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Practice Questions

Try all 30 first, then check the answer key at the back.

1. A physician orders 500 mL of lactated Ringer's solution to infuse over 4 hours. What is the correct infusion rate in mL/hr?

A. 100 mL/hr
B. 150 mL/hr
C. 200 mL/hr
D. 125 mL/hr

2. An order reads: Infuse 1500 mL D5W over 12 hours using tubing with a drop factor of 10 gtt/mL. What is the correct drip rate in drops per minute?

A. 25 gtt/min
B. 31 gtt/min
C. 21 gtt/min
D. 15 gtt/min

3. A patient weighing 70 kg requires dopamine at 5 mcg/kg/min. The solution concentration is 400 mg in 250 mL. What infusion rate in mL/hr should be set?

A. 21.0 mL/hr
B. 13.1 mL/hr
C. 10.5 mL/hr
D. 15.8 mL/hr

4. A medication order specifies 250 mg in 100 mL to infuse over 30 minutes. What is the infusion rate in mL/hr?

A. 200 mL/hr
B. 100 mL/hr
C. 150 mL/hr
D. 300 mL/hr

5. An IV is infusing at 125 mL/hr. Using tubing with a drop factor of 20 gtt/mL, what is the drip rate in drops per minute?

A. 25 gtt/min
B. 33 gtt/min
C. 50 gtt/min
D. 42 gtt/min

6. A vial contains 1 gram of medication powder. The reconstitution instructions state to add 9.6 mL of sterile water to yield 10 mL of solution. What is the final concentration in mg/mL?

A. 104 mg/mL
B. 150 mg/mL
C. 100 mg/mL
D. 96 mg/mL

7. A patient weighing 55 kg needs a loading dose of a medication at 15 mg/kg. How many milligrams should be administered?

A. 900 mg
B. 825 mg
C. 750 mg
D. 800 mg

8. An infusion of 1000 mL is running at 75 mL/hr. How many hours will it take for the infusion to complete?

A. 13.3 hours
B. 10.0 hours
C. 12.0 hours
D. 15.0 hours

9. A physician orders 2000 mL of 0.45 percent sodium chloride to infuse over 24 hours using microdrip tubing (60 gtt/mL). What is the drip rate in drops per minute?

A. 67 gtt/min
B. 100 gtt/min
C. 125 gtt/min
D. 83 gtt/min

10. A medication label states 50 mg/2 mL. The order is for 35 mg. How many milliliters should be drawn up?

A. 1.75 mL
B. 2.0 mL
C. 1.4 mL
D. 1.2 mL

11. An IV pump is infusing at 80 mL/hr. After 5 hours, how many milliliters will have been infused?

A. 500 mL
B. 400 mL
C. 320 mL
D. 450 mL

12. A patient weighing 80 kg requires heparin at 18 units/kg/hr. The heparin concentration is 25,000 units in 500 mL. What is the infusion rate in mL/hr?

A. 28.8 mL/hr
B. 24.0 mL/hr
C. 32.0 mL/hr
D. 36.0 mL/hr

13. An order reads: Infuse 750 mL over 6 hours using tubing with a drop factor of 15 gtt/mL. What is the drip rate in drops per minute?

A. 25 gtt/min
B. 38 gtt/min
C. 42 gtt/min
D. 31 gtt/min

14. A medication is available as 0.5 mg/mL. The order is for 750 mcg. How many milliliters should be administered?

A. 2.0 mL
B. 3.75 mL
C. 1.5 mL
D. 1.0 mL

15. An infusion of 250 mL is to be completed in 90 minutes. What is the infusion rate in mL/hr?

A. 200 mL/hr
B. 167 mL/hr
C. 125 mL/hr
D. 150 mL/hr

16. A patient requires nitroglycerin at 10 mcg/min. The concentration is 50 mg in 250 mL. What is the infusion rate in mL/hr?

A. 3 mL/hr
B. 2 mL/hr
C. 5 mL/hr
D. 6 mL/hr

17. An IV bag contains 1000 mL. It has been infusing at 100 mL/hr for 3 hours. How much fluid remains in the bag?

A. 600 mL
B. 750 mL
C. 800 mL
D. 700 mL

18. A medication order is for 0.25 grams. The vial is labeled 500 mg/10 mL. How many milliliters should be drawn up?

A. 2.5 mL
B. 7.5 mL
C. 5 mL

19. An infusion pump is set at 150 mL/hr. How many milliliters will infuse in 45 minutes?

A. 150 mL
B. 112.5 mL
C. 100 mL
D. 125 mL

20. A patient weighing 60 kg needs an antibiotic dosed at 40 mg/kg/day divided into three equal doses. How many milligrams should be given per dose?

A. 800 mg
B. 600 mg
C. 720 mg
D. 900 mg

21. A patient receiving 3 percent sodium chloride develops confusion, muscle twitching, and seizures. Which complication is most likely occurring?

A. Hyponatremia
B. Fluid overload
C. Hypocalcemia
D. Hypernatremia

22. Which IV solution is classified as isotonic and most appropriate for treating hypovolemia in a trauma patient?

A. 0.45 percent sodium chloride
B. 3 percent sodium chloride
C. 0.9 percent sodium chloride
D. 5 percent dextrose in water

23. A nurse is preparing to administer furosemide and gentamicin through the same IV line. What is the most appropriate action?

A. Dilute both medications together in a minibag
B. Flush the line with normal saline between medications
C. Administer both medications simultaneously
D. Mix the medications in one syringe

24. Which adverse effect requires immediate discontinuation of a vancomycin infusion?

A. Red man syndrome with flushing and hypotension
B. Mild nausea
C. Slight burning at the IV site
D. Elevated blood pressure

25. A patient with cerebral edema requires a hypertonic solution to reduce intracranial pressure. Which solution should be selected?

A. 0.45 percent sodium chloride
B. 5 percent dextrose in water
C. Lactated Ringer's solution
D. 3 percent sodium chloride

26. Which electrolyte must be diluted and administered slowly via infusion pump, never as IV push, due to risk of cardiac arrest?

A. Calcium gluconate
B. Magnesium sulfate
C. Potassium chloride
D. Sodium chloride

27. What is the primary mechanism of action of lactated Ringer's solution in treating metabolic acidosis?

A. Chloride enhances renal acid excretion
B. Lactate is converted to bicarbonate, buffering excess acid
C. Direct infusion of bicarbonate neutralizes acid
D. Sodium binds to hydrogen ions

28. A patient receiving D5W (5 percent dextrose in water) continuously for 24 hours is at risk for which complication?

A. Hyponatremia
B. Hypernatremia
C. Hyperkalemia
D. Metabolic acidosis

29. Which medication class requires monitoring for phlebitis and should be infused through a large vein or central line when possible?

A. Penicillin antibiotics
B. Normal saline
C. Acetaminophen
D. Vesicant chemotherapy agents

30. Before administering IV calcium gluconate, the nurse should assess for concurrent infusion of which incompatible solution?

A. 5 percent dextrose in water
B. Lactated Ringer's solution
C. Sodium bicarbonate
D. Normal saline

Answer Key & Explanations

1. D — 125 mL/hr
To calculate mL/hr, divide the total volume by the time in hours: 500 mL divided by 4 hours = 125 mL/hr.

2. C — 21 gtt/min
Using the formula (Volume × Drop factor) divided by Time in minutes: (1500 × 10) divided by 720 minutes = 15000 divided by 720 = 20.8, which rounds to 21 gtt/min.

3. B — 13.1 mL/hr
First calculate the dose: 70 kg × 5 mcg/kg/min = 350 mcg/min. Convert to mg/min: 350 mcg divided by 1000 = 0.35 mg/min. Convert to mg/hr: 0.35 × 60 = 21 mg/hr. Calculate concentration: 400 mg in 250 mL = 1.6 mg/mL. Finally: 21 mg/hr divided by 1.6 mg/mL = 13.125 mL/hr, rounds to 13.1 mL/hr.

4. A — 200 mL/hr
To convert 30 minutes to an hourly rate: 100 mL in 30 minutes equals 100 mL divided by 0.5 hours = 200 mL/hr. Alternatively, 100 mL × 2 (since 30 min is half an hour) = 200 mL/hr.

5. D — 42 gtt/min
Convert mL/hr to mL/min first: 125 mL/hr divided by 60 min = 2.083 mL/min. Then multiply by drop factor: 2.083 × 20 = 41.66, which rounds to 42 gtt/min. Alternatively, use the formula: (mL/hr × Drop factor) divided by 60 = (125 × 20) divided by 60 = 41.66, rounds to 42 gtt/min.

6. C — 100 mg/mL
Convert 1 gram to milligrams: 1 g = 1000 mg. The final volume is 10 mL. Concentration = 1000 mg divided by 10 mL = 100 mg/mL.

7. B — 825 mg
Multiply the patient's weight by the dose per kilogram: 55 kg × 15 mg/kg = 825 mg.

8. A — 13.3 hours
Divide the total volume by the infusion rate: 1000 mL divided by 75 mL/hr = 13.33 hours, which is approximately 13 hours and 20 minutes.

9. D — 83 gtt/min
Using the formula (Volume × Drop factor) divided by Time in minutes: (2000 × 60) divided by 1440 minutes = 120000 divided by 1440 = 83.33, which rounds to 83 gtt/min. With microdrip (60 gtt/mL), the drip rate equals the mL/hr rate numerically: 2000 divided by 24 = 83.33 mL/hr = 83 gtt/min.

10. C — 1.4 mL
Set up a proportion: 50 mg / 2 mL = 35 mg / X mL. Cross multiply: 50X = 70. Solve for X: X = 70 divided by 50 = 1.4 mL.

11. B — 400 mL
Multiply the infusion rate by the time: 80 mL/hr × 5 hours = 400 mL.

12. A — 28.8 mL/hr
Calculate the dose: 80 kg × 18 units/kg/hr = 1440 units/hr. Calculate concentration: 25000 units in 500 mL = 50 units/mL. Calculate rate: 1440 units/hr divided by 50 units/mL = 28.8 mL/hr.

13. D — 31 gtt/min
Using the formula (Volume × Drop factor) divided by Time in minutes: (750 × 15) divided by 360 minutes = 11250 divided by 360 = 31.25, which rounds to 31 gtt/min.

14. C — 1.5 mL
First convert the order to the same units as the available concentration. 750 mcg = 0.75 mg. Set up proportion: 0.5 mg / 1 mL = 0.75 mg / X mL. Solve: X = 0.75 divided by 0.5 = 1.5 mL.

15. B — 167 mL/hr
Convert minutes to hours: 90 minutes = 1.5 hours. Calculate rate: 250 mL divided by 1.5 hours = 166.67 mL/hr, which rounds to 167 mL/hr.

16. A — 3 mL/hr
Convert dose to same units: 10 mcg/min = 0.01 mg/min. Convert to mg/hr: 0.01 × 60 = 0.6 mg/hr. Calculate concentration: 50 mg in 250 mL = 0.2 mg/mL. Calculate rate: 0.6 mg/hr divided by 0.2 mg/mL = 3 mL/hr.

17. D — 700 mL
Calculate amount infused: 100 mL/hr × 3 hours = 300 mL. Subtract from total: 1000 mL - 300 mL = 700 mL remaining.

18. C — 5 mL
Convert grams to milligrams: 0.25 g = 250 mg. Determine concentration: 500 mg in 10 mL = 50 mg/mL. Calculate volume: 250 mg divided by 50 mg/mL = 5 mL.

19. B — 112.5 mL
Convert time to hours: 45 minutes = 0.75 hours. Calculate volume: 150 mL/hr × 0.75 hours = 112.5 mL.

20. A — 800 mg
Calculate total daily dose: 60 kg × 40 mg/kg/day = 2400 mg/day. Divide by number of doses: 2400 mg divided by 3 doses = 800 mg per dose.

21. D — Hypernatremia
3 percent sodium chloride is a hypertonic solution that can cause rapid shifts in sodium levels. These neurological symptoms indicate hypernatremia from too rapid correction or overinfusion, causing cellular dehydration in the brain.

22. C — 0.9 percent sodium chloride
0.9 percent sodium chloride (normal saline) is an isotonic crystalloid solution with osmolarity similar to blood plasma. It is the first-line fluid for volume resuscitation in trauma because it expands intravascular volume without causing fluid shifts between compartments.

23. B — Flush the line with normal saline between medications
Furosemide and gentamicin are incompatible when mixed together as they form a precipitate. The line must be flushed with normal saline between administrations to prevent chemical incompatibility and ensure patient safety.

24. A — Red man syndrome with flushing and hypotension
Red man syndrome is a histamine-mediated reaction to rapid vancomycin infusion characterized by flushing, pruritus, and hypotension affecting the face, neck, and upper torso. The infusion must be stopped immediately and the provider notified.

25. D — 3 percent sodium chloride
3 percent sodium chloride is a hypertonic solution with higher osmolarity than plasma. It draws fluid from the interstitial and intracellular spaces into the vascular space, thereby reducing cerebral edema and intracranial pressure.

26. C — Potassium chloride
Potassium chloride must always be diluted and infused slowly via pump because rapid administration or bolus injection can cause fatal cardiac arrhythmias and cardiac arrest. Direct IV push of potassium is never appropriate.

27. B — Lactate is converted to bicarbonate, buffering excess acid
Lactated Ringer's contains lactate, which is metabolized by the liver to bicarbonate. This bicarbonate acts as a buffer to neutralize excess hydrogen ions, thereby correcting metabolic acidosis and restoring normal pH balance.

28. A — Hyponatremia
D5W is initially isotonic but becomes hypotonic once dextrose is metabolized. Prolonged infusion causes fluid to shift into cells, diluting extracellular sodium and resulting in hyponatremia with symptoms such as confusion and lethargy.

29. D — Vesicant chemotherapy agents
Vesicant chemotherapy agents cause severe tissue damage if extravasated and are highly irritating to vessel walls, leading to phlebitis. They should be administered through large veins or preferably central lines to minimize risk.

30. C — Sodium bicarbonate
Calcium gluconate is incompatible with sodium bicarbonate and forms a precipitate when mixed. The two should never be infused through the same line simultaneously, as this creates a chemical incompatibility hazard.

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