

7. **Clinical manifestations of acute venous insufficiency include all of the following except:**

e. Cool and cyanotic skin.
f. Initial absence of edema.*
g. Sharp pain that may be relieved by the elevation of the extremity.
h. Numbness and tingling in the affected extremity.

8. **Probably the strongest risk factor for the development of atherosclerotic lesions is:**

e. Cigarette smoking.*
f. Lack of exercise.
g. Obesity.
h. Stress.

9. **The hallmark symptom of peripheral arterial occlusive disease is:**

Intermittent claudication

10. **List six clinical symptoms associated with acute arterial embolism:**

Pain, pallor, pulselessness, paresthesia, poikilothermia (coldness), and paralysis.

Matching:

Match t he type of vessel insufficiency listed in column II with its associated symptom listed in column I:

Column I	Column II
9. a - Intermittent claudication.	**a. Arterial insufficiency.**
10. b - Paresthesia.	**b. Venous insufficiency.**
11. a- Dependent rubor.	
12. a - old, pale extremity.	
13. b - Ulcers of lower legs and ankles.	
14. a - Muscle fatigue and cramping.	
15. a - Diminished or absent pulses.	
16. a - Reddish-blue discoloration with dependency.	