Textbook of Laboratory and Diagnostic Testing 1st edition Leeuwen Test Bank

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Chapter 2

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

____ 1. A 40-year-old male patient who was just admitted to the emergency room was in an automobile accident and has suffered major trauma. He is estimated to have lost 2 L of blood, and his normal weight is 75 kg. Based on the average total blood volume per kilogram of body weight, the nurse should recognize that this patient has lost what percentage of his total blood volume?
1. 18%
2. 28%
3. 38%
4. 48%

____ 2. A 21-year-old woman just underwent an emergency Cesarean section and lost 1 L of blood during the procedure. Her weight before becoming pregnant was 55 kg. Assuming that her blood volume increased 50% over her pre-pregnancy volume during her pregnancy, and based on the average total blood volume per kilogram of body weight, the nurse should recognize that this patient has lost what percentage of her total blood volume during the Cesarean section?
1. 17%
2. 27%
3. 37%
4. 47%

____ 3. A patient with anemia has just learned that her bone marrow is not producing as many red blood cells as her body requires. The patient says, "Why does my body need to make new blood cells? Don't I have enough already?" The nurse should explain to the patient that a mature red blood cell has an average life span of how many days?
1. 30 days
2. 60 days
3. 120 days
4. 240 days

____ 4. A patient has just been diagnosed with iron-deficiency anemia. The nurse knows that the majority of iron in the body is found in which form?
1. Myoglobin
2. Hemoglobin
3. Ferritin
4. Hemosiderin

____ 5. A patient has just received laboratory test results that indicate a decrease in white blood cells (WBCs). The nurse is aware that this finding is associated with which of the following conditions?
1. Leukopenia
2. Leukocytosis
3. Leukopoiesis
4. Bandemia

____ 6. A patient's laboratory test results indicate a reduced monocyte count. The nurse knows that the primary role of this type of cell is which of the following?
1. Response to inflammation
2. Cellular mediator of immunity

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3. Phagocytosis
4. Prevention of bleeding

____ 7. A charge nurse observes a new nurse preparing to collect a blood specimen above an intravenous (IV) infusion site. The charge nurse stops the new nurse from doing so and provides teaching. Which of the following should the charge nurse explain is the result of collecting a specimen above an IV infusion site?
1. Anticoagulant excess relative to plasma volume
2. Hemolyzed specimen
3. Falsely increased hemoglobin (Hgb) and hematocrit (Hct) levels
4. Falsely decreased red blood cell levels

____ 8. In performing a venipuncture, the nurse is careful to remove the tourniquet as quickly as possible once an appropriate vein has been identified and the needle inserted. The nurse understands that leaving the tourniquet on too long can result in which of the following?
1. Anticoagulant excess relative to plasma volume
2. Hemolyzed specimen
3. Falsely increased hemoglobin (Hgb) and hematocrit (Hct) levels
4. Falsely decreased red blood cell levels

____ 9. A nurse is reviewing a patient's hematocrit (Hct). The nurse understands that this measure depends primarily on the number of which of the following?
1. White blood cells
2. Platelets
3. Lymphocytes
4. Red blood cells

____ 10. Throughout the course of a day at a clinic, the nurse performs blood testing on a number of patients and reviews the results. Which of the following healthy patients should the nurse most expect to have the lowest hemoglobin (Hgb) level?
1. 20-year-old African American man
2. 33-year-old Caucasian woman
3. 15-year-old Asian girl
4. 41-year-old Mexican American man

____ 11. A patient's laboratory test results indicate an elevated hemoglobin level. The nurse is aware that this finding is consistent with which of the following conditions?
1. Bone marrow hyperplasia
2. Hemolytic anemia
3. Chronic obstructive pulmonary disorder
4. Renal disease

____ 12. A patient's laboratory test results indicate an elevated red blood cell (RBC) count. The nurse is aware that which emotional state can cause this result?
1. Anxiety
2. Depression
3. Boredom
4. Joy

____ 13. A patient's laboratory test results indicate an elevated red blood cell (RBC) count. The nurse knows the patient has a condition in which the bone marrow overproduces RBCs. Which condition does this patient most likely have?
1. Hemoglobinopathy
2. Hodgkin's disease

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3. Polycythemia vera
4. Subacute endocarditis

____ 14. A complete blood count has been ordered for a patient. The nurse understands that the red blood cell (RBC) indices are most helpful in diagnosing which of the following conditions?
1. Iron-deficiency anemia
2. Polycythemia vera
3. Hemophilia
4. Hodgkin's disease

____ 15. A patient's mean corpuscular volume (MCV) is elevated. Which condition should the nurse most suspect in this patient?
1. Alcoholism
2. Iron-deficiency anemia
3. Thalassemia
4. Microcytic anemia

____ 16. A nurse is responsible for performing venipuncture to obtain a blood sample for a complete blood count, including red blood cell indices, on a patient who is undergoing a blood transfusion. How long after the transfusion should the nurse wait before performing the venipuncture?
1. 1 hour
2. 6 hours
3. 12 hours
4. 24 hours

____ 17. A patient with alcoholic cirrhosis with hemolytic anemia has undergone testing for red blood cell (RBC) morphology and inclusions. Which of the following red blood cell shapes should the nurse expect to find in this patient?
1. Dacryocytes
2. Codocytes
3. Burr cells
4. Acanthocytes

____ 18. A patient suspected of lead poisoning is undergoing blood testing for red blood cell (RBC) inclusions. Which inclusion should the nurse most expect to find in this patient?
1. Basophilic stippling
2. Hgb C crystals
3. Howell-Jolly bodies
4. Pappenheimer bodies

____ 19. A nurse is reviewing a patient's laboratory test results following a complete blood count. Which measure on the test results would most inform the nurse regarding a possible infection?
1. Platelets
2. Red blood cell count
3. White blood cell count
4. Hemoglobin

____ 20. A nurse is reviewing a healthy patient's laboratory test results following a white blood cell (WBC) count and differential. Which type of WBC should the nurse expect to be the most abundant?
1. Lymphocytes
2. Neutrophils
3. Monocytes
4. Eosinophils

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____ 21. A nurse learns that transport of a blood sample collected 2 hours ago to the laboratory for erythrocyte sedimentation rate analysis has been delayed. It will be at least 3 more hours before the sample can be delivered to the lab and tested. Which action should the nurse take?
1. Pack the sample in ice.
2. Place the sample in a dark area at room temperature.
3. Refrigerate the sample at 3°C (37.4°F).
4. Discard the sample and obtain another from the patient.

____ 22. A nurse reviews a patient's laboratory test results and sees that the patient has a reticulocyte count of 4%, a hematocrit (Hct) of 25% (compared with a normal Hct of 45%), and a maturation time of 2 days. What is this patient's reticulocyte production index (RPI)?
1. 0.03
2. 0.6
3. 1.1
4. 4.3

____ 23. A patient's laboratory test results indicate an increased reticulocyte count. Which of the following conditions should the nurse most suspect in this patient?
1. Blood loss
2. Alcoholism
3. Aplastic anemia
4. Renal disease

____ 24. A nurse is interpreting the results of a sickle cell screen for a 1 month old. The nurse should keep in mind that an elevated level of which of the following hemoglobin (Hgb) variants is a normal finding for this patient?
1. Hgb C Harlem
2. Hgb D
3. Hgb S
4. Hgb F

Multiple Response
Identify one or more choices that best complete the statement or answer the question.

____ 25. A nurse is explaining the role of blood to a 12-year-old patient who is receiving a blood transfusion. Which of the following functions of blood should the nurse mention? *Select all that apply.*
1. Transportation of oxygen and nutrients to body cells
2. Transmission of nerve impulses
3. Removal of carbon dioxide
4. Regulation of body temperature
5. Production of movement in the body

____ 26. A nurse is explaining to a patient who will be receiving a bone marrow transplant that blood cell formation in adults occurs in the red marrow of which of the following bones? *Select all that apply.*
1. Skull
2. Radius
3. Sternum
4. Vertebral bodies
5. Pelvis

____ 27. A nurse is obtaining information from a patient regarding her health history. Which of the following questions would be appropriate to ask to help diagnose disorders of the hematopoietic system? *Select all that apply.*

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1. Have you experienced any shortness of breath recently?
2. Do you feel fatigued?
3. Have you been getting sick or having fevers more often than usual?
4. Have you had your appendix removed?
5. Have any of your family members been diagnosed with any type of anemia?

____ 28. A nurse is concerned that a patient may not be able to sit still during a venipuncture procedure. The nurse knows that which of the following factors are likely to contribute to a patient being unable to remain still? *Select all that apply.*
1. Age
2. Significant pain
3. Gender
4. Mental status
5. Diet

____ 29. A nurse is prepared to perform blood collection on an infant. Which of the following actions should the nurse take? *Select all that apply.*
1. Ask the parent to leave the room.
2. Keep the child covered.
3. Provide the child with a pacifier or gentle touch.
4. Prepare a venipuncture site above an intravenous infusion.
5. Keep the room temperature cool.

____ 30. A patient's laboratory test results indicate an elevated hematocrit (Hct). The nurse recognizes that this finding is associated with which of the following conditions? *Select all that apply.*
1. Anemia
2. Burns
3. Congestive heart failure
4. Dehydration
5. Cirrhosis

____ 31. A patient's laboratory test results indicate a decreased hematocrit (Hct). The nurse recognizes that this finding is associated with which of the following conditions? *Select all that apply.*
1. Carcinoma
2. High altitudes
3. Hemorrhage
4. Polycythemia
5. Leukemia

____ 32. A nurse is reviewing a patient's laboratory test results and notes that the hemoglobin (Hgb) level is higher than what the nurse usually sees in patients. Which of the following factors could explain this finding? *Select all that apply.*
1. Newborn patient
2. Recumbent position during blood collection
3. Lipemia present
4. Severe copper deficiency
5. Acute blood loss

____ 33. To prevent agglutinins from falsely increasing the mean corpuscular volume (MCV) and decreasing the red blood cell (RBC) count in a blood sample, the nurse understands that which of the following actions should be taken by appropriate personnel? *Select all that apply.*
1. Dilute the sample with warmed saline.

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2. Reduce anxiety in the patient before collection.
3. Ask the patient to not exercise before collection.
4. Warm the blood sample.
5. Protect the sample from direct sunlight during transport.

____ 34. A patient's laboratory test results indicate the presence of schistocytes in the red blood cells. The nurse should most suspect which of the following conditions in this patient? *Select all that apply.*
1. Burns
2. Metastases to the bone marrow
3. Cardiac valve disease
4. Tuberculosis
5. Glomerulonephritis

____ 35. A patient's laboratory test results indicate an elevated white blood cell (WBC) count. The nurse should recognize that which of the following normal physiological and environmental conditions could explain this finding? *Select all that apply.*
1. The patient is 1 month old.
2. The specimen was collected at 7:30 in the morning.
3. The patient is chronically anxious.
4. The patient was outside in 101°F (38.3°C) weather just before venipuncture.
5. The patient had just been to the gym before blood collection.

____ 36. A patient's laboratory test results indicate neutropenia. The nurse should recognize that which of the following pathological conditions could explain this finding? *Select all that apply.*
1. Acromegaly
2. Mononucleosis
3. Anorexia nervosa
4. Acute hemorrhage
5. Myelocytic leukemia

____ 37. A nurse learns that a patient's erythrocyte sedimentation rate (ESR) is increased. The nurse knows that which of the following factors could lead to this finding? *Select all that apply.*
1. Increased fibrinogen levels
2. Inflammation
3. Increased viscosity
4. Decreased rouleaux formation
5. Increased plasma volume

____ 38. A nurse is reviewing a patient's laboratory test results following hemoglobin electrophoresis. The nurse should recognize the presence of which of the following hemoglobin (Hgb) forms as inherited hemoglobinopathies? *Select all that apply.*
1. Hgb A
2. Hgb C
3. Hgb D
4. Hgb E
5. Hgb F

____ 39. A patient's laboratory test results indicate an increased hemoglobin (Hgb) A_2 level. The nurse understands that this finding is consistent with which of the following conditions? *Select all that apply.*
1. Iron-deficiency anemia (untreated)
2. Hyperthyroidism
3. Megaloblastic anemia

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4. Erythroleukemia
5. Sickle trait

____ 40. A patient's laboratory test results are positive for sickle cell trait. The nurse knows that which of the following hemoglobin (Hgb) variants are indicative of these results? *Select all that apply.*
1. Hgb S
2. Hgb A
3. Hgb C Harlem
4. Hgb F
5. Hgb E

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Chapter 2
Answer Section

MULTIPLE CHOICE

1. ANS: 3
   Rationale: The average total blood volume is estimated at 70 mL/kg body weight. The estimated blood volume of this patient is as follows: 70 mL/kg × 75 kg = 5,250 mL. The amount of blood lost, 2 L, may be converted to milliliters as follows: 2 L × 1,000 = 2,000 mL. The amount of blood lost as a percentage of total blood volume before the loss may be calculated as follows: 2,000 mL/5,250 mL = 0.38 (rounded off) = 38%.

   Page: 129
   Heading: Overview
   Integrated Processes: Nursing Process
   Client Need: Physiological Integrity: Reduction of Risk Potential
   Cognitive Level: Analysis [Analyzing]
   Concept: Perfusion
   Difficulty: Difficult

   PTS: 1 CON: Perfusion
2. ANS: 1
   Rationale: The average total blood volume is estimated at 70 mL/kg body weight. The estimated blood volume of this patient before pregnancy may be calculated as follows: 70 mL/kg × 55 kg = 3,850 mL. To calculate her blood volume immediately before the procedure, multiply her pre-pregnancy volume by 50%, or 0.5, and then add this value to her pre-pregnancy volume: 3,850 mL × 0.5 = 1,925 mL + 3,850 mL = 5,775 mL. The amount of blood lost, 1 L, may be converted to milliliters as follows: 1 L × 1,000 = 1,000 mL. The amount of blood lost as a percentage of total blood volume before the loss may be calculated as follows: 1,000 mL/5,775 mL = 0.17 (rounded off) = 17%.

   Page: 129
   Heading: Overview
   Integrated Processes: Nursing Process
   Client Need: Physiological Integrity: Reduction of Risk Potential
   Cognitive Level: Analysis [Analyzing]
   Concept: Perfusion
   Difficulty: Difficult

   PTS: 1 CON: Perfusion
3. ANS: 3
   Rationale: The mature red blood cell is a biconcave disk with an average life span of 120 days.

   Page: 131
   Heading: Overview
   Integrated Processes: Teaching and Learning
   Client Need: Physiological Integrity: Physiological Adaptation
   Cognitive Level: Application [Applying]
   Concept: Perfusion
   Difficulty: Easy

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PTS: 1 CON: Perfusion

4. ANS: 2
Rationale: The human body contains between 4 and 5 grams of iron, about 65% of which is present in hemoglobin and 3% of which is present in myoglobin, the oxygen storage protein found in skeletal and cardiac muscle. Excess iron is stored in the liver and spleen as ferritin and hemosiderin.

Page: 132
Heading: Overview
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

5. ANS: 1
Rationale: Leukocytosis reflects an increase in the WBC count, whereas leukopenia reflects a decrease in the WBC count. Leukopoiesis is the production of WBCs that occurs mainly in the hematopoietic or red bone marrow. Bandemia is defined by the presence of greater than 10% band neutrophils in the total WBC population.

Page: 132
Heading: Overview
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

6. ANS: 3
Rationale: The major function of monocytes is phagocytosis. Monocytes provide protection as they circulate in the peripheral blood for about 1 to 5 days, after which they migrate into the tissues and develop into macrophages, a type of phagocytic tissue cell. Eosinophils move to areas of established inflammation, responding to allergic and parasitic diseases. T-lymphocytes function as cellular mediators of immunity. The main function of platelets is to prevent bleeding when there has been trauma to a blood vessel wall.

Page: 133
Heading: Overview
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Immunity
Difficulty: Moderate

PTS: 1 CON: Immunity

7. ANS: 4

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Rationale: Collection of the specimen above an IV infusion could result in falsely decreased values due to hemodilution. A hematocrit level greater than 55% may affect results because of anticoagulant excess relative to plasma volume. Vascular injury caused during venipuncture is evident in hemolyzed specimens, which must be rejected for analysis. Placement of the tourniquet for longer than 1 minute can result in venous stasis and changes in the results, including Hgb and Hct levels being falsely increased by 2% to 5%.

Page: 135
Heading: Discussion Point
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

8. ANS: 3
Rationale: Placement of the tourniquet for longer than 1 minute can result in venous stasis and changes in the results, including Hgb and Hct levels being falsely increased by 2% to 5%. Collection of the specimen above an intravenous infusion could result in falsely decreased values due to hemodilution. A hematocrit level greater than 55% may affect results because of anticoagulant excess relative to plasma volume. Vascular injury caused during venipuncture is evident in hemolyzed specimens, which must be rejected for analysis.

Page: 134
Heading: Discussion Point
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

9. ANS: 4
Rationale: The Hct depends primarily on the number of red blood cells (RBCs); however, the average size of the RBCs influences Hct.

Page: 138
Heading: Complete Blood Count, Hematocrit
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

10. ANS: 1
Rationale: After the first decade of life, the mean Hgb in African Americans is 0.5 to 1 g lower than in whites. Mexican Americans and Asian Americans have higher Hgb and hematocrit values than whites.

Page: 138
Heading: Complete Blood Count, Hemoglobin

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Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Physiological Adaptation
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

11. ANS: 3
Rationale: Hemoglobin is increased in chronic obstructive pulmonary disorder, related to chronic hypoxia that stimulates production of red blood cells (RBCs) and a corresponding increase in hemoglobin. Hemoglobin is decreased in bone marrow hyperplasia (bone marrow failure that results in decreased RBC production), hemolytic anemia (reduced RBC survival with corresponding decrease in hematocrit), and renal disease (related to decreased levels of erythropoietin, which stimulates production of RBCs).

Page: 143
Heading: Complete Blood Count, Hemoglobin
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

12. ANS: 1
Rationale: Anxiety or stress is associated with an increase in RBC count, related to a physiological response. The other emotions listed are not associated with the stress response, and so would not lead to an increase in RBCs.

Page: 147
Heading: Complete Blood Count, RBC Count
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Physiological Adaptation
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Easy

PTS: 1 CON: Hematologic Regulation

13. ANS: 3
Rationale: Polycythemia vera is a condition related to an abnormal bone marrow response resulting in overproduction of RBCs. The other conditions listed are associated with a decrease in RBCs.

Page: 147
Heading: Complete Blood Count, RBC Count
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

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14. ANS: 1
Rationale: RBC indices are frequently used to assist in the classification of anemias, including iron-deficiency anemia. Measures of hemoglobin and hematocrit are used to assess for polycythemia vera. Hemophilia and Hodgkin's disease are assessed using other tests.

Page: 150
Heading: Complete Blood Count, RBC Indices
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

15. ANS: 1
Rationale: MCV is increased in alcoholism due to vitamin deficiency related to malnutrition. Iron-deficiency anemia and thalassemias are associated with decreased MCV, both related to low hemoglobin. Microcytic anemia is associated with a decreased mean corpuscular hemoglobin.

Page: 151
Heading: Complete Blood Count, RBC Indices
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

16. ANS: 1
Rationale: Considerations for draw times after transfusion include the type of product, the amount of product transfused, and the patient's clinical situation. Generally, specimens collected an hour after transfusion will provide an acceptable reflection of the effects of the transfused product.

Page: 152
Heading: Complete Blood Count, RBC Indices
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

17. ANS: 4

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Rationale: Acanthocytes are associated with acquired conditions such as alcoholic cirrhosis with hemolytic anemia, disorders of lipid metabolism, hepatitis of newborns, malabsorptive diseases, metastatic liver disease, the postsplenectomy period, and pyruvate kinase deficiency. Dacryocytes are most commonly associated with metastases to the bone marrow, myelofibrosis, myeloid metaplasia, pernicious anemia, and tuberculosis. Codocytes are seen in hemoglobinopathies, iron-deficiency anemia, obstructive liver disease, and the postsplenectomy period. Burr cells are commonly seen in acquired renal insufficiency, burns, cardiac valve disease, disseminated intravascular coagulation, hypertension, intravenous fibrin deposition, metastatic malignancy, normal neonatal period, and uremia.

Page: 155
Heading: Complete Blood Count, RBC Morphology and Inclusions
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Difficult

PTS: 1 CON: Hematologic Regulation

18. ANS: 1

Rationale: Basophilic stippling is seen whenever there is altered hemoglobin synthesis, as in thalassemias, megaloblastic anemias, alcoholism, and lead or arsenic intoxication. Hgb C crystals are seen in hereditary Hgb C disease. Howell-Jolly bodies are seen in sickle cell anemia, other hemolytic anemias, megaloblastic anemia, congenital absence of the spleen, and the postsplenectomy period. Pappenheimer bodies may be seen in cases of sideroblastic anemia, thalassemias, refractory anemia, dyserythropoietic anemias, hemosiderosis, and hemochromatosis.

Page: 155
Heading: Complete Blood Count, RBC Morphology and Inclusions
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

19. ANS: 3

Rationale: The purpose of the white blood cell count is to evaluate viral and bacterial infections and to assist in diagnosing and monitoring leukemic disorders. The purpose of platelet count is to assist in diagnosing and evaluating treatment for blood disorders such as thrombocytosis and thrombocytopenia and to evaluate preprocedure or preoperative coagulation status. The purpose of the red blood cell count is to evaluate the number of circulating red cells in the blood toward diagnosing disease and monitoring therapeutic treatment. Variations in the number of cells are most often seen in anemias, cancer, and hemorrhage. The purpose of hemoglobin testing is to evaluate anemia, polycythemia, hydration status, and monitor therapy such as transfusion.

Page: 156
Heading: Complete Blood Count, WBC Count and Differential
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]

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Concept: Infection
Difficulty: Moderate

PTS: 1 CON: Infection

20. ANS: 2
Rationale: Neutrophils are normally found as the predominant WBC type in the circulating blood. Also called *polymorphonuclear cells,* they are the body's first line of defense through the process of phagocytosis. They also contain enzymes and pyogenes, which combat foreign invaders. Lymphocytes are agranular, mononuclear blood cells that are smaller than granulocytes. They are found in the next highest percentage in normal circulation. Monocytes are mononuclear cells similar to lymphocytes, but they are related more closely to granulocytes in terms of their function. The function of eosinophils is phagocytosis of antigen-antibody complexes. They become active in the later stages of inflammation.

Page: 158
Heading: Complete Blood Count, WBC Count and Differential
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

21. ANS: 3
Rationale: The test should be performed within 4 hours of collection when the specimen has been stored at room temperature. If a delay in testing is anticipated, refrigerate the sample at 2°C (35.6°F) to 4°C (39.2°F); a refrigerated temperature is reported to extend the stability of the sample from 4 to 12 hours.

Page: 163
Heading: Erythrocyte Sedimentation Rate
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

22. ANS: 3
Rationale: The formula for calculating RPI is as follows: RPI = % reticulocytes × [patient Hct / normal Hct] × (1 / maturation time). So, the calculation for this patient would be as follows: RPI = 4% × [25% / 45%] × (1 / 2 days) = 1.1.

Page: 167
Heading: Reticulocyte Count
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Analysis [Analyzing]
Concept: Hematologic Regulation
Difficulty: Difficult

PTS: 1 CON: Hematologic Regulation

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23. ANS: 1
Rationale: An increased reticulocyte count is associated with blood loss, as conditions that result in excessive red blood cell (RBC) loss or destruction stimulate a compensatory bone marrow response by increasing production of RBCs. A decreased reticulocyte count is associated with alcoholism (decreased production related to nutritional deficit), aplastic anemia (related to overall lack of RBCs), and renal disease (diseased kidneys cannot produce erythropoietin, which stimulates the bone marrow to produce RBCs).

Page: 167
Heading: Reticulocyte Count
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

24. ANS: 4
Rationale: Hgb F is the main form of Hgb in the fetus, the remainder being composed of Hgb A_1 and A_2. Children younger than 3 months of age have elevated levels of Hgb F. Small amounts of Hgb F are normal in the adult. Hgb S and Hgb C Harlem are rare sickling variants that indicate sickle cell trait. Hgb D is a rare hemoglobinopathy that may also be found in combination with Hgb S or thalassemia.

Page: 164
Heading: Sickle Cell Screen
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

PTS: 1 CON: Hematologic Regulation

MULTIPLE RESPONSE

25. ANS: 1, 3, 4
Page: 129
Heading: Overview
Integrated Processes: Teaching and Learning
Client Need: Health Promotion and Maintenance
Cognitive Level: Application [Applying]
Concept: Perfusion
Difficulty: Moderate

	Rationale
1.	This is correct. The main role of blood is the transportation of substances required for critical processes to their intended targets, such as oxygen to the lungs for respiration, and enzymes, co-enzymes, vitamins, minerals, other nutrients, and hormones to cells as required for metabolism.
2.	This is incorrect. Nerves are responsible for transmitting nervous impulses, not blood.
3.	This is correct. The blood transports waste products for excretion, such as the carbon

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	dioxide produced from respiration and the numerous by-products of cellular metabolism.
4.	This is correct. Blood participates in the regulation of body temperature. When the body is cold, one mechanism it uses to decrease heat loss is by preventing the blood vessels from coming in close proximity to the skin's surface (vasoconstriction). The opposite occurs when the body is hot and vasodilation occurs: the blood vessels widen and come close to the skin surface. This allows heat from the warm blood to be lost through the skin by radiation.
5.	This is incorrect. The musculoskeletal system, not blood, produces movement in the body.

PTS: 1 CON: Perfusion

26. ANS: 3, 4, 5
Page: 130
Heading: Overview
Integrated Processes: Teaching and Learning
Client Need: Health Promotion and Maintenance
Cognitive Level: Application [Applying]
Concept: Perfusion
Difficulty: Moderate

	Rationale
1.	This is incorrect. In adults, hematopoiesis normally occurs in the red marrow of bones such as the sternum, ribs, vertebral bodies, pelvis, and proximal portions of the humerus and femur; the long bones contain relatively little red marrow.
2.	This is incorrect. In adults, hematopoiesis normally occurs in the red marrow of bones such as the sternum, ribs, vertebral bodies, pelvis, and proximal portions of the humerus and femur; the long bones contain relatively little red marrow.
3.	This is correct. In adults, hematopoiesis normally occurs in the red marrow of bones such as the sternum, ribs, vertebral bodies, pelvis, and proximal portions of the humerus and femur; the long bones contain relatively little red marrow.
4.	This is correct. In adults, hematopoiesis normally occurs in the red marrow of bones such as the sternum, ribs, vertebral bodies, pelvis, and proximal portions of the humerus and femur; the long bones contain relatively little red marrow.
5.	This is correct. In adults, hematopoiesis normally occurs in the red marrow of bones such as the sternum, ribs, vertebral bodies, pelvis, and proximal portions of the humerus and femur; the long bones contain relatively little red marrow.

PTS: 1 CON: Perfusion

27. ANS: 1, 2, 3, 5
Page: 134
Heading: Overview
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. While shortness of breath does pertain to a cardiovascular or pulmonary

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	disorder, very low hemoglobin levels make it difficult to breathe due to the decreased oxygen carrying capacity of the blood.
2.	This is correct. One of the hallmarks of anemia is fatigue due to a decreased red blood cell (RBC) count and the ensuing ramifications that occur when there is an insufficient number of RBCs to support the normal functions of the body.
3.	This is correct. Conditions such as leukemia or chronic infections may be implicated by general symptoms reflected by compromised immune function.
4.	This is incorrect. The appendix is not related to the hematopoietic system. A better question would be, "Have you had your spleen removed?"
5.	This is correct. A number of hematologic disorders can be inherited so obtaining a family history of disease is an important area of discussion.

PTS: 1 CON: Hematologic Regulation

28. ANS: 1, 2, 4
Page: 136
Heading: Universal Pretest Pearls (Planning)
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Safety
Difficulty: Moderate

	Rationale
1.	This is correct. Age can affect whether a patient is able to sit calmly through a procedure. A small child is less likely to be able to remain still during a procedure than is an adult.
2.	This is correct. Significant pain can make it difficult for a patient to sit calmly through a procedure.
3.	This is incorrect. Gender would not affect a person's ability to sit still through a procedure.
4.	This is correct. Mental status can affect whether a patient is able to sit calmly through a procedure. Someone who is agitated, angry, or nervous is more likely to move around, for instance.
5.	This is incorrect. Diet would not affect a person's ability to sit still through a procedure.

PTS: 1 CON: Safety

29. ANS: 2, 3
Page: 136
Heading: Universal Intratest Pearls (Implementation)
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Comfort
Difficulty: Moderate

	Rationale
1.	This is incorrect. Children and infants may be accompanied by a parent to calm them.
2.	This is correct. The nurse should keep neonates and infants covered and in a warm room and provide a pacifier or gentle touch.

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3.	This is correct. The nurse should keep neonates and infants covered and in a warm room and provide a pacifier or gentle touch.
4.	This is incorrect. Collection of the specimen above an IV infusion could result in falsely decreased values due to hemodilution.
5.	This is incorrect. The nurse should keep neonates and infants covered and in a warm room and provide a pacifier or gentle touch.

PTS: 1 CON: Comfort

30. ANS: 2, 3, 4
Page: 139
Heading: Complete Blood Count, Hematocrit
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is incorrect. Anemia is associated with a decreased Hct, due to an associated decrease in red blood cells (RBCs).
2.	This is correct. Burns are associated with an increased Hct, related to dehydration; total blood volume is decreased, but RBC count remains the same.
3.	This is correct. Congestive heart failure is associated with an increased Hct. When the underlying cause is anemia, the body responds by increasing production of RBCs with a corresponding increase in Hct.
4.	This is correct. Dehydration is associated with an increased Hct because total blood volume is decreased, but RBC count remains the same.
5.	This is incorrect. Cirrhosis is associated with a decreased Hct, related to accumulation of fluid.

PTS: 1 CON: Hematologic Regulation

31. ANS: 1, 3, 5
Page: 139
Heading: Complete Blood Count, Hematocrit
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. Carcinoma is associated with a decreased Hct, as anemia is often associated with chronic disease.
2.	This is incorrect. High altitudes are associated with an increased Hct, related to hypoxia that stimulates production of red blood cells (RBCs) and therefore increases Hct.
3.	This is correct. Hemorrhage is associated with a decreased Hct, related to loss of RBCs that exceeds rate of production.
4.	This is incorrect. Polycythemia is associated with an increased Hct, related to an abnormal bone marrow response resulting in overproduction of RBCs.

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5.	This is correct. Leukemia is associated with a decreased Hct, related to bone marrow failure that results in decreased RBC production.

PTS: 1 CON: Hematologic Regulation

32. ANS: 1, 3
Page: 143
Heading: Complete Blood Count, Hemoglobin
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. Newborns normally have increased values due to hemoconcentration.
2.	This is incorrect. Hgb can decrease when the patient is recumbent as a result of hemodilution.
3.	This is correct. Lipemia will falsely increase the Hgb measurement because the turbidity in the sample caused by excessive levels of lipids is measured as Hgb by the instrument.
4.	This is incorrect. A severe copper deficiency may result in decreased Hgb levels.
5.	This is incorrect. Care should be taken in evaluating the Hgb during transfusion or acute blood loss because the value may appear to be normal and may not be a reliable indicator of anemia or a therapeutic response to treatment. In the case of acute blood loss, the Hgb level would appear to be lower than normal.

PTS: 1 CON: Hematologic Regulation

33. ANS: 1, 4
Page: 148
Heading: Complete Blood Count, RBC Count
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. Cold agglutinins may falsely increase the MCV and decrease the RBC count. This can be corrected by warming the blood or diluting the sample with warmed saline and repeating the analysis.
2.	This is incorrect. Excessive exercise, anxiety, pain, and dehydration may cause false elevations in RBC count, not decreases.
3.	This is incorrect. Excessive exercise, anxiety, pain, and dehydration may cause false elevations in RBC count, not decreases.
4.	This is correct. Cold agglutinins may falsely increase the MCV and decrease the RBC count. This can be corrected by warming the blood or diluting the sample with warmed saline and repeating the analysis.
5.	This is incorrect. Light exposure does not affect RBC count in a blood sample.

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34. ANS: 1, 3
Page: 155
Heading: Complete Blood Count, RBC Morphology and Inclusions
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Difficult

	Rationale
1.	This is correct. Schistocytes are seen in burns, cardiac valve disease, disseminated intravascular coagulation (DIC), glomerulonephritis, hemolytic anemia, microangiopathic hemolytic anemia, renal graft rejection, thrombotic thrombocytopenic purpura, uremia, and vasculitis.
2.	This is incorrect. Dacryocytes are most commonly associated with metastases to the bone marrow, myelofibrosis, myeloid metaplasia, pernicious anemia, and tuberculosis.
3.	This is correct. Schistocytes are seen in burns, cardiac valve disease, DIC, glomerulonephritis, hemolytic anemia, microangiopathic hemolytic anemia, renal graft rejection, thrombotic thrombocytopenic purpura, uremia, and vasculitis.
4.	This is incorrect. Dacryocytes are most commonly associated with metastases to the bone marrow, myelofibrosis, myeloid metaplasia, pernicious anemia, and tuberculosis.
5.	This is correct. Schistocytes are seen in burns, cardiac valve disease, DIC, glomerulonephritis, hemolytic anemia, microangiopathic hemolytic anemia, renal graft rejection, thrombotic thrombocytopenic purpura, uremia, and vasculitis.

PTS: 1 CON: Hematologic Regulation

35. ANS: 1, 3, 4, 5
Page: 159
Heading: Complete Blood Count, WBC Count and Differential
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Physiological Adaptation
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. WBC count is increased in early infancy, believed to be related to the physiological stress of birth and metabolic demands of rapid development.
2.	This is incorrect. WBC count is decreased, not increased, in the morning due to diurnal variations.
3.	This is correct. WBC count is increased in emotional stress, related to secretion of epinephrine.
4.	This is correct. WBC count is increased in exposure to extreme heat or cold, related to physiological stress.
5.	This is correct. WBC count is increased in strenuous exercise, related to epinephrine secretion; such increases are short in duration, lasting minutes to hours.

PTS: 1 CON: Hematologic Regulation

36. ANS: 1, 2, 3
Page: 159

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Heading: Complete Blood Count, WBC Count and Differential
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. Neutropenia occurs in acromegaly.
2.	This is correct. Neutropenia occurs in viral infections, including mononucleosis, hepatitis, and influenza.
3.	This is correct. Neutropenia occurs in anorexia nervosa, starvation, and malnutrition.
4.	This is incorrect. Neutrophilia occurs in acute hemorrhage.
5.	This is incorrect. Neutrophilia occurs in myelocytic leukemia.

PTS: 1 CON: Hematologic Regulation

37. ANS: 1, 2, 5
Page: 163
Heading: Erythrocyte Sedimentation Rate
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Analysis [Analyzing]
Concept: Hematologic Regulation
Difficulty: Difficult

	Rationale
1.	This is correct. The ESR is a measure of the rate of sedimentation of red blood cells (RBCs) in an anticoagulated whole blood sample over a specified period of time. The basis of the ESR test is the alteration of blood proteins by inflammatory and necrotic processes that cause the RBCs to stick together, become heavier, and rapidly settle at the bottom of a vertically held, calibrated tube over time. The most common promoter of rouleaux is an increase in circulating fibrinogen levels.
2.	This is correct. Increased rouleaux formation is associated with increased levels of fibrinogen and/or production of cytokines and other acute-phase reactant proteins in response to inflammation, and thus with an increased ESR.
3.	This is incorrect. The sedimentation rate is proportional to the size or mass of the falling RBCs and is inversely proportional to plasma viscosity. Therefore, increased plasma viscosity would result in decreased ESR.
4.	This is incorrect. Increased, not decreased, rouleaux formation is associated with an increased ESR.
5.	This is correct. Anemia of chronic disease and acute anemia influence the ESR because the decreased number of RBCs falls faster with the relatively increased plasma volume.

PTS: 1 CON: Hematologic Regulation

38. ANS: 2, 3, 4
Page: 165
Heading: Hemoglobin Electrophoresis
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]

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Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is incorrect. Hgb A is the main form of Hgb in the normal adult.
2.	This is correct. Presence of Hgb C is associated with Hgb C disease, the second most common variant in the United States. It has a higher prevalence among African Americans.
3.	This is correct. Hgb D is a rare hemoglobinopathy that may also be found in combination with Hgb S or thalassemia.
4.	This is correct. Presence of Hgb E is associated with Hgb E disease, a thalassemia-like condition and the second-most common hemoglobinopathy in the world. It occurs with the highest frequency in Southeast Asians and African Americans.
5.	This is incorrect. Hgb F is the main form of Hgb in the fetus, the remainder being composed of Hgb A_1 and A_2. Small amounts of Hgb F are normal in the adult.

PTS: 1 CON: Hematologic Regulation |

39. ANS: 2, 3, 5
Page: 165
Heading: Hemoglobin Electrophoresis
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is incorrect. A decreased, not increased, Hgb A_2 level is associated with untreated iron-deficiency anemia.
2.	This is correct. An increased Hgb A_2 level is associated with hyperthyroidism.
3.	This is correct. An increased Hgb A_2 level is associated with megaloblastic anemia.
4.	This is incorrect. A decreased, not increased, Hgb A_2 level is associated with erythroleukemia.
5.	This is correct. An increased Hgb A_2 level is associated with sickle trait.

PTS: 1 CON: Hematologic Regulation

40. ANS: 1, 3
Page: 169
Heading: Sickle Cell Screen
Integrated Processes: Nursing Process
Client Need: Physiological Integrity: Reduction of Risk Potential
Cognitive Level: Application [Applying]
Concept: Hematologic Regulation
Difficulty: Moderate

	Rationale
1.	This is correct. The test is positive in the presence of rare sickling Hgb variants such as Hgb S and Hgb C Harlem.
2.	This is incorrect. Hgb A is the main form of Hgb in the normal adult.

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3.	This is correct. The test is positive in the presence of rare sickling Hgb variants such as Hgb S and Hgb C Harlem.
4.	This is incorrect. Hgb F is the main form of Hgb in the fetus, the remainder being composed of Hgb A_1 and A_2. Small amounts of Hgb F are normal in the adult.
5.	This is incorrect. Presence of Hgb E is associated with Hgb E disease, a thalassemia-like condition and the second-most common hemoglobinopathy in the world. It occurs with the highest frequency in Southeast Asians and African Americans.

PTS: 1 CON: Hematologic Regulation

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