MEDICAL TECHNOLOGY LICENSURE EXAM

PREPARATION IN THE PHILIPPINES

HEMATOLOGY

PRACTICE EXAM QUESTION

400 QUESTIONS

TEST YOUR KNOWLEDGE AS IF YOU WERE TAKING A BOARD EXAM

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1. EDTA-induced pseudothrombocytopenia can be identified on blood smear by:
a. Finding platelets pushed to the feathered end
b. Finding platelets adhering to WBCs
c. Finding no platelets at all on the smear
d. Bluish discoloration to the macroscopic appearance of the slide

2. Which ratio of anticoagulant to blood is correct for coagulation procedures?
a. 1:4
b. 1:5
c. 1:9
d. 1:10

3. The bevel of the needle should be held ____ in the performance of a venipuncture.
a. Sideways
b. Upward
c. Downward
d. In any direction

4. Most common complication encountered in obtaining a blood specimen:
a. Ecchymosis (bruise)
b. Hematoma
c. Hemoconcentration
d. Anemia

5. Blood collection tubes are labeled:
a. As soon as the test order is received
b. Before the specimen is even collected
c. Immediately after specimen collection
d. After returning to the laboratory

6. A blood sample is needed from a patient with IV fluids running in both arms. Which of the following is an acceptable procedure?
a. Any obtainable vein is satisfactory.
b. Obtain sample from above the IV site.
c. Obtain sample from below the IV site with special restrictions.
d. Disconnect the IV line.

7. The recommended cleaner for removing oil from objectives is:
a. 70% alcohol or lens cleaner
b. Xylene
c. Water
d. Benzene

8. Blood drop size in the manual wedge technique:
a. 1 to 2 mm in diameter
b. 2 to 3 mm in diameter
c. 4 to 5 mm in diameter
d. 5 to 6 mm in diameter

9. In the preparing wedge smear from blood samples of polycythemic patients, the angle between the two slides should be:
a. 25
b. 30
c. 35
d. 45

10. When a blood film is viewed through the microscope, the RBCs appear redder than normal, the neutrophils are barely visible, and the eosinophils are bright orange. What is the most likely cause?
a. Slide was overstained
b. Stain was too alkaline
c. Buffer was too acidic
d. Slide was not rinsed adequately

11. A stained blood film is held up to the light and observed to be bluer than normal. What microscopic abnormality might be expected on this film?
a. Rouleaux
b. Spherocytosis
c. Reactive lymphocytosis
d. Toxic granulation

12. The normal sequence of blood cell development is:
a. Yolk sac—red bone marrow—liver and spleen
b. Yolk sac—thymus—liver and spleen—red bone marrow
c. Yolk sac—liver and spleen—red bone marrow
d. Liver and spleen—yolk sac—red bone marrow

13. The best source of active bone marrow from a 20- year-old would be:
a. Iliac crest
b. Femur
c. Distal radius
d. Tibia

14. Primary target cells of G-CSF, EXCEPT:
a. Fibroblasts
b. Leukemic myeloblasts
c. Neutrophil precursors
d. T and B cells

15. Bone marrow cellularity refers to the ratio of:
a. Red cell precursors to white cell precursors
b. Hematopoietic tissue to adipose tissue
c. Granulocytic cells to erythrocytic cells
d. Extravascular tissue to intravascular tissue

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16. What is the recommended order of draw when the evacuated tube system is used?
a. Gel separator, nonadditive, coagulation, and blood culture
b. Additive, nonadditive, gel separator, and blood culture
c. Nonadditive, blood culture, coagulation, and other additives
d. Blood culture, coagulation, nonadditive, and gel separator or other additives

17. The most important step in phlebotomy is:
a. Cleansing the site
b. Identifying the patient
c. Selecting the proper needle length
d. Using the correct evacuated tube

18. Which of the following skin puncture areas is (are) acceptable for the collection of capillary blood from an infant?
a. Previous puncture site
b. Posterior curve of the heel
c. The arch
d. Medial or lateral plantar surface

19. Vein of choice for performing a venipuncture is the:
a. Basilic
b. Cephalic or accessory cephalic
c. Median or median cubital
d. One of the hand veins

20. Which characteristic is inaccurate with respect to the anticoagulant K3 EDTA?
a. Removes ionized calcium (Ca2+) from fresh whole blood by the process of chelation
b. Is used for most routine coagulation studies
c. Is the most commonly used anticoagulant in hematology
d. Is conventionally placed in lavender stoppered evacuated tube

21. Number of inversions of light blue top evacuated tube:
a. None
b. 3 to 4
c. 5 to 6
d. 8

22. Adjuvant for infectious disease therapy:
a. Interleukin 2
b. Interleukin 3
c. Interleukin 6
d. Interleukin 12

23. All of the following are examples of preanalytical errors, EXCEPT
a. Specimen obtained from the wrong patient
b. Specimen collected in the wrong tube or container
c. Incorrect labeling of specimen
d. Failure to report critical values immediately

24. Heel punctures in infants should not be made more than __ mm deep because of the risk of bone injury and possible infection (osteomyelitis).
a. Not more than 1 mm deep
b. Not more than 2 mm deep
c. Not more than 3 mm deep
d. Not more than 5 mm deep

25. Counterproductive smear drying technique because the moisture causes RBCs to become echinocytic (crenated) or to develop water artifact (also called drying artifact):
a. Natural drying
b. Use of small fan
c. Blowing of breath
d. None of these

26. Which of the following best describes the function of the Rapoport Luebering pathway?
a. It produces ATP to help maintain RBC membrane deformability
b. It results in reduction of glutathione
c. It produces 2,3 diphosphoglycerate (2,3 DPG)
d. It produces cytochrome reductase

27. Which conditions will shift the oxyhemoglobin dissociation curve to the right?
a. Acidosis
b. Alkalosis
c. Multiple blood transfusions
d. Increased quantities of hemoglobin S or C

28. What is the last nucleated stage in development of erythrocyte?
a. Prorubricyte
b. Rubricyte
c. Metarubricyte
d. Reticulocyte

29. Which one of the following morphologic changes occurs during normal blood cell maturation?
a. Increase in cell diameter
b. Development of cytoplasmic basophilia
c. Condensation of nuclear chromatin
d. Appearance of nucleoli

30. Bite cells are usually seen in patients with:
a. Rh null disease
b. Chronic granulomatous disease
c. G6PD deficiency
d. Pyruvate kinase deficiency

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31. Which of the following organs is responsible for the "pitting process" for RBCs?
a. Liver
b. Spleen
c. Kidney
d. Lymph nodes

32. A hemoglobin molecule is composed of:
a. 4 heme, 4 globin, 2 iron
b. 2 heme, 2 globin, 2 iron
c. 4 heme, 4 globin, 4 iron
d. 4 heme, 2 globin, 2 iron

33. Schistocytes, ovalocytes, and acanthocytes are examples of abnormal changes in RBC:
a. Volume
b. Shape
c. Inclusions
d. Hemoglobin concentration

34. A morphological description of echinocytes is:
a. short, scalloped, or spike-like projections that are regularly distributed around the cell
b. fragments of erythrocytes
c. the scooped-out part of an erythrocyte that remains after a blister cell ruptures
d. compact round shape

35. Which of the following is decreased in cases of intravascular hemolytic anemia?
a. Bilirubin
b. Urine hemosiderin
c. Haptoglobin
d. Serum hemoglobin

36. The maturational sequence(s) of the erythrocyte is (are):
a. Rubriblast—prorubricyte—metarubricyte— rubricyte—reticulocyte—mature erythrocyte
b. Rubriblast—prorubricyte—rubricyte — metarubricyte—reticulocyte—mature erythrocyte
c. Pronormoblast—basophilic normoblast— polychromatophilic normoblast— orthochromic normoblast—reticulocyte— mature erythrocyte
d. Both B and C

37. With a normal diet, an erythrocyte remains in the reticulocyte stage in the circulating blood for:
a. 1 day
b. 2.5 days
c. 3 days
d. 120 days

38. In a Wright-stained peripheral blood film, the reticulocyte will have a blue appearance. This is referred to as:
a. Megaloblastic maturation
b. Bluemia
c. Polychromatophilia
d. Erythroblastosis

39. The final steps in heme synthesis, including the formation of protoporphyrin take place in:
a. Cell's nucleus
b. Cell's cytoplasm
c. Spleen
d. Mitochondria

40. In an alkaline pH (pH of 8.6) electrophoresis is performed, hemoglobin E has the same mobility as hemoglobin:
a. S
b. F
c. A
d. C

41. The type of hemoglobin that is detectable with the Kleihauer-Betke test is:
a. A
b. A2
c. F
d. S

42. Basophilic stippling represents:
a. DNA
b. Precipitated denatured hemoglobin
c. Granules of ribosomes and RNA
d. Aggregates of iron, mitochondria and ribosomes

43. The most versatile type of stem cell, can develop into any human cell type, including development from embryo into fetus:
a. Multipotential stem cell
b. Pluripotential stem cell
c. Totipotential stem cell
d. Semipotential stem cell

44. What is the normal distribution of hemoglobin in healthy adults?
a. 80% to 90% Hb A, 5% to 10% Hb A2, 1% to 5% Hb F
b. 80% to 90% Hb A2, 5% to 10% Hb A, 1% to 5% Hb F
c. Greater than 95% Hb A, less than 3.5% Hb A2, 1% to 2% Hb F
d. Greater than 90% Hb A, 5% Hb F, less than 5% Hb A2

45. Which of the following is considered a normal hemoglobin?
a. Carboxyhemoglobin
b. Methemoglobin
c. Sulfhemoglobin
d. Deoxyhemoglobin

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46. Which of the following hemoglobins migrates to the same position as Hgb A2 at pH 8.6?
a. Hgb H
b. Hgb F
c. Hgb C
d. Hgb S

47. What staining method is used most frequently to stain and manually count reticulocytes?
a. Immunofluorescence
b. Supravital staining
c. Romanowsky staining
d. Cytochemical staining

48. As a blood cell matures, the ratio of nucleus to cytoplasm (N:C) in most cases:
a. Increases
b. Decreases
c. Remains the same
d. Variable

49. Apoptosis:
1. Cell size enlarged due to swelling
2. Cell size reduced due to shrinkage
3. Nucleus condensation and fragmentation
4. Nucleus exhibits random breaks and lysis (karyolysis)

a. 1 and 3
b. 1 and 4
c. 2 and 3
d. 2 and 4

50. The positive predictive value predicts the probability that an individual with a positive assay result ___ the disease or condition
a. has (have)
b. could have
c. may have
d. will have

51. Counting area for manual RBC count:
a. 0.2 mm2
b. 1 mm2
c. 4 mm2
d. 5 mm2

52. Dehydration:
a. Decreased hematocrit
b. Increased hematocrit
c. Variable hematocrit
d. Hematocrit cannot be determined

53. When the correct area of a specimen from a patient with a normal RBC count is viewed, there are generally about ___ RBCs per 100x oil immersion field.
a. 10 to 15 RBCs per OIF
b. 20 to 25 RBCs per OIF
c. 100 to 150 RBCs per OIF
d. 200 to 250 RBCs per OIF

54. The ESR is ___ proportional to the red blood cell mass and ____proportional to plasma viscosity
a. Direct, direct
b. Direct, inverse
c. Inverse, direct
d. Inverse, inverse

55. If 60 reticulocytes are counted in 1000 red blood cells, what is the reticulocyte count?
a. 0.06%
b. 0.6%
c. 6.0%
d. 60.0%

56. To improve accuracy of the reticulocyte count, have another laboratorian count the other film; counts should agree within:
a. 10%
b. 20%
c. 30%
d. 40%

57. All of the following causes a falsely low ESR, EXCEPT:
a. Column used is slanted
b. EDTA tube is clotted
c. EDTA tube is one-third full
d. EDTA specimen is 24-hour old

58. The reagent used in the traditional sickle cell screening test is:
a. Sodium chloride
b. Sodium citrate
c. Sodium metabisulfite
d. Sodium-potassium oxalate

59. Hemoglobin solubility test is a screening test for:
a. Hemoglobin A2
b. Hemoglobin F
c. Hemoglobin S
d. Unstable hemoglobin

60. If the sugar water test is positive, ____ procedure should be performed before a diagnosis of PNH is made.
a. Autohemolysis test
b. Hemoglobin electrophoresis
c. Osmotic fragility test
d. Sucrose hemolysis test

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61. Anticoagulant for the sugar water and sucrose hemolysis test:
a. EDTA
b. Citrate
c. Heparin
d. Oxalate

62. What are the initial laboratory tests that are performed for the diagnosis of anemia?
a. CBC, iron studies, and reticulocyte count
b. CBC, reticulocyte count, and peripheral blood film examination
c. Reticulocyte count and serum iron, vitamin B12 and folate assays
d. Bone marrow study, iron studies, and peripheral blood film examination

63. All of the following are associated with increased OFT, EXCEPT:
a. Sickle cell anemia
b. Hereditary spherocytosis
c. HDN
d. Acquired hemolytic anemia

64. A Miller disk is an ocular device used to facilitate counting of:
a. Platelets
b. Reticulocytes
c. Sickle cells
d. Nucleated RBCs

65. The presence of excessive rouleaux formation on a blood smear is often accompanied by an increased:
a. Reticulocyte count
b. Sedimentation rate
c. Hematocrit
d. Erythrocyte count

66. Duplicate hematocrit results should agree within __ unit (%).
a. 1%
b. 2%
c. 5%
d. 15%

67. Insufficient centrifugation will result in:
a. A false increase in hematocrit (Hct) value
b. A false decrease in Hct value
c. No effect on Hct value
d. All of these options, depending on the patient

68. A correction is necessary for WBC counts when nucleated RBCs are seen on the peripheral smear because:
a. The WBC count would be falsely lower
b. The RBC count is too low
c. Nucleated RBCs are counted as leukocytes
d. Nucleated RBCs are confused with giant platelets

69. What combination of reagents is used to measure hemoglobin?
a. Hydrochloric acid and p-dimethylaminobenzaldehyde
b. Potassium ferricyanide and potassium cyanide
c. Sodium bisulfite and sodium metabisulfit
d. Sodium citrate and hydrogen peroxide

70. All of the following are sources of error when measuring hemoglobin by the cyanmethemoglobin method EXCEPT:
a. Excessive anticoagulant
b. White blood cell count that exceeds linearity limits
c. Lipemic plasma
d. Scratched or dirty hemoglobin measuring cell

71. Lipemia can cause turbidity in the cyanmethemoglobin method and a falsely high hemoglobin result. It can be corrected by:
a. Reagent-sample solution can be centrifuged and the supernatant measured
b. Adding 0.01 mL of the patient's plasma to 5 mL of the cyanmethemoglobin reagent and using this solution as the reagent blank
c. Making a 1:2 dilution with distilled water (1 part diluted sample plus 1 part water) and multiplying the results from the standard curve by 2.
d. Cannot be corrected

72. Increased ESR:
1. Anemia
2. Macrocytosis
3. Sickle cells
4. Spherocytes

a. 1 and 2
b. 1 and 3
c. 1, 2 and 3
d. 1, 2, 3 and 4

73. Which of the following can be used with the MCV for initial classification of anemia?
a. RBC count
b. RDW
c. MPV
d. PDW

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74. The Clinical and Laboratory Standards Institute (CLSI) recommends that bands and neutrophils be counted:
a. Separately and placed in two categories
b. Together and placed in a single category
c. Either of these
d. Neither of these

75. S or DNA replication
a. 1 hour
b. 4 hours
c. 8 hours
d. 10 hours

76. A patient has macrocytic anemia, the physician suspects pernicious anemia. Which tests would best rule in a definitive diagnosis of pernicious anemia?
a. Homocysteine
b. Intrinsic factor antibodies
c. Ova and parasite examination for
D. latum d. Bone marrow examination

77. G6PD deficiency episodes are related to which of the following?
a. Exposure to oxidant drugs
b. Defective globin chains
c. Antibodies to RBCs
d. Abnormal protein structures

78. Which antibody is associated with paroxysmal cold hemoglobinuria (PCH)?
a. Anti-I
b. Anti-i
c. Anti-M
d. Anti-P

79. Which antibiotic(s) is (are) most often implicated in the development of aplastic anemia?
a. Sulfonamides
b. Penicillin
c. Tetracycline
d. Chloramphenicol

80. Which anemia has red cell morphology similar to that seen in iron deficiency anemia?
a. Sickle cell anemia
b. Thalassemia
c. Pernicious anemia
d. Hereditary spherocytosis

81. Lack of vitamin B12 or folic acid hinders the erythroblast in manufacturing:
a. Heme
b. Globin
c. DNA
d. RNA

82. Megaloblastic anemia is characterized by all of the following, EXCEPT:
a. Decreased WBCs and retics
b. Hypersegmented neutrophils
c. Oval macrocytes
d. Increased platelets

83. Which type of anemia is usually present in a patient with acute leukemia?
a. Microcytic, hyperchromic
b. Microcytic, hypochromic
c. Normocytic, normochromic
d. Macrocytic, normochromic

84. Iron deficiency anemia may be distinguished from anemia of chronic infection by:
a. Serum iron level
b. Red cell morphology
c. Red cell indices
d. Total iron-binding capacity

85. Storage iron is usually best determined by:
a. Serum transferrin levels
b. Hgb values
c. Myoglobin values
d. Serum ferritin levels

86. The fish tapeworm Diphyllobothrium latum is associated with the development of:
a. Microcytic anemia
b. Macrocytic anemia
c. Hemolytic anemia
d. Hypoproliferative anemia

87. Paroxysmal nocturnal hemoglobinuria is characterized by flow cytometry results that are:
a. Negative for CD55 and CD59
b. Positive for CD55 and CD59
c. Negative for CD4 and CD8
d. Positive for all normal CD markers

88. Which of the following characteristics are common to hereditary spherocytosis, hereditary elliptocytosis, hereditary stomatocytosis, and paroxysmal nocturnal hemoglobinuria?
a. Autosomal dominant inheritance
b. Red cell membrane defects
c. Positive direct antiglobulin test
d. Measured platelet count

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89. Anemia is due to the infiltration of abnormal cells into the bone marrow and subsequent destruction and replacement of normal hematopoietic cells:
a. Aplastic anemia
b. Pure red cell aplasia
c. Myelophthisic anemia
d. Anemia of chronic kidney disease

90. Deletion of three alpha globin genes:
a. Silent carrier state
b. Alpha thalassemia minor
c. Hemoglobin H disease
d. Bart's hydrops fetalis

91. Hemoglobinopathies associated with abnormal molecular structure:
a. Alpha thalassemia
b. Alpha and beta thalassemia
c. Sickle cell anemia and beta thalassemia
d. Sickle cell anemia, sickle cell trait and Hb C disease

92. In aplastic anemia, the bone marrow is:
a. Empty
b. Empty, hypoplastic
c. Empty, hyperplastic
d. Either hypoplastic or hyperplastic

93. In stage 3 IDA, the erythrocyte indices are typically:
a. MCV increased, MCH decreased, and MCHC decreased
b. MCV decreased, MCH decreased, and MCHC decreased
c. MCV decreased, MCH increased, and MCHC decreased
d. MCV decreased, MCH decreased, and MCHC normal

94. In cold-type AIHA:
a. IgM, usually anti-I is present
b. Rh antibodies are the most frequent cause
c. IgM usually occurs in newborn infants
d. Autoantibodies are present

95. What factors contribute to the sickling of erythrocytes in sickle cell disease crisis?
a. Increase in blood pH and increase in oxygen
b. Extremely hot weather
c. Extremely reduced oxygen and increased acidity in the blood
d. Sickling is spontaneous

96. Classification of anemia EXCEPT:
a. Blood loss
b. Impaired red cell production
c. Accelerated red cell destruction
d. Hemoglobin

97. Caused when lysine replaces glutamic acid at position 26 on the beta chains:
a. Hb S
b. Hb C
c. Hb E
d. Hb D

98. all of the following are associated with Folic acid deficiency EXCEPT:
a. CNS involvement
b. Methotrexate
c. Poor diet
d. Pregnancy

99. Diamond black fan anemia is characterized by the following EXCEPT
a. Decreased RBC count
b. Normal RBC count
c. Normal plt count
d. Normal WBC count

100. Triad of features characteristic of MAHA, EXCEPT:
a. Thrombocytopenia
b. Thrombocytosis
c. RBC polychromasia
d. RBC fragmentation

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1. If a blood specimen is spilled on a laboratory bench or floor area, the first step in cleanup should be
a. Wear gloves and a lab coat
b. Absorb blood with disposable towels
c. Clean with freshly prepared 1% chlorine solution
d. Wash with water

2. Acceptable limits of a control value must fall
a. Within ± 1 SD of the mean
b. Between 1 and 2 SD of the mean
c. Within ± 2 SD of the mean
d. Within ± 3 SD of the mean

3. A trend change in QC data is:
a. A progressive change all in one direction away from the mean for at least 3 days
b. An abrupt shift in the control values
c. Scattered variations from the mean
d. A progressive change in various directions away from the mean for at least 1 week

4. Which of the following statements is true of a Gaussian curve?
a. It represents the standard deviation
b. It represents the coefficient of variation
c. It represents variance of a population
d. It represents a normal bell-shaped distribution

5. Which characteristic is inaccurate with respect to the anticoagulant K3EDTA?
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b. Is used for most routine coagulation studies
c. Is the most commonly used anticoagulant in hematology
d. Is conventionally placed in lavender-stoppered evacuated tubes

6. A blood sample is needed from a patient with IV fluids running in both arms. Which of the following is an acceptable procedure?
a. Any obtainable vein is satisfactory
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c. Obtain sample from below the IV site with special restrictions
d. Disconnect the IV line

7. The bevel of the needle should be held ___ in the performance of a venipuncture.
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b. Upward
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d. In any direction

8. Which of the following skin puncture areas is/are acceptable for the collection of capillary blood from an infant?
a. Previous puncture site
b. Posterior curve of the heel
c. The arch
d. Medial or lateral plantar surface

9. If a blood smear is too long, the problem can be resolved by:
a. Decreasing the angle of the pusher slide
b. Increasing the angle of the pusher slide
c. Using a larger drop of blood
d. Pushing the slide slower in smearing out the blood

10. If a blood smear stains too red on microscopic examination of a Wright-stained preparation, possible causes include that
a. The staining time was too long
b. The stain was too basic
c. The buffer was too acidic and the exposure time was too short
d. The buffer was too basic and the exposure time was too long

11. During cell division, the S phase, the stage at which DNA is replicated, takes approximately ___ hours.
a. 10
b. 8
c. 4
d. 1

12. As a blood cell matures, the overall cell diameter in most cases
a. Increases
b. Decreases
c. Remains the same
d. Increases then decreases

13. The normal sequence of blood cell development is
a. Yolk sac -red bone marrow - liver and spleen
b. Yolk sac - thymus - liver and spleen red bone marrow
c. Yolk sac - liver and spleen - red bone marrow
d. Liver and spleen yolk sac - red bone marrow

14. The maturational sequence of the thrombocyte is:
a. Megakaryoblast - promegakaryocyte - megakaryocyte - metamegakaryocyte - thrombocyte
b. Promegakaryocyte - megakaryocyte - metamegakaryocyte - thrombocyte
c. Megakaryoblast - promegakaryocyte - megakaryocyte - thrombocyte
d. Megakaryoblast - promegakaryocyte - metamegakaryocyte - thrombocyte

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15. The chromatin pattern, in most cells, as the cell matures
a. Becomes more clumped
b. Becomes less clumped
c. Remains the same
d. Becomes more clumped then less clumped

16. Stimulation of erythropoietin is caused by:
a. Tissue hypoxia
b. Hypervolemia
c. Inflammation
d. Infection

17. What is the immature erythrocyte found in the bone marrow with the following characteristics: 12-17 □m in diameter, N:C of 4:1, nucleoli not usually apparent, and basophilic cytoplasm?
a. Rubriblast
b. Reticulocyte
c. Metarubricyte
d. Prorubricyte

18. In a Wright-stained peripheral blood film, the reticulocyte will have a blue appearance. This is referred to as:
: a. Megaloblastic maturation
b. Bluemia
c. Polychromatophilia
d. Erythroblastosis

19. On a Wright-stained peripheral blood smear, stress or shift reticulocytes are
a. Smaller than normal reticulocytes
b. About the same size as normal reticulocytes
c. Larger than normal reticulocytes
d. Noticeable because of a decreased blue tint

20. The normal range for reticulocytes in adults is
a. 0% to 0.5%
b. 0.5% to 1.0%
c. 0.5% to 1.5%
d. 1.5% to 2.5%

21. If a male patient has a reticulocyte count of 5.0% and a packed cell volume of 0.45 L/L, what is his corrected reticulocyte count?
a. 2.5%
b. 4.5%
c. 5.0%
d. 10.0%

22. If a male patient has a reticulocyte count of 6.0% and a packed cell volume of 45%, what is his RPI?
a. 1.5
b. 3.0
c. 4.5
d. 6.0

23. Normal adult hemoglobin has
a. Two alpha and two delta chains
b. Three alpha and one beta chains
c. Two alpha and two beta chains
d. Two beta and two epsilon chains

24. Increased amounts of 2,3-DPG ____ the oxygen affinity of the hemoglobin molecule.
a. Increases
b. Decreases
c. Does not change
d. Increases then decreases

25. The protein responsible for the transport of iron in hemoglobin synthesis is:
a. Globin
b. Transferrin
c. Oxyhemoglobin
d. Ferritin

26. Relative polycythemia exists when
a. Increased erythropoietin is produced
b. The total blood volume is expanded
c. The plasma volume is increased
d. The plasma volume is decreased

27. Which of the following is/are characteristic(s) of megaloblastic maturation?
a. Cells of some leukocytic cell lines are smaller than normal
b. Nuclear maturation lags behind cytoplasmic maturation
c. Cytoplasmic maturation lags behind nuclear maturation
d. Erythrocytes are smaller than normal

28. If an alkaline (pH 8.6) electrophoresis is performed, hemoglobin E has the same mobility as hemoglobin
a. S
b. F
c. A
d. C

29. The most common erythrocytic enzyme deficiency involving the Embden-Meyerhof glycolytic pathway is a deficiency of:
a. ATPase
b. Pyruvate kinase
c. Glucose-6-phosphate dehydrogenase
d. Lactic dehydrogenase

30. The Luebering-Rapoport pathway
a. Permits the accumulation of 2,3-DPG
b. Promotes glycolysis
c. Produces cellular energy
d. Produces acidosis

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31. The average diameter of a normal erythrocyte is ___ um.
a. 5.2
b. 6.4
c. 7.2
d. 8.4

32. Which of the following is the term for erythrocytes resembling a stack of coins on thin sections of a peripheral blood smear?
a. Anisocytosis
b. Poikilocytosis
c. Agglutination
d. Rouleaux formation

33. If you are grading changes in erythrocytic size or shape using a scale of 0 to 4+ and many erythrocytes deviate from normal per microscopic field, the typical score would be:
a. 1+
b. 2+
c. 3+
d. 4+

34. The erythrocyte morphology associated with anemia in an otherwise healthy individual caused by acute blood loss is usually
a. Microcytic
b. Megaloblastic
c. Normochromic
d. Hypochromic

35. The peripheral blood smear demonstrates ____ red blood cells in IDA.
a. Microcytic, hypochromic
b. Macrocytic, hypochromic
c. Macrocytic, spherocytic
d. Either A or B

36. In megaloblastic anemia, the typical erythrocytic indices are:
a. MCV increased, MCH increased, and MCHC normal
b. MCV increased, MCH variable, and MCHC normal
c. MCV increased, MCH decreased, and MCHC normal
d. MCV normal, MCH increased, and MCHC normal

37. In IDA, the
a. Serum iron is severely decreased and the TIBC is increased
b. Serum iron is decreased and the TIBC is normal
c. Serum iron is normal and the TIBC is normal
d. Serum iron is increased and the TIBC is normal

38. The greatest portion of operational body iron is normally contained in what compound?
a. Hemoglobin
b. Ferritin
c. Cytochromes
d. Myoglobin

39. Hemolytic disruption of the erythrocyte involves
a. An alteration in the erythrocyte membrane
b. A defect of the hemoglobin molecule
c. An antibody coating the erythrocyte
d. Physical trauma

40. Heinz bodies are associated with the congenital hemolytic anemia
a. G6PD deficiency
b. Abetalipoproteinemia
c. Hereditary spherocytosis
d. Hemolytic anemias

41. The erythrocyte alteration characteristically associated with hemolytic anemias is:
a. Hypochromia
b. Macrocytosis
c. Spherocytosis
d. Burr cells

42. Paroxysmal nocturnal hemoglobinuria exhibits sensitivity of one population of red blood cells to:
a. Warm antibodies
b. Cold antibodies
c. Complement
d. Either A or B

43. Patients with suspected PCH can be confirmed by performing which of the following tests?
a. DAT
b. Donath-Landsteiner test
c. Osmotic fragility test
d. G6PD activity assay

44. In sickle cell disease, the abnormality is related to:
a. The rate of synthesis of hemoglobin
b. An abnormal molecular structure of hemoglobin
c. An acquired defect
d. A membrane dysfunction

45. In α-type thalassemia, with three inactive α genes, which of the following is characteristic?
a. Hb A2
b. Hb A
c. Hb H
d. Hb F and A2

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

46. The stages of neutrophilic granulocyte development are:
a. Promyelocyte, myeloblast, myelocyte, metamyelocyte, and band and segmented neutrophils
b. Myeloblast, promyelocyte, myelocyte, metamyelocyte, and band and segmented neutrophils
c. Myelocyte, myeloblast, promyelocyte, metamyelocyte, and band and segmented neutrophils
d. Myeloblast, promyelocyte, metamyelocyte, myelocyte, and band and segmented neutrophils

47. Marginating granulocytes in the peripheral blood can be found:
a. In the circulating pool
b. In the tissues
c. Adhering to the vascular endothelium
d. All of the above

48. The half-life of circulating granulocytes in normal blood is estimated to be:
a. 2.5 to 5 hours
b. 7 to 10 hours
c. 24 hours
d. 2 days

49. The earliest granulocytic maturational stage in which secondary or specific granules appear is:
a. Myeloblast
b. Monoblast
c. Promyelocyte
d. Myelocyte

50. A leukocyte with the morphological characteristics of being the largest normal mature leukocyte in the peripheral blood and having a convoluted or twisted nucleus is the:
a. Myelocyte
b. Metamyelocyte
c. Promonocyte
d. Monocyte

51. On the basis of the following data, calculate the absolute value of the segmented neutrophils. Total leukocyte count = 12 x 109/L; percentage of segmented neutrophils on the differential count = 80%. The absolute segmented neutrophil value is:
a. 2.5 x 109/L
b. 4.5 x 109/L
c. 6.5 x 109/L
d. 9.6 x 109/L

52. An increase in metamyelocytes, myelocytes, and promyelocytes can be referred to as:
a. Leukocytopenia
b. A shift to the right
c. A shift to the left
d. Pelger-Huet anomaly

53. Faggot cells are predominantly seen in which type of leukemia?
a. M1
b. M2
c. M3
d. M4

54. The most characteristic morphological feature of variant lymphocytes include
a. Increased overall size, possibly 1-3 nucleoli, and abundant cytoplasm
b. Increased overall size, round nucleus, and increased granulation in the cytoplasm
c. Segmented nucleus, light-blue cytoplasm, and no nucleoli
d. Enlarged nucleus, 6-8 nucleoli, and dark-blue cytoplasm

55. An abnormal plasma cell with red-staining cytoplasm is a
a. Russell body
b. Mott cell
c. Grape cell
d. Flame cell

56. Which antibody test has replaced the LE cell preparation in the diagnosis of SLE?
a. Rheumatoid arthritis factor
b. ANA test
c. Complement fixation test
d. Antibody Smith test

57. An acute leukemia can be described as being
a. Of short duration with many mature leukocyte forms in the peripheral blood
b. Of short duration with many immature leukocyte forms in the peripheral blood
c. Of short duration with little alteration of the leukocytes of the peripheral blood
d. Of long duration with many mature leukocyte forms in the peripheral blood

58. Characteristics of FAB M1 include:
a. Leukocytosis with maturation of the myeloid cell line in the peripheral blood
b. Leukocytosis with maturation of the lymphocytic cell line in the peripheral blood
c. Leukocytosis without maturation of the myeloid cell line in the peripheral blood
d. Leukocytosis with many mature leukocytes in the peripheral blood

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

59. The Sudan black B cytochemical stain differentiates
a. Acute myeloid from ALL
b. Acute monocytic from AML
c. Myeloid leukemia from a leukemoid reaction
d. Acute myeloid from acute myelomonocytic leukemia

60. Naphthol AS-D chloroacetate differentiates:
a. Granulocytic from the monocytic cell line
b. Promyelocytes from myelocytes
c. Monoblasts from myeloblasts
d. Metamyelocytes from myelocytes

61. CLL is classically a
a. T-cell disorder
b. B-cell disorder
c. Null cell disorder
d. Disorder of the young

62. The abnormal protein frequently found in the urine of persons with multiple myeloma is
a. Albumin
b. Globulin
c. IgG
d. Bence Jones

63. The ALP cytochemical staining reaction is used to differentiate between
a. CLL and AML
b. ALL and AML
c. CML and severe bacterial infections
d. Leukemoid reactions and severe bacterial infections

64. The Philadelphia chromosome is typically associated with
a. AML
b. Leukemoid reactions
c. ALL
d. CML

65. The primary treatment for PV is:
a. Therapeutic phlebotomy
b. Myelosuppressive agents
c. Radioactive phosphorus
d. Low-dose busulfan

66. The level of EPO in the urine is ____ in patients with PV compared with other kinds of polycythemia
a. Increased
b. The same
c. Variable
d. Decreased

67. The initiating stimulus to blood coagulation following injury to a blood vessel is:
a. Contact activation with collagen
b. Vasoconstriction
c. Stenosis
d. Release of serotonin

68. The cellular ultrastructural component(s) unique to the platelet is/are:
a. Cytoplasmic membrane
b. Glycocalyx
c. Mitochondria
d. Microtubules

69. Choose the incorrect statement regarding storage granules related to hemostasis in the mature platelet.
a. Alpha-granules contain platelet factor 4, beta-thromboglobulin, and platelet-derived growth factor
b. Alpha-granules contain platelet fibrinogen and von Willebrand factor
c. Dense bodies contain serotonin and ADP
d. Lysosomes contain actomyosin, myosin, and filamin

70. At all times, approximately ___ of the total number of platelets are in the systemic circulation.
a. One-fourth
b. One-third
c. One-half
d. Two-thirds

71. The reference range of platelets in the systemic circulation is:
a. 50-150 x 109/L
b. 100-200 x 109/L
c. 150-350 x 109/L
d. 150-450 x 109/L

72. If 10 platelets are seen per OIO, what is the approximate platelet count?
a. 50 x 109/L
b. 100 x 109/L
c. 150 x 109/L
d. 200 x 109/L

73. Aspirin ingestion has the following hemostatic effect in a normal person:
a. Prolongs the bleeding time
b. Prolongs the clotting time
c. Inhibits factor VIII
d. Has no effect

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

74. The bleeding time test measures
a. The ability of platelets to stick together
b. Platelet adhesion and aggregation on locally injured vascular subendothelium
c. The quantity and quality of platelets
d. Antibodies against platelets

75. This component is essential for normal platelet aggregation:
a. Calcium
b. Glycoprotein Ib
c. VWF
d. Glycoprotein IIb-IIIa complex

76. The clot retraction test is:
a. A visible reaction to the activation of platelet actomyosin (thrombosthenin)
b. A reflection of the quantity and quality of platelets and other factors
c. A measurement of the ability of platelets to stick to glass
d. A measurement of the cloudiness of blood

77. The extrinsic pathway of coagulation is triggered by the entry of ____ into the circulation.
a. Membrane lipoproteins (phospholipoproteins)
b. Tissue thromboplastin
c. Ca2+
d. Factor VII

78. Prothrombin to thrombin conversion is accelerated by:
a. A complex of activated factors IX and VII
b. Factor V and ionized calcium
c. A complex of phospholipids and factor VII
d. A complex of activated factors X and V

79. The phase contrast microscope is employed in which platelet count method?
a. Rees-Ecker
b. Brecker-Cronkite
c. Indirect
d. Coulter

80. If a pediatric preoperative patient has a family history of bleeding but has never had a bleeding episode herself, what test should be included in a coagulation profile in addition to the PT, aPTT, and platelet count?
a. Lee-White clotting time
b. Clot retraction
c. Bleeding time
d. FSPs

81. A patient with a severe decrease in factor X activity would demonstrate normal
a. aPTT
b. PT
c. Thrombin time
d. Bleeding time

82. Neither the aPTT nor the PT detects a deficiency of:
a. PF3
b. Factor VII
c. Factor VIII
d. Factor IX

83. Liver disease is characterized by all of the following, except:
a. Prolonged PT
b. Acanthocytosis
c. Decreased factor VIII
d. Decreased fibrinogen

84. If a child ingested rat poison, which of the following tests should be performed to test the effect of the poison on the child's coagulation mechanism?
a. aPTT
b. PT
c. Fibrinogen assay
d. Thrombin time

85. A patient has a prolonged aPTT and a normal PT. The aPTT is not corrected by factor VIII-deficient plasma but is corrected by factor IX-deficient plasma. In which factor does the patient appear to be deficient?
a. Factor II
b. Factor V
c. Factor VIII
d. Factor IX

86. Hemorrhagic disease of newborns is often due to hypoprothrombinemia. This condition may be prevented by giving expectant mothers adequate doses of:
a. Vitamin A
b. Vitamin C
c. Vitamin D
d. Vitamin K

87. Which of the following is/are characteristic of protein C?
a. It is not vitamin K-dependent
b. It is formed in response to thrombin generation
c. It inactivates factors Va and VIIIa
d. Both B and C

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

88. Laboratory results in acute DIC reflect abnormalities in which of the following coagulation components?
a. Platelet function
b. Excessive clotting and fibrinolysis
c. Accelerated thrombin formation
d. Fibrin formation

89. 5M urea or 1% monochloroacetic acid are reagents used in tests for which plasma factor deficiency?
a. VIII
b. IX
c. XII
d. XIII

90. A condition characterized by the presence of large platelets with Dohle-like bodies in leukocytes
a. Wiskott-Aldrich
b. May-Hegglin
c. Bernard-Soulier
d. Alport syndrome

91. A positive protamine sulfate test is suggestive of:
a. DIC
b. vWD
c. Glanzmann's thrombasthenia
d. Primary fibrinolysis

92. A platelet count of 100,000-150,000/uL is reported as:
a. Normal
b. Low Normal
c. Slightly decreased
d. Moderately decreased

93. What is the appropriate procedure and characteristic for the Westergren method?
a. The diluting solution lyses RBCs with propylene glycol and contains sodium carbonate and water
b. The procedure measures the rate of erythrocyte settling.
c. Ferrous ions are oxidized to the ferric state.
d. The diluting solution is either 1% HCl or 2% acetic acid.

94. What source of error will have the greatest effect on PCV?
a. Incorrect dilution of blood and diluent
b. Hemolysis of whole blood specimen
c. Excessive anticoagulant will produce shrinkage of cells
d. Incorrect gauge used in specimen collection

95. A normal blood smear should have no more than approximately ___ (maximum) number of platelets per OIF in an area where the erythrocytes are just touching each other
a. 10
b. 15
c. 20
d. 25

96. Leukocytes that demonstrate a positive reaction in the tartrate acid-resistant acid phosphatase cytochemical stain are the lymphocytes seen in:
a. Infectious lymphocytosis
b. Malignant lymphoma
c. ALL (non-T type)
d. Hairy cell leukemia

97. A decreased LAP score is seen in:
a. PV
b. CML
c. Leukemoid reactions
d. AML

98. In the LAP procedure, blood smears should be stained
a. Within 8 hours of specimen collection
b. Within 48 hours of specimen collection
c. Within 72 hours of specimen collection
d. Within 5 days of specimen collection

99. The reagent used in the traditional sickle cell screening test is
a. Sodium chloride
b. Sodium citrate
c. Sodium metabisulphite
d. Sodium-potassium oxalate

100. The abbreviation laser stands for:
a. Light-associated simulated emission of radiation
b. Largely amplified by simulated emission of radiation
c. Light amplified by stimulated emission of radiation
d. Liquid amplified by stimulated emission of radiation

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

1. In obese patients, veins may be neither readily visible nor easy to palpate. Sometimes the use of a blood pressure cuff can aid in locating a vein. The cuff should:
a. Inflated higher than 40 mm Hg and should be left on the arm for longer than 1 minute
b. Inflated higher than 40 mmHg and should not be left on the arm for longer than 1 minute
c. Not be inflated any higher than 40 mm Hg and should be left on the arm for longer than 1 minute
d. Not be inflated any higher than 40 mm Hg and should not be left on the arm for longer than 1 minute

2. Basophilic stippling represents:
a. DNA
b. Precipitated denatured hemoglobin
c. Granules of ribosomes and RNA
d. Aggregates of iron, mitochondria and ribosomes

3. Which of the following hematologic tests may not be part of the usual complete blood count?
a. Hematocrit
b. Hemoglobin
c. Platelet estimate
d. Reticulocyte count

4. When comparing von Willebrand's disease and Glanzmann's thrombasthenia, Glanzmann's thrombasthenia will demonstrate:
a. Absent ADP
b. Normal clot retraction
c. Abnormal ristocetin aggregation
d. Abnormal release of ADP

5. The Philadelphia chromosome is formed by a translocation between:
a. Chromosome 22 and chromosome 9
b. Chromosome 21 and chromosome 9
c. Chromosome 21 and chromosome 6
d. Chromosome 22 and chromosome 6

6. In measuring platelet aggregation, platelet-rich plasma can be treated with ___ to aggregate platelets
a. Saline
b. Collagen
c. Epinephrine
d. Both B and C

7. Which parameters are calculated rather than directly measured?
a. Hematocrit and erythrocyte distribution width
b. Erythrocyte count and leukocyte count
c. Leukocyte count and hematocrit
d. Platelet count and platelet volume

8. What is the first type of cell produced by the developing embryo?
a. Erythrocyte
b. Granulocyte
c. Lymphocyte
d. Thrombocyte

9. A manual WBC count is performed. Eighty WBCs are counted in the four large corner squares of a Neubauer hemocytometer. The dilution is 1:100. What is the total WBC count?
a. 4.0 × 10^9/L
b. 8.0 × 10^9/L
c. 20.0 × 10^9/L
d. 200.0 × 10^9/L

10. The type of hemoglobin that is detectable with the Kleihauer-Betke test is:
a. A
b. A2
c. F
d. S

11. A preanalytical error can be introduced by:
a. Drawing a coagulation tube before an EDTA tube
b. Mixing an EDTA tube 8-10 times
c. Vigorously shaking of blood tube
d. Transporting the specimen in a biohazard bag

12. The transfer of iron from the enterocyte into the plasma is regulated by:
a. Transferrin
b. Ferroportin
c. Hephaestin
d. Hepcidin

13. The major application of flow cytometry is:
a. Determining cell size and granularity
b. Sorting of cells and cellular identification using monoclonal antibodies
c. Treating cancer cells and identifying specific virus types
d. Counting leukocytes and platelets

14. A laboratory assay that can be used to differentiate a leukemoid reaction from chronic myelogenous leukemia is:
a. Leukocyte alkaline phosphatase (LAP) stain
b. Erythrocyte sedimentation rate (ESR)
c. Assessment of the shift to the left
d. Absolute neutrophil count

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

15. Acceptable limits of a control value must fall:
a. Within ±1 standard deviation of the mean
b. Between 1 and 2 standard deviations of the mean
c. Within ±2 standard deviations of the mean
d. Within ±3 standard deviations of the mean

16. All the megakaryocyte progenitor stages resemble ___ and cannot be distinguished by Wright-stained microscopy.
a. Lymphocyte
b. Monocyte
c. Neutrophil
d. Eosinophil

17. All are fibrin degradation products, EXCEPT:
a. Fragment E
b. Fragment X
c. Fragment Z
d. Fragment D

18. What is the best way to clean up blood that has dripped on the arm of a phlebotomy chair?
a. Absorb it with a gauze pad and clean the area with disinfectant.
b. Rub it with a damp cloth and wash the area with soap and water.
c. Wait for it to dry and then scrape it into a biohazard container.
d. Wipe it with an alcohol pad using an outward circular motion

19. Lymphocyte development in the thymus and bursal equivalent are:
a. Antigen-independent
b. Antigen-dependent
c. Antibody-independent
d. Antibody-dependent

20. A peripheral blood smear can be prepared from:
a. EDTA-anticoagulated blood within 1 hour of collection
b. Free-flowing capillary blood
c. Citrated whole blood
d. Both A and B

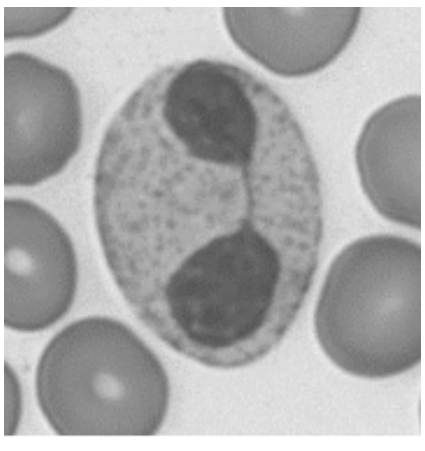
21. When encountering a patient with a fistula, the phlebotomist should:
a. Apply the tourniquet below the fistula
b. Use the other arm
c. Collect the blood from the fistula
d. Attach a syringe to the T-tube connector

22. RBC with membrane folded over:
a. Aplastic anemia
b. Iron deficiency anemia
c. Hemoglobin C, hemoglobin SC disease
d. Sickle cell anemia, thalassemia

23. A combined scatter histogram measure:
a. Overall size versus nuclear size
b. Cytoplasm-to-nucleus ratio
c. Cell size and granularity
d. Cell shape and cytoplasmic color

24. A hemoglobin molecule is composed of:
a. 4 heme, 4 globin, 2 iron
b. 4 heme, 2 globin, 2 iron
c. 2 heme, 2 globin, 2 iron
d. 4 heme, 4 globin, 4 iron

25. Study the picture below. Which of the following cells is being illustrated?



a. Reed-sternberg cell
b. Sezary cell
c. Reider cell
d. Pelger-Huet cell

26. Effect of increased amounts of 2,3-DPG to oxygen affinity of the hemoglobin molecule
a. Increases
b. Decreases
c. Do not alter
d. Variable

27. Vitamin K dependent coagulation factor:
a. II
b. V
c. VIII
d. XIII

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

28. In cold-type AIHA
a. IgM, usually anti-I is present
b. Rh antibodies are the most frequent cause
c. IgM usually occurs in newborn infants
d. Autoantibodies are present

29. Orthogonal Light Scatter is used to measure:
a. Cell nuclear volume
b. Internal complexity of the cell
c. Cellular granularity
d. Nuclear density

30. The extrinsic pathway of coagulation is triggered by the entry of ___ into the circulation.
a. Membrane lipoproteins
b. Tissue thromboplastin
c. Calcium
d. Factor VII

31. Which test result would be normal in a patient with dysfibrinogenemia?
a. Thrombin time
b. APTT
c. PT
d. Immunologic fibrinogen level

32. The fibrometer relies on the principle of:
a. Clot elasticity
b. Fibrin adhesion
c. Conduction or impedance of an electrical current by fibrin
d. Changes in optical density

33. Which of the following is NOT a characteristic of platelets?
a. Size of 2 to 4 μm
b. The presence of a nucleus
c. A discoid shape as an inactive cell
d. Cytoplasm is light blue with fine red-purple granules

34. The MPV is:
a. Analogous to the MCHC
b. A direct measure of the platelet count
c. A measurement of the average volume of platelets
d. A comparison of the patient's value to the normal value

35. The venipuncture needle should be inserted into the arm with the bevel facing:
a. Down and an angle of insertion between 15 and 30 degrees
b. Up and an angle of insertion less than 30 degrees
c. Down and an angle of insertion greater than 45 degrees
d. Up and an angle of insertion between 30 and 45 degrees

36. Insufficient centrifugation will result in:
a. A false increase in hematocrit (Hct) value
b. A false decrease in Hct value
c. No effect on Hct value
d. All of these options, depending on the patient

37. The cytochemical stain that can demonstrate iron, hemosiderin and ferritin is:
a. New methylene blue
b. Romanowsky
c. Prussian blue
d. Wright-Giemsa

38. According to the WHO classification, except in leukemias with specific genetic anomalies, the minimal percentage of blasts necessary for a diagnosis of acute leukemia is:
a. 10%
b. 20%
c. 30%
d. 50%

39. An unconscious inpatient does not have an ID band. The name on an envelope on the patient's nightstand matches with the requisition. What should you do?
a. Ask the nurse to verify the patient's ID and collect the specimen.
b. Complete the required procedure and then file an incident report.
c. Do not start any procedure until the nurse attaches an ID bracelet.
d. Make a computer entry to alert other phlebotomists of the issue.

40. Which of the following blood film findings indicates EDTA-induced pseudothrombocytopenia?
a. The platelets are pushed to the feathered end.
b. The platelets are adhering to WBCs.
c. No platelets at all are seen on the film.
d. The slide has a bluish discoloration when examined macroscopically.

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

41. Reticulated platelets can be enumerated in peripheral blood to detect:
a. Impaired production in disease states
b. Abnormal organelles associated with diseases such as leukemia
c. Increased platelet production in response to need
d. Inadequate rates of membrane cholesterol exchange with the plasma

42. If a blood smear is too long, the problem can be resolved by:
a. Decreasing the angle of the pusher slide
b. Increasing the angle of the pusher slide
c. Using a larger drop of blood
d. Pushing the slide slower in smearing out the blood

43. As a blood cell matures, the overall cell diameter in most cases:
a. Increases
b. Decreases
c. Remains the same
d. Variable

44. Detects lymphocytic cells and certain abnormal erythrocytic cells by staining of cytoplasmic glycogen:
a. MPO
b. SBB
c. PAS
d. Tdt

45. The primary pathophysiologic mechanism of anemia associated with chronic kidney disease is:
a. Inadequate production of erythropoietin
b. Excessive hemolysis
c. Hematopoietic stem cell mutation
d. Toxic destruction of stem cells

46. The defect in Paroxysmal Nocturnal Hemoglobinuria is a/an ___ associated defect of the RBC membrane.
a. Structural protein
b. Hemoglobin
c. Antibody
d. Enzyme

47. Platelets interacting with and binding with other platelets is referred to as:
a. Adhesion
b. Aggregation
c. Release
d. Retraction

48. The test reagent in PT contains which of the following substance(s)?
1. Calcium ions
2. Kaolin
3. Tissue thromboplastin
4. Celite

a. 1, 2 and 3 are correct
b. 1 and 3 are correct
c. 2 and 4 are correct
d. Only 4 is correct

49. The recommended cleaner for removing oil from objectives is:
a. Lens cleaner or Xylene
b. 70% alcohol or Lens cleaner
c. Xylene or 70% alcohol
d. NOTA

50. The size threshold range used by electrical impedance methods to count particles as platelets is
a. 0-10 fL
b. 2-20 fL
c. 15-40 fL
d. 35-90 fL

51. Delta checks identify:
a. Random error
b. Shift
c. Trend
d. Gross error

52. The RDW and MCV are both quantitative descriptors of erythrocyte size. If both are increased, the most probable erythrocytic abnormality would be:
a. Iron deficiency anemia
b. Acquired aplastic anemia
c. Megaloblastic anemia
d. Hemoglobinopathy

53. Which of the following is considered to be an advantage of the mechanical end-point detection methodology?
a. It has the ability to provide a graph of clot formation
b. It can incorporate multiple wavelengths into a single testing sequence
c. It is not affected by lipemia in the test sample
d. It can measure proteins that do not have fibrin formation as the end-point

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

54. The bleeding time test measures:
a. Ability of platelets to stick together
b. Platelet adhesion and aggregation of locally injured vascular subendothelium
c. Quantity and quality of platelets
d. Antibodies against platelets

55. The final common pathway of the intrinsic-extrinsic pathway is:
a. Factor X activation
b. Factor II activation
c. Factor I activation
d. Factor XII activation

56. Which is the first stage of erythrocytic maturation in which the cytoplasm is pink due to the formation of hemoglobin?
a. Reticulocyte
b. Pronormoblast
c. Basophilic normoblast
d. Polychromatic normoblast

57. Which characteristic is inaccurate with respect to the anticoagulant K3 EDTA?
a. Removes ionized calcium (Ca2+) from fresh whole blood by the process of chelation
b. Is used for most routine coagulation studies
c. Is the most commonly used anticoagulant in hematology
d. Is conventionally placed in lavender-stoppered evacuated tubes

58. What does “S” in VCS Hematology Coulter Technology stands for?
a. Standard
b. Scatter
c. System
d. Slide

59. All of the following are acceptable sites for blood collection, EXCEPT
a. Palmar surface of the hand
b. Dorsal surface of the hand
c. Lateral sides of ankle
d. Ventral wrist

60. Relative polycythemia exists when:
a. Increased erythropoietin is produced
b. Total blood volume is expanded
c. Plasma volume is increased
d. Plasma volume is decreased

61. Which of the following can be found in a patient with classic megaloblastic anemia?
a. Ovalocytes and hypersegmented neutrophils
b. Hypochromic macrocytes and variant lymphocytes
c. Howell-Jolly bodies and Pappenheimer bodies
d. Lymphocytosis

62. Smudge cells are associated with:
a. Niemann Pick disease and Burkitt’s lymphoma
b. CLL
c. Leukosarcoma
d. Natural artifact

63. Myeloid and monocytic acute leukemias are classified as FAB:
a. M1
b. M4
c. M5
d. L1

64. Which of the following is/are characteristic of protein C?
a. It is not vitamin K-dependent
b. It is formed in response to thrombin generation
c. It inactivates factors Va and VIIIa
d. Both B and C

65. The restriction of data analysis to one cell population is accomplished by:
a. Amplification
b. Gating
c. Compensatory monitoring
d. Data limitation

66. Which clinical or specimen condition will produce an increased Westergren ESR method test result?
a. Splenectomy
b. Rouleaux formation
c. Polycythemia
d. Hemolytic anemia crisis

67. The normal sequence of blood cell development is:
a. Yolk sac—red bone marrow—liver and spleen
b. Yolk sac—thymus—liver and spleen—red bone marrow
c. Yolk sac—liver and spleen—red bone marrow
d. Liver and spleen—yolk sac—red bone marrow

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

68. True of endoreduplication, EXCEPT
a. Duplicates DNA without cell division
b. Results in cells with ploidy values of 4n, 8n, 16n and 32n
c. Is unique to the megakaryocytic type of blood cell
d. Duplicates DNA with cell division

69. What happens if a coagulation specimen collection tube is underfilled?
a. The specimen clots and is useless
b. The specimen is hemolyzed and is useless
c. Clot-based test results are falsely prolonged
d. Chromogenic test results are falsely decreased

70. This component is essential for normal platelet aggregation:
a. Calcium
b. Glycoprotein Ib
c. VWF
d. Glycoprotein IIb-IIIa complex

71. Neither the APTT nor the PT detects a deficiency of:
a. Platelet factor 3
b. Factor VII
c. Factor VIII
d. Factor IX

72. RBCs are too pale and or red, WBCs are barely visible. All are probable causes, EXCEPT
a. Stain or buffer too acidic
b. Underbuffering
c. Over-rinsing
d. Heparinized blood sample

73. An increase in metamyelocytes, myelocytes and promyelocytes can be referred to as:
a. Leukocytopenia
b. Shift to the right
c. Shift to the left
d. Pelger-Huet anomaly

74. Thrombin
a. II
b. IIa
c. VIII
d. IV

75. A 7.0-mL EDTA tube is received in the laboratory containing only 2.0 mL of blood. If the laboratory is using manual techniques, which of the following tests will most likely be erroneous?
a. RBC count
b. Hemoglobin
c. Hct
. WBC count

76. A positive protamine sulfate test is suggestive of:
a. DIC
b. vWD
c. Glanzmann's thrombasthenia
d. Primary fibrinolysis

77. In an erythrocyte histogram, the erythrocytes that are larger than normal will be to the ____ of the normal distribution curve.
a. Right
b. Left
c. Middle
d. Variable

78. Which of the following is characteristic of Dohle body inclusions?
a. Gigantic peroxidase positive deposits
b. Precipitated mucopolysaccharides
c. Dark blue cytoplasmic inclusions
d. Single or multiple pale-blue staining inclusions

79. What single feature of normal RBCs is most responsible for limiting their life span?
a. Loss of the nucleus
b. Increased flexibility of the cell membrane
c. Reduction of hemoglobin iron
d. Loss of mitochondria

80. Fibrinogen is converted to thrombin monomers by
a. Prothrombin
b. Thrombin
c. Calcium ions
d. Factor XIIIa

81. Heparin inhibits clotting by
a. Preventing the activation of prothrombin
b. Chelation of calcium
c. Causing the liver synthesis of nonfunctional factors
d. Enhancing the function of antithrombin

82. If a small blood clot exists in an anticoagulated blood specimen, which blood cell parameter will be affected the most?
a. Leukocyte count
b. Erythrocyte count
c. Platelet count
d. Microhematocrit

83. Reticulocytes can be detected using ___ stain.
a. New methylene blue
b. Thiazole orange
c. Propidium iodide
d. Both A and B

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

84. What is the average diameter of RBCs?
a. 5.2 um
b. 6.4 um
c. 7.2 um
d. 8.4 um

85. What is the usual shape of platelets in citrated blood?
a. Cylindrical and beaded
b. Biconvex and discoid
c. Spherical or round with pseudopods
d. Round

86. The reference range of platelets in the systemic circulation is:
a. 50 to 120 x 10^9/L
b. 100 to 200 x 10^9/L
c. 150 to 350 x 10^9/L
d. 150 to 400 x 10^9/L

87. Acute leukemia can be described as being:
a. Short duration with many mature leukocyte forms in the peripheral blood
b. Short duration with many immature leukocyte forms in the peripheral blood
c. Short duration with little alteration of the leukocytes of the peripheral blood
d. Long duration with many mature leukocyte forms in the peripheral blood

88. Which of the following is NOT associated with hemolytic anemia?
a. Decrease hemoglobin and packed cell volume
b. Increased reticulocyte count
c. Increased serum haptoglobin
d. Decreased erythrocyte survival

89. Hypoxia stimulates RBC production by:
a. Inducing more pluripotent stem cells into the erythroid lineage
b. Stimulating EPO production by the kidney
c. Increasing the number of RBC mitoses
d. Stimulating the production of fibronectin by macrophages of the bone marrow

90. All of the following factors may influence the erythrocyte sedimentation rate (ESR), EXCEPT:
a. Blood drawn into a sodium citrate tube
b. Anisocytosis
c. Plasma proteins
d. Poikilocytosis

91. RU flag, EXCEPT:
a. Nucleated RBCs
b. RBC fragments
c. RBC agglutination
d. Cold agglutinins

92. Faggot cells are predominantly seen in which type of leukemia?
a. M1
b. M2
c. M3
d. M4

93. Which of the following inclusions is only visible with supravital staining?
a. Basophilic stippling
b. Cabot rings
c. Heinz Bodies
d. Pappenheimer bodies

94. What is the area counted for manual platelet count?
a. 0.2 mm^2
b. 1 mm^2
c. 1.5 mm^2
d. 4 mm^2

95. Normal adult hemoglobin has:
a. Two alpha and two delta chains
b. Three alpha and one beta chains
c. Two alpha and two beta chains
d. Two beta and two epsilon chains

96. If 10 platelets are seen per OIO, what is the approximate platelet count?
a. 50 x 10^9/L
b. 100 x 10^9/L
c. 150 x 10^9/L
d. 200 x 10^9/L

97. What are the fibrinogen levels in Hemophilia A, B, and C, respectively?
a. Increased, increased, increased
b. Normal, normal, normal
c. Decreased, decreased, decreased
d. Increased, decreased, increased

98. The least mature specific progenitor:
a. MK-I
b. BFU-Meg
c. LD-CFU-Meg
d. MK-III

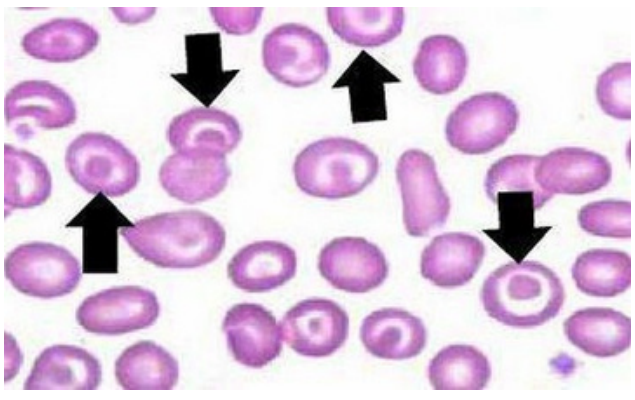
MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

99. What growth factor is produced in the kidneys and is used to treat anemia associated with kidney disease?

a. EPO
b. TPO
c. G-CSF
d. KIT ligand

100. Study the picture below. Which of the following poikilocytes is being illustrated?



a. Stomatocytes
b. Codocytes
c. Acanthocytes
d. Drepanocyte

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

1. Three standard deviations (3SD) from the mean in normal distribution curve would include
a. 99% of all values
b. 95% of all values
c. 75% of all values
d. 68% of all values

2. The delta check method of quality control
a. Uses the patient's own data to monitor population values
b. Uses batches of 20 samples to track MCV, MCH, and MCHC values
c. Compares the patient's leukocyte and platelet counts with his or her previous results
d. Monitors the patient's values within two SDs of the mean

3. Acceptable limits of a control value must fall
a. Within ± 1 SD of the mean
b. Between 1 and 2 SD of the mean
c. Within ± 2 SD of the mean
d. Within ± 3 SD of the mean

4. What is the average diameter of a normal erythrocyte in µm?
a. 5.2
b. 6.4
c. 7.2
d. 8.4

5. What is the average amount of blood in Liters?
a. 5 Liters
b. 6 Liters
c. 7 Liters
d. 8 Liters

6. Which of the following is the composition of hemoglobin?
a. 2 heme, 4 oxygen, 2 globin
b. 4 heme, 2 oxygen, 4 globin
c. 4 heme, 4 oxygen, 4 globin
d. 2 heme, 2 oxygen, 2 globin

7. The greatest portion of operational body iron is normally contained in what compound?
a. Hemoglobin
b. Ferritin
c. Cytochromes
d. Myoglobin

8. The presence of nucleoli is associated with:
a. Immature cells
b. All young cells, except myeloblasts
c. Only erythroblasts
d. Disintegrating cells

9. As blood cell matures, the overall cell diameter in most cases:
a. Increases
b. Decreases
c. remains the same
d. varies

10. The nucleated erythrocyte with a reddish-pink cytoplasm and condensed chromatin pattern is
a. Rubricyte
b. Basophilic normoblast
c. Metarubricyte
d. Either B and C

11. With a normal diet, an erythrocyte remains in the reticulocyte stage in the circulating blood for how many days?
a. 1 day
b. 2.5 days
c. 3 days
d. 120 days

12. The normal range for reticulocytes in adults is:
a. 0% to 0.5%
b. 0.5% to 1.0%
c. 0.5% to 2.5%
d. 1.5% to 2.5%

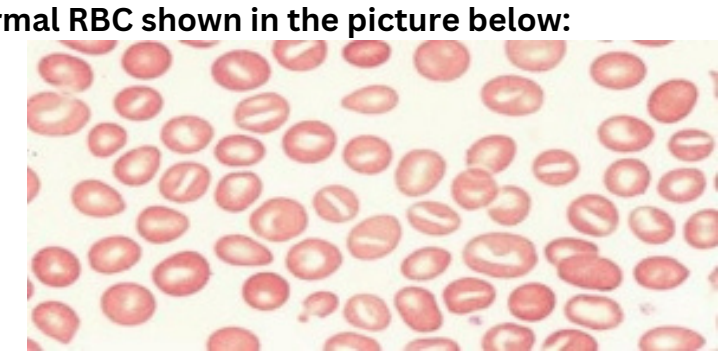
13. What is the appropriate reagent for the reticulocyte count?
a. New methylene blue
b. Phloxine B
c. Eosin Y
d. A and B

14. A morphological description of echinocytes is
a. Short, scalloped, or spike-like projections that are regularly distributed
b. Fragments of erythrocytes
c. The scooped-out part of an erythrocyte that remains after a blister cell ruptures
d. presence of irregularly spaced, spiky projections or thorn-like protrusions

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

15. Identify the abnormal RBC shown in the picture below:



a. Helmet cell
b. Burr cells
c. Spur cells
d. Stomatocyte

16. Which of the following represents an imbalance between erythrocytic and plasma lipids?
a. Sickle cell
b. Schistocytes
c. Macrocytes
d. Spur cell

17. Decreased amounts of 2,3-DPG _____ the oxygen affinity of the hemoglobin molecule?
a. Decreases
b. Increases
c. Does not alter
d. Variable

18. The following are classification of anemias is based upon, EXCEPT?
a. Impaired red cell production
b. Accelerated red cell destruction
c. Blood loss
d. Insufficient Hemoglobin

19. What is the initial laboratory test that are performed for the diagnosis of anemia?
a. CBC, iron studies, and reticulocyte count
b. CBC, reticulocyte count, and peripheral blood film examination
c. Reticulocyte count and serum iron, vitamin B12, and folate assays
d. Bone marrow study, iron studies, and peripheral blood film examination

20. Which is a characteristic of anemia of renal disease?
a. Severe hemochromatosis with microcystosis
b. Normocytic, hypochromic
c. Presence of burr cells in PBS
d. Normocytic, normochromic

21. Which of the following condition is characterized by the absence of CD55 (DAF) and CD 59 (MIRL) on the surface of RBCs rendering it susceptible to spontaneous lysis by complement?
a. PCH
b. PNH
c. HUS
d. DIC

22. Which of the following blood film findings indicate EDTA-induced pseudothrombocytopenia?
a. Platelets are pushed to the feathered end
b. Platelets are adhering to WBCs
c. No platelets at all are seen on the film
d. Slide has a bluish discoloration when examined macroscopically

23. If a small blood clot exists in an anticoagulated blood specimen, which blood parameter will be affected the most?
a. Leukocyte count
b. Erythrocyte count
c. Platelet count
d. Microhematocrit

24. What is the effect of insufficient centrifugation in hematocrit measurement?
a. False increase
b. False decrease
c. Increase
d. Decrease

25. If a blood smear is too long, the problem can be resolved by:
a. decreasing the angle of the pusher slide
b. increasing the angle of the pusher slide
c. using a larger drop of blood
d. pushing the slide slower in smearing out the blood

26. Which of the following should be observed macroscopically if the smear was properly stained?
a. Bluish-purple
b. Reddish-purple
c. Pink-Purple
d. Bluish-green

27. If a blood smear stains too red on microscopic examination of a Wright-stained preparation, possible causes include that:
I. the staining time was too long
II. the stain was too basic
III. the buffer was too acidic
IV. exposure time was too short

a. I and II
b. II and IV
c. I and III
d. III and IV

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

28. The screening test for Hb S that uses a reducing agent, such as sodium dithionite, is based on the fact that hemoglobins that sickle:

a. Are insoluble in reduced, deoxygenated form
b. Form methemoglobin more readily and cause a color change
c. Are unstable and precipitate as Heinz bodies
d. Oxidize quickly and cause turbidity

29. If an alkaline electrophoresis is performed Hemoglobin E has the same motility as hemoglobin

a. HbS
b. HbF
c. HbA
d. HbC

30. How does increased plasma proteins like fibrinogen and globulins affect ESR results?

a. Increased ESR
b. Decreased ESR
c. Normal ESR
d. Variable

31. The dark staining granules in the RBC when a bone marrow smear stained with Prussian blue stain is examined represent a defect of?

a. Membrane development
b. Hemoglobin synthesis
c. Globulin synthesis
d. Red blood cell aging

32. Earliest granulocytic maturational stage in which specific or secondary granules appear?

a. Myeloblast
b. Monoblast
c. Promyelocyte
d. Myelocyte

33. Which of the following cells originates from the Common Lymphoid Progenitor lineage?

a. T cell
b. Neutrophil
c. RBCs
d. Macrophage

34. Which of the following best describes Pelger— Huet anomaly?

a. Dark blue-black precipitates of RNA.
b. Five or more nuclear segments
c. Failure of the nucleus to segment.
d. Precipitated mucopolysaccharides

35. Leukocytes that demonstrate a positive reaction in tartaric acid-resistant phosphatase cytochemical staining are the lymphocytes seen in

a. Infectious mononucleosis
b. Malignant lymphoma
c. ALL
d. Hairy Cell Leukemia

36. The Philadelphia chromosome translocation:

a. 8;21
b. 15;17
c. 9;22
d. 8;14

37. The presence of Auer rods in the peripheral blood is associated with which of the following cells?

a. Lymphoblast
b. Myeloblast
c. Reactive lymphocyte
d. Shift cell

38. Using FAB classification of AML, Myelomonocytic leukemia is equivalent to:

a. M1
b. M2
c. M3
d. M4

39. Electrical impedance principle of cell counting was originally developed by:

a. Coulter
b. Abott
c. Beckman
d. Sysmex

40. A patient peripheral blood film demonstrates agglutinated RBCs, and the CBC shows an elevated MCHC. What other parameters will be affected by the agglutination of the RBCs?

a. MCV will be decreased and RBC count will be increased.
b. MCV will be decreased and RBC count will be decreased.
c. MCV will be increased and RBC count will be decreased.
d. MCV will be increased and RBC count will be increased.

41. The following are major systems in a flow cytometer, EXCEPT?

a. Fluidics
b. Optics
c. Electronics
d. Gating

42. Which parameters are calculated rather than directly measured?

a. Hematocrit and erythrocyte distribution width
b. RBC count and WBC count
c. WBC count and Hematocrit
d. Platelet count and platelet volume

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

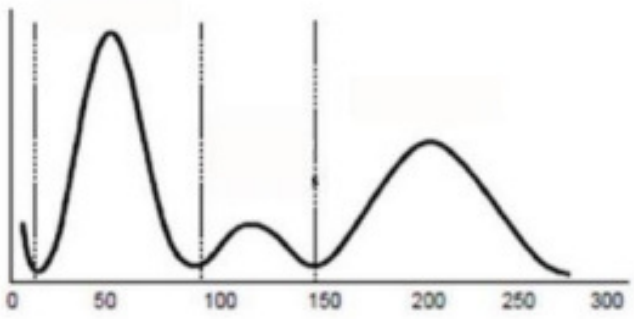
HEMATOLOGY EXAM

43. What does C in VCS hematology technology stand for?
a. Coagulability
b. Coulter
c. Conductivity
d. Counting

44. In an erythrocyte histogram, the erythrocyte that are larger than normal will be to the ____ of the normal distribution curve?
a. Left
b. Right
c. In the middle
d. Cannot be determined

45. Which of the following is sorted under mononuclear cells in a WBC histogram, EXCEPT?
a. Blast cells
b. Promyelocytes
c. Monocytes
d. Lymphocytes

46. In the WBC histogram, which cells are measured/ determined using the first peak?



a. Neutrophils
b. Basophils
c. Eosinophils
d. Lymphocytes

47. The sorting of leukocyte subpopulation in the WBC histogram determined by electrical impedance reflects the
a. Overall size
b. Relative size
c. Nuclear size
d. Chromatin pattern

48. The sorting of leukocyte subpopulation in the WBC histogram is primarily related to their?
a. Cytoplasmic size
b. Nuclear size
c. Concentration of granules
d. Cytoplasmic color

49. What measurement is made to determine the average volume of platelets?
a. MPV
b. PDW
c. RDW
d. MCV

50. The initiating stimulus to blood coagulation following injury to a blood vessel is
a. contact activation with collagen
b. vasoconstriction
c. stenosis
d. release of serotonin

51. Which of the following will NOT cause the thrombin time to be prolonged?
a. Fibrin degradation products
b. Heparin
c. Factory I deficiency
d. Factor II deficiency

52. Scott's syndrome results from
a. Defective granule secretion
b. Altered platelet aggregation
c. Altered expression of phospholipids on the platelet membrane
d. Deficiency of vitamin K-dependent clotting factors

53. Platelet aggregation will occur with the end product of:
a. Serotonin
b. Prostacyclin
c. Thromboxane A2
d. Prostaglandin

54. Most common acquired platelet dysfunction
a. HUS
b. DIC
c. Drug-induced
d. Heparin-induced

55. Which of the following is the most common of the hereditary platelet function defects?
a. Glanzmann thrombasthenia
b. Bernard-Soulier syndrome
c. Storage pool defects
d. Multiple myeloma

56. The clinical presentation of platelet-related bleeding may include all of the following EXCEPT:
a. Bruising
b. Nosebleeds
c. Gastrointestinal bleeding
d. Bleeding into the joints (hemarthroses)

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

57. If 10 platelets are seen per oil immersion field, what is the approximate platelet count?
a. 50 × 109/L
b. 100 × 109/L
c. 150 × 109/L
d. 200 × 109/L

58. If a pediatric preoperative patient has a family history of bleeding but has never had a bleeding episode herself, what test should be included in a coagulation profile in addition to the PT, aPTT, and platelet count?
a. Lee-White clotting time
b. Clot retraction
c. Bleeding time
d. Fibrin split products

59. Mucocutaneous hemorrhage is typical of:
a. Acquired hemorrhagic disorders
b. Localized hemorrhagic disorders
c. Defects in primary hemostasis
d. Defects in fibrinolysis

60. Which of the following is NOT a site of anatomic bleeding?
a. Orifices of the body
b. Soft tissue
c. Muscle
d. Joints

61. The coagulation factors referred to as "vitamin K□dependent" are
a. I,V,VIII,XIII
b. II,V,IX,XII
c. II,VII,IX,X
d. XI, XII, Fletcher, Fitzgerald

62. The following are a product of fragment X , EXCEPT?
a. Y
b. D
c. E
d. Z

63. What protein secreted by endothelial cells activates fibrinolysis?
a. Plasminogen
b. TPA
c. PAI-1
d. TAFI

64. What is the specimen of choice for the PT and APTT procedures?
a. platelet-rich plasma, citrated
b. PPP, citrated
c. serum
d. plasma, heparinized

65. In the photo-optical method, the change in light transmission versus the ____ is used to determine the activity of coagulation factors or stages.
a. Amount of patient's plasma
b. Amount of test reagent
c. Time
d. Temperature

66. Neither the aPTT nor the PT detects a deficiency of
a. Platelet factor 3
b. Factor VII
c. Factor VIII
d. Factor IX

67. The function of thromboplastin in the prothrombin test is to provide ____ to the assay
a. Kaolin
b. Fibrinogen
c. Phospholipoprotein
d. Thrombin

68. Which of the following is the appropriate principle or description of the antithrombin assay?
a. In the presence of heparin, thrombin is neutralized.
b. Measures the time require to generate thrombin and fibrin polymers via the intrinsic pathway
c. Measures inhibitors of specific factors
d. An in vivo measurement of platelet adhesion an aggregation on locally injured vascular subendothelium

69. Which laboratory test is used to investigate the hypercoagulable states?
a. thrombin time
b. plasminogen
c. APCR
d. euglobulin lysis

70. The following laboratory results were obtained from a 40-year-old woman: PT 20 seconds, APTT = 50 seconds, TT = 18 seconds. What is the most probable diagnosis?
a. Factor VII deficiency
b. Factor VIII deficiency
c. Factor X deficiency
d. Hypofibrinogenemia

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

71. Reference range for APTT
a. 2 to 8 minutes
b. 10 to 14 seconds
c. 20 to 35 seconds
d. 80% to 100%

72. What blood cell lineage is affected in Lazy Leukocyte Syndrome?
a. Lymphocytic Series
b. Erythrocytic Series
c. Neutrophilic Series
d. Monocytic Series

73. Excessive specimen agitation, called "cocktail Shaking", causes, EXCEPT:
a. Hemolysis or RBC rupture
b. Procoagulant activation
c. Platelet activation
d. Deterioration of clotting factors

74. Enucleation occurs at what stage of erythrocytic series?
a. Orthochromic erythroblast
b. Erythroblast
c. Reticulocyte
d. Mature RBC

75. What is the source of thromboplastin reagent in PT test?
a. Sheep lungs
b. Sheep brain
c. Rabbit liver
d. Rabbit brain

76. Which is True about flow cytometry?
a. In flow cytometry, the number of pulses generated is directly proportional to the number of cells counted
b. Flow cytometry has the advantage of being performed fast at the patient's bedside
c. Flow cytometry measures exclusively White blood cell volume and frequency
d. Flow cytometry can detect other particles like microorganisms, chromosomes, and proteins

77. What term is used to describe the ratio of yellow marrow and red marrow?
a. Bone marrow cellularity
b. Yellow marrow:red marrow index
c. M:E Ratio
d. Retrogression

78. Factor XII deficiency is associated with:
a. Hemorrhage
b. Epistaxis
c. Increased risk of thrombosis
d. Decreased risk of thrombosis

79. What is the characteristic appearance of platelets in Wiskott-Aldrich syndrome?
a. Giant
b. Tiny
c. Normal
d. Small

80. Which of the following coagulation factors is sensitive to PTT?
a. Factor VII
b. Factor XI
c. Factor X
d. Fibrinogen

81. Bluish coloration of the skin due to decrease oxygen level:
a. Hematoma
b. Cyanosis
c. Purpura
d. Petechiae

82. What initiates the extrinsic coagulation pathway?
a. Calcium
b. Factor VII
c. Tissue Thromboplastin
d. Platelets

83. A growth factor that is produced in the kidney and is used to treat anemia in patients with renal disorders
a. Kit Ligand (stem-cell growth factor)
b. Erythropoietin
c. Thrombopoietin
d. GM-CSF

84. The most predominant reported cases of AIHA (AUTO IMMUNE HEMOLYTIC ANEMIA):
a. WAIHA
b. CAIHA
c. Mixed CAIHA AND WAIHA
d. Drug Induced AIHA

85. Which of the following phenomena is not associated with conditions when blood samples for hemostasis are stored at refrigerated temperatures?
a. Activation of factor VII
b. Precipitation of Vwf
c. Activation of Prothrombin
d. Destruction of platelet activity and integrity

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

86. What is the reference method for manual platelet counting?
a. Slide counting
b. Brecher Cronkite method using Phase contrast microscope on Neubauer counting chamber
c. Fonio's method using bright field microscope
d. Platelet estimation

87. What is the gold standard for the anticoagulant therapy?
a. Heparin
b. Warfarin
c. Hirudin
d. Argatroban

88. IDENTIFY: represents granules composed of ribosomes and RNA that are precipitated
a. Heinz
b. Basophilic stippling
c. Howell Jolly
d. Auer rods

89. What is the least and earliest precursor of megakaryocyte series?
a. BFU-Meg
b. LD-CFU-Meg
c. MK-3
d. MK-1

90. This test measures the time required to generate thrombin and fibrin polymers via the intrinsic pathway
a. PT
b. CT
c. aPTT
d. Thrombin time

91. What is being replaced in hemoglobinopathies?
a. Heme
b. Amino acid
c. Peptide chain
d. Ferrous iron

92. Compute for the RPI. There are 20 reticulocytes counted in the 1000 total RBCs. The patient hematocrit is 43%.
a. 1.91
b. 2.50
c. 1.5
d. 19.1

93. What is the result being detected in Clauss fibrinogen assay?
a. Turbidity
b. Color change
c. Change in pH
d. Color intensity

94. Which of the following describes a stomatocyte?
a. Slit like opening on one side of the cell
b. Slit like opening on both sides of the cell
c. Zigzag like opening one side of the cell
d. Zigzag like one both side of the cell

95. The percent of blast needed to diagnose CML:
a. 30%
b. 20%
c. 15%
d. 50%

96. What is the light source used in flow cytometer?
a. Halogen lamp
b. Bunsen burner
c. Tungsten lamp
d. Mercury lamp

97. The normal appearance of a resting inactive platelet:
a. Discoid and biconcave
b. Discoid and biconvex
c. Spherical and biconcave
d. Spherical and biconvex

98. Usage of rough and chipped spreader slide in preparing a blood smear would produce what characteristic?
a. With irregularities
b. With streaks
c. With lines, and breaks
d. AOTA

99. What are the phases involved that leads in the formation of fibrin?
a. Stabilization
b. Stabilization, and polymerizatio
c. Proteolysis, polymerization, and stabilization
d. Transformation, proteolysis, polymerization, and stabilization

100.The main enzyme of the coagulation pathway with multiple key activities
a. Fibrin
b. Thrombin
c. VIIa
d. Xa

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

1. EDTA-induced pseudothrombocytopenia can be identified on blood smear by:
a. Finding platelets pushed to the feathered end
b. Finding platelets adhering to WBCs
c. Finding no platelets at all on the smear
d. Bluish discoloration to the macroscopic appearance of the slide

2. Which ratio of anticoagulant to blood is correct for coagulation procedures?
a. 1:4
b. 1:5
c. 1:9
d. 1:10

3. The bevel of the needle should be held ____ in the performance of a venipuncture.
a. Sideways
b. Upward
c. Downward
d. In any direction

4. Most common complication encountered in obtaining a blood specimen:
a. Ecchymosis (bruise)
b. Hematoma
c. Hemoconcentration
d. Anemia

5. Blood collection tubes are labeled:
a. As soon as the test order is received
b. Before the specimen is even collected
c. Immediately after specimen collection
d. After returning to the laboratory

6. A blood sample is needed from a patient with IV fluids running in both arms. Which of the following is an acceptable procedure?
a. Any obtainable vein is satisfactory.
b. Obtain sample from above the IV site.
c. Obtain sample from below the IV site with special restrictions.
d. Disconnect the IV line.

7. The recommended cleaner for removing oil from objectives is:
a. 70% alcohol or lens cleaner
b. Xylene
c. Water
d. Benzene

8. Blood drop size in the manual wedge technique:
a. 1 to 2 mm in diameter
b. 2 to 3 mm in diameter
c. 4 to 5 mm in diameter
d. 5 to 6 mm in diameter

9. In the preparing wedge smear from blood samples of polycythemic patients, the angle between the two slides should be:
a. 25
b. 30
c. 35
d. 45

10. When a blood film is viewed through the microscope, the RBCs appear redder than normal, the neutrophils are barely visible, and the eosinophils are bright orange. What is the most likely cause?
a. Slide was overstained
b. Stain was too alkaline
c. Buffer was too acidic
d. Slide was not rinsed adequately

11. A stained blood film is held up to the light and observed to be bluer than normal. What microscopic abnormality might be expected on this film?
a. Rouleaux
b. Spherocytosis
c. Reactive lymphocytosis
d. Toxic granulation

12. The normal sequence of blood cell development is:
a. Yolk sac—red bone marrow—liver and spleen
b. Yolk sac—thymus—liver and spleen—red bone marrow
c. Yolk sac—liver and spleen—red bone marrow
d. Liver and spleen—yolk sac—red bone marrow

13. The best source of active bone marrow from a 20- year-old would be:
a. Iliac crest
b. Femur
c. Distal radius
d. Tibia

14. Primary target cells of G-CSF, EXCEPT:
a. Fibroblasts
b. Leukemic myeloblasts
c. Neutrophil precursors
d. T and B cells

15. Bone marrow cellularity refers to the ratio of:
a. Red cell precursors to white cell precursors
b. Hematopoietic tissue to adipose tissue
c. Granulocytic cells to erythrocytic cells
d. Extravascular tissue to intravascular tissue

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

16. What is the recommended order of draw when the evacuated tube system is used?
a. Gel separator, nonadditive, coagulation, and blood culture
b. Additive, nonadditive, gel separator, and blood culture
c. Nonadditive, blood culture, coagulation, and other additives
d. Blood culture, coagulation, nonadditive, and gel separator or other additives

17. The most important step in phlebotomy is:
a. Cleansing the site
b. Identifying the patient
c. Selecting the proper needle length
d. Using the correct evacuated tube

18. Which of the following skin puncture areas is (are) acceptable for the collection of capillary blood from an infant?
a. Previous puncture site
b. Posterior curve of the heel
c. The arch
d. Medial or lateral plantar surface

19. Vein of choice for performing a venipuncture is the:
a. Basilic
b. Cephalic or accessory cephalic
c. Median or median cubital
d. One of the hand veins

20. Which characteristic is inaccurate with respect to the anticoagulant K3 EDTA?
a. Removes ionized calcium (Ca2+) from fresh whole blood by the process of chelation
b. Is used for most routine coagulation studies
c. Is the most commonly used anticoagulant in hematology
d. Is conventionally placed in lavender stoppered evacuated tube

21. Number of inversions of light blue top evacuated tube:
a. None
b. 3 to 4
c. 5 to 6
d. 8

22. Adjuvant for infectious disease therapy:
a. Interleukin 2
b. Interleukin 3
c. Interleukin 6
d. Interleukin 12

23. All of the following are examples of preanalytical errors, EXCEPT
a. Specimen obtained from the wrong patient
b. Specimen collected in the wrong tube or container
c. Incorrect labeling of specimen
d. Failure to report critical values immediately

24. Heel punctures in infants should not be made more than __ mm deep because of the risk of bone injury and possible infection (osteomyelitis).
a. Not more than 1 mm deep
b. Not more than 2 mm deep
c. Not more than 3 mm deep
d. Not more than 5 mm deep

25. Counterproductive smear drying technique because the moisture causes RBCs to become echinocytic (crenated) or to develop water artifact (also called drying artifact):
a. Natural drying
b. Use of small fan
c. Blowing of breath
d. None of these

26. Which of the following best describes the function of the Rapoport Luebering pathway?
a. It produces ATP to help maintain RBC membrane deformability
b. It results in reduction of glutathione
c. It produces 2,3 diphosphoglycerate (2,3 DPG)
d. It produces cytochrome reductase

27. Which conditions will shift the oxyhemoglobin dissociation curve to the right?
a. Acidosis
b. Alkalosis
c. Multiple blood transfusions
d. Increased quantities of hemoglobin S or C

28. What is the last nucleated stage in development of erythrocyte?
a. Prorubricyte
b. Rubricyte
c. Metarubricyte
d. Reticulocyte

29. Which one of the following morphologic changes occurs during normal blood cell maturation?
a. Increase in cell diameter
b. Development of cytoplasmic basophilia
c. Condensation of nuclear chromatin
d. Appearance of nucleoli

30. Bite cells are usually seen in patients with:
a. Rh null disease
b. Chronic granulomatous disease
c. G6PD deficiency
d. Pyruvate kinase deficiency

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

31. Which of the following organs is responsible for the "pitting process" for RBCs?
a. Liver
b. Spleen
c. Kidney
d. Lymph nodes

32. A hemoglobin molecule is composed of:
a. 4 heme, 4 globin, 2 iron
b. 2 heme, 2 globin, 2 iron
c. 4 heme, 4 globin, 4 iron
d. 4 heme, 2 globin, 2 iron

33. Schistocytes, ovalocytes, and acanthocytes are examples of abnormal changes in RBC:
a. Volume
b. Shape
c. Inclusions
d. Hemoglobin concentration

34. A morphological description of echinocytes is:
a. short, scalloped, or spike-like projections that are regularly distributed around the cell
b. fragments of erythrocytes
c. the scooped-out part of an erythrocyte that remains after a blister cell ruptures
d. compact round shape

35. Which of the following is decreased in cases of intravascular hemolytic anemia?
a. Bilirubin
b. Urine hemosiderin
c. Haptoglobin
d. Serum hemoglobin

36. The maturational sequence(s) of the erythrocyte is (are):
a. Rubriblast—prorubricyte—metarubricyte— rubricyte—reticulocyte—mature erythrocyte
b. Rubriblast—prorubricyte—rubricyte — metarubricyte—reticulocyte—mature erythrocyte
c. Pronormoblast—basophilic normoblast— polychromatophilic normoblast— orthochromic normoblast—reticulocyte— mature erythrocyte
d. Both B and C

37. With a normal diet, an erythrocyte remains in the reticulocyte stage in the circulating blood for:
a. 1 day
b. 2.5 days
c. 3 days
d. 120 days

38. In a Wright-stained peripheral blood film, the reticulocyte will have a blue appearance. This is referred to as:
a. Megaloblastic maturation
b. Bluemia
c. Polychromatophilia
d. Erythroblastosis

39. The final steps in heme synthesis, including the formation of protoporphyrin take place in:
a. Cell's nucleus
b. Cell's cytoplasm
c. Spleen
d. Mitochondria

40. In an alkaline pH (pH of 8.6) electrophoresis is performed, hemoglobin E has the same mobility as hemoglobin:
a. S
b. F
c. A
d. C

41. The type of hemoglobin that is detectable with the Kleihauer-Betke test is:
a. A
b. A2
c. F
d. S

42. Basophilic stippling represents:
a. DNA
b. Precipitated denatured hemoglobin
c. Granules of ribosomes and RNA
d. Aggregates of iron, mitochondria and ribosomes

43. The most versatile type of stem cell, can develop into any human cell type, including development from embryo into fetus:
a. Multipotential stem cell
b. Pluripotential stem cell
c. Totipotential stem cell
d. Semipotential stem cell

44. What is the normal distribution of hemoglobin in healthy adults?
a. 80% to 90% Hb A, 5% to 10% Hb A2, 1% to 5% Hb F
b. 80% to 90% Hb A2, 5% to 10% Hb A, 1% to 5% Hb F
c. Greater than 95% Hb A, less than 3.5% Hb A2, 1% to 2% Hb F
d. Greater than 90% Hb A, 5% Hb F, less than 5% Hb A2

45. Which of the following is considered a normal hemoglobin?
a. Carboxyhemoglobin
b. Methemoglobin
c. Sulfhemoglobin
d. Deoxyhemoglobin

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46. Which of the following hemoglobins migrates to the same position as Hgb A2 at pH 8.6?
a. Hgb H
b. Hgb F
c. Hgb C
d. Hgb S

47. What staining method is used most frequently to stain and manually count reticulocytes?
a. Immunofluorescence
b. Supravital staining
c. Romanowsky staining
d. Cytochemical staining

48. As a blood cell matures, the ratio of nucleus to cytoplasm (N:C) in most cases:
a. Increases
b. Decreases
c. Remains the same
d. Variable

49. Apoptosis:
1. Cell size enlarged due to swelling
2. Cell size reduced due to shrinkage
3. Nucleus condensation and fragmentation
4. Nucleus exhibits random breaks and lysis (karyolysis)
a. 1 and 3
b. 1 and 4
c. 2 and 3
d. 2 and 4

50. The positive predictive value predicts the probability that an individual with a positive assay result ___ the disease or condition
a. has (have)
b. could have
c. may have
d. will have

51. Counting area for manual RBC count:
a. 0.2 mm2
b. 1 mm2
c. 4 mm2
d. 5 mm2

52. Dehydration:
a. Decreased hematocrit
b. Increased hematocrit
c. Variable hematocrit
d. Hematocrit cannot be determined

53. When the correct area of a specimen from a patient with a normal RBC count is viewed, there are generally about ___ RBCs per 100x oil immersion field.
a. 10 to 15 RBCs per OIF
b. 20 to 25 RBCs per OIF
c. 100 to 150 RBCs per OIF
d. 200 to 250 RBCs per OIF

54. The ESR is ___ proportional to the red blood cell mass and ____proportional to plasma viscosity
a. Direct, direct
b. Direct, inverse
c. Inverse, direct
d. Inverse, inverse

55. If 60 reticulocytes are counted in 1000 red blood cells, what is the reticulocyte count?
a. 0.06%
b. 0.6%
c. 6.0%
d. 60.0%

56. To improve accuracy of the reticulocyte count, have another laboratorian count the other film; counts should agree within:
a. 10%
b. 20%
c. 30%
d. 40%

57. All of the following causes a falsely low ESR, EXCEPT:
a. Column used is slanted
b. EDTA tube is clotted
c. EDTA tube is one-third full
d. EDTA specimen is 24-hour old

58. The reagent used in the traditional sickle cell screening test is:
a. Sodium chloride
b. Sodium citrate
c. Sodium metabisulfite
d. Sodium-potassium oxalate

59. Hemoglobin solubility test is a screening test for:
a. Hemoglobin A2
b. Hemoglobin F
c. Hemoglobin S
d. Unstable hemoglobin

60. If the sugar water test is positive, ____ procedure should be performed before a diagnosis of PNH is made.
a. Autohemolysis test
b. Hemoglobin electrophoresis

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61. Anticoagulant for the sugar water and sucrose hemolysis test:
a. EDTA
b. Citrate
c. Heparin
d. Oxalate

62. What are the initial laboratory tests that are performed for the diagnosis of anemia?
a. CBC, iron studies, and reticulocyte count
b. CBC, reticulocyte count, and peripheral blood film examination
c. Reticulocyte count and serum iron, vitamin B12 and folate assays
d. Bone marrow study, iron studies, and peripheral blood film examination

63. All of the following are associated with increased OFT, EXCEPT:
a. Sickle cell anemia
b. Hereditary spherocytosis
c. HDN
d. Acquired hemolytic anemia

64. A Miller disk is an ocular device used to facilitate counting of:
a. Platelets
b. Reticulocytes
c. Sickle cells
d. Nucleated RBCs

65. The presence of excessive rouleaux formation on a blood smear is often accompanied by an increased:
a. Reticulocyte count
b. Sedimentation rate
c. Hematocrit
d. Erythrocyte count

66. Duplicate hematocrit results should agree within __ unit (%).
a. 1%
b. 2%
c. 5%
d. 15%

67. Insufficient centrifugation will result in:
a. A false increase in hematocrit (Hct) value
b. A false decrease in Hct value
c. No effect on Hct value
d. All of these options, depending on the patient

68. A correction is necessary for WBC counts when nucleated RBCs are seen on the peripheral smear because:
a. The WBC count would be falsely lower
b. The RBC count is too low
c. Nucleated RBCs are counted as leukocytes
d. Nucleated RBCs are confused with giant platelets

69. What combination of reagents is used to measure hemoglobin?
a. Hydrochloric acid and p-dimethylaminobenzaldehyde
b. Potassium ferricyanide and potassium cyanide
c. Sodium bisulfite and sodium metabisulfit
d. Sodium citrate and hydrogen peroxide

70. All of the following are sources of error when measuring hemoglobin by the cyanmethemoglobin method EXCEPT:
a. Excessive anticoagulant
b. White blood cell count that exceeds linearity limits
c. Lipemic plasma
d. Scratched or dirty hemoglobin measuring cell

71. Lipemia can cause turbidity in the cyanmethemoglobin method and a falsely high hemoglobin result. It can be corrected by:
a. Reagent-sample solution can be centrifuged and the supernatant measured
b. Adding 0.01 mL of the patient's plasma to 5 mL of the cyanmethemoglobin reagent and using this solution as the reagent blank
c. Making a 1:2 dilution with distilled water (1 part diluted sample plus 1 part water) and multiplying the results from the standard curve by 2.
d. Cannot be corrected

72. Increased ESR:
1. Anemia
2. Macrocytosis
3. Sickle cells
4. Spherocytes

a. 1 and 2
b. 1 and 3
c. 1, 2 and 3
d. 1, 2, 3 and 4

73. Which of the following can be used with the MCV for initial classification of anemia?
a. RBC count
b. RDW
c. MPV
d. PDW

HEMATOLOGY EXAM

c. Either of these
d. Neither of these

74. The Clinical and Laboratory Standards Institute (CLSI) recommends that bands and neutrophils be counted:
a. Separately and placed in two categories
b. Together and placed in a single category
c. 8 hours
d. 10 hours

75. S or DNA replication
a. 1 hour
b. 4 hours
c. Ova and parasite examination for
D. latum d. Bone marrow examination

76. A patient has macrocytic anemia, the physician suspects pernicious anemia. Which tests would best rule in a definitive diagnosis of pernicious anemia?
a. Homocysteine
b. Intrinsic factor antibodies
c. Antibodies to RBCs
d. Abnormal protein structures

77. G6PD deficiency episodes are related to which of the following?
a. Exposure to oxidant drugs
b. Defective globin chains
c. Anti-M
d. Anti-P

78. Which antibody is associated with paroxysmal cold hemoglobinuria (PCH)?
a. Anti-I
b. Anti-i
c. Tetracycline
d. Chloramphenicol

79. Which antibiotic(s) is (are) most often implicated in the development of aplastic anemia?
a. Sulfonamides
b. Penicillin
c. Pernicious anemia
d. Hereditary spherocytosis

80. Which anemia has red cell morphology similar to that seen in iron deficiency anemia?
a. Sickle cell anemia
b. Thalassemia
c. DNA
d. RNA

81. Lack of vitamin B12 or folic acid hinders the erythroblast in manufacturing:
a. Heme
b. Globin
c. Oval macrocytes
d. Increased platelets

82. Megaloblastic anemia is characterized by all of the following, EXCEPT:
a. Decreased WBCs and retics
b. Hypersegmented neutrophils
c. Normocytic, normochromic
d. Macrocytic, normochromic

83. Which type of anemia is usually present in a patient with acute leukemia?
a. Microcytic, hyperchromic
b. Microcytic, hypochromic
c. Red cell indices
d. Total iron-binding capacity

84. Iron deficiency anemia may be distinguished from anemia of chronic infection by:
a. Serum iron level
b. Red cell morphology
c. Myoglobin values
d. Serum ferritin levels

85. Storage iron is usually best determined by:
a. Serum transferrin levels
b. Hgb values
c. Hemolytic anemia
d. Hypoproliferative anemia

86. The fish tapeworm Diphyllobothrium latum is associated with the development of:
a. Microcytic anemia
b. Macrocytic anemia
c. Negative for CD4 and CD8
d. Positive for all normal CD markers

87. Paroxysmal nocturnal hemoglobinuria is characterized by flow cytometry results that are:
a. Negative for CD55 and CD59
b. Positive for CD55 and CD59
c. Positive direct antiglobulin test
d. Measured platelet count

88. Which of the following characteristics are common to hereditary spherocytosis, hereditary elliptocytosis, hereditary stomatocytosis, and paroxysmal nocturnal hemoglobinuria?
a. Autosomal dominant inheritance
b. Red cell membrane defects

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89. Anemia is due to the infiltration of abnormal cells into the bone marrow and subsequent destruction and replacement of normal hematopoietic cells:
a. Aplastic anemia
b. Pure red cell aplasia
c. Myelophthisic anemia
d. Anemia of chronic kidney disease

90. Deletion of three alpha globin genes:
a. Silent carrier state
b. Alpha thalassemia minor
c. Hemoglobin H disease
d. Bart's hydrops fetalis

91. Hemoglobinopathies associated with abnormal molecular structure:
a. Alpha thalassemia
b. Alpha and beta thalassemia
c. Sickle cell anemia and beta thalassemia
d. Sickle cell anemia, sickle cell trait and Hb C disease

92. In aplastic anemia, the bone marrow is:
a. Empty
b. Empty, hypoplastic
c. Empty, hyperplastic
d. Either hypoplastic or hyperplastic

93. In stage 3 IDA, the erythrocyte indices are typically:
a. MCV increased, MCH decreased, and MCHC decreased
b. MCV decreased, MCH decreased, and MCHC decreased
c. MCV decreased, MCH increased, and MCHC decreased
d. MCV decreased, MCH decreased, and MCHC normal

94. In cold-type AIHA:
a. IgM, usually anti-I is present
b. Rh antibodies are the most frequent cause
c. IgM usually occurs in newborn infants
d. Autoantibodies are present

95. What factors contribute to the sickling of erythrocytes in sickle cell disease crisis?
a. Increase in blood pH and increase in oxygen
b. Extremely hot weather
c. Extremely reduced oxygen and increased acidity in the blood
d. Sickling is spontaneous

96. Classification of anemia EXCEPT:
a. Blood loss
b. Impaired red cell production
c. Accelerated red cell destruction
d. Hemoglobin

97. Caused when lysine replaces glutamic acid at position 26 on the beta chains:
a. Hb S
b. Hb C
c. Hb E
d. Hb D

98. all of the following are associated with Folic acid deficiency EXCEPT:
a. CNS involvement
b. Methotrexate
c. Poor diet
d. Pregnancy

99. Diamond black fan anemia is characterized by the following EXCEPT
a. Decreased RBC count
b. Normal RBC count
c. Normal plt count
d. Normal WBC count

100. Triad of features characteristic of MAHA, EXCEPT:
a. Thrombocytopenia
b. Thrombocytosis
c. RBC polychromasia
d. RBC fragmentation

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1. If a blood specimen is spilled on a laboratory bench or floor area, the first step in cleanup should be
a. Wear gloves and a lab coat
b. Absorb blood with disposable towels
c. Clean with freshly prepared 1% chlorine solution
d. Wash with water

2. Acceptable limits of a control value must fall
a. Within ± 1 SD of the mean
b. Between 1 and 2 SD of the mean
c. Within ± 2 SD of the mean
d. Within ± 3 SD of the mean

3. A trend change in QC data is:
a. A progressive change all in one direction away from the mean for at least 3 days
b. An abrupt shift in the control values
c. Scattered variations from the mean
d. A progressive change in various directions away from the mean for at least 1 week

4. Which of the following statements is true of a Gaussian curve?
a. It represents the standard deviation
b. It represents the coefficient of variation
c. It represents variance of a population
d. It represents a normal bell-shaped distribution

5. Which characteristic is inaccurate with respect to the anticoagulant K3EDTA?
a. Removes ionized calcium (Ca2+) from fresh whole blood by the process of chelation
b. Is used for most routine coagulation studies
c. Is the most commonly used anticoagulant in hematology
d. Is conventionally placed in lavender-stoppered evacuated tubes

6. A blood sample is needed from a patient with IV fluids running in both arms. Which of the following is an acceptable procedure?
a. Any obtainable vein is satisfactory
b. Obtain sample from above the IV site
c. Obtain sample from below the IV site with special restrictions
d. Disconnect the IV line

7. The bevel of the needle should be held ___ in the performance of a venipuncture.
a. Sideways
b. Upward
c. Downward
d. In any direction

8. Which of the following skin puncture areas is/are acceptable for the collection of capillary blood from an infant?
a. Previous puncture site
b. Posterior curve of the heel
c. The arch
d. Medial or lateral plantar surface

9. If a blood smear is too long, the problem can be resolved by:
a. Decreasing the angle of the pusher slide
b. Increasing the angle of the pusher slide
c. Using a larger drop of blood
d. Pushing the slide slower in smearing out the blood

10. If a blood smear stains too red on microscopic examination of a Wright-stained preparation, possible causes include that
a. The staining time was too long
b. The stain was too basic
c. The buffer was too acidic and the exposure time was too short
d. The buffer was too basic and the exposure time was too long

11. During cell division, the S phase, the stage at which DNA is replicated, takes approximately ___ hours.
a. 10
b. 8
c. 4
d. 1

12. As a blood cell matures, the overall cell diameter in most cases
a. Increases
b. Decreases
c. Remains the same
d. Increases then decreases

13. The normal sequence of blood cell development is
a. Yolk sac -red bone marrow - liver and spleen
b. Yolk sac - thymus - liver and spleen □ red bone marrow
c. Yolk sac - liver and spleen - red bone marrow
d. Liver and spleen □ yolk sac - red bone marrow

14. The maturational sequence of the thrombocyte is:
a. Megakaryoblast - promegakaryocyte - megakaryocyte - metamegakaryocyte - thrombocyte
b. Promegakaryocyte - megakaryocyte - metamegakaryocyte - thrombocyte
c. Megakaryoblast - promegakaryocyte - megakaryocyte - thrombocyte
d. Megakaryoblast - promegakaryocyte - metamegakaryocyte - thrombocyte

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15. The chromatin pattern, in most cells, as the cell matures
a. Becomes more clumped
b. Becomes less clumped
c. Remains the same
d. Becomes more clumped then less clumped

16. Stimulation of erythropoietin is caused by:
a. Tissue hypoxia
b. Hypervolemia
c. Inflammation
d. Infection

17. What is the immature erythrocyte found in the bone marrow with the following characteristics: 12-17 □m in diameter, N:C of 4:1, nucleoli not usually apparent, and basophilic cytoplasm?
a. Rubriblast
b. Reticulocyte
c. Metarubricyte
d. Prorubricyte

18. In a Wright-stained peripheral blood film, the reticulocyte will have a blue appearance. This is referred to as:
: a. Megaloblastic maturation
b. Bluemia
c. Polychromatophilia
d. Erythroblastosis

19. On a Wright-stained peripheral blood smear, stress or shift reticulocytes are
a. Smaller than normal reticulocytes
b. About the same size as normal reticulocytes
c. Larger than normal reticulocytes
d. Noticeable because of a decreased blue tint

20. The normal range for reticulocytes in adults is
a. 0% to 0.5%
b. 0.5% to 1.0%
c. 0.5% to 1.5%
d. 1.5% to 2.5%

21. If a male patient has a reticulocyte count of 5.0% and a packed cell volume of 0.45 L/L, what is his corrected reticulocyte count?
a. 2.5%
b. 4.5%
c. 5.0%
d. 10.0%

22. If a male patient has a reticulocyte count of 6.0% and a packed cell volume of 45%, what is his RPI?
a. 1.5
b. 3.0
c. 4.5
d. 6.0

23. Normal adult hemoglobin has
a. Two alpha and two delta chains
b. Three alpha and one beta chains
c. Two alpha and two beta chains
d. Two beta and two epsilon chains

24. Increased amounts of 2,3-DPG ____ the oxygen affinity of the hemoglobin molecule.
a. Increases
b. Decreases
c. Does not change
d. Increases then decreases

25. The protein responsible for the transport of iron in hemoglobin synthesis is:
a. Globin
b. Transferrin
c. Oxyhemoglobin
d. Ferritin

26. Relative polycythemia exists when
a. Increased erythropoietin is produced
b. The total blood volume is expanded
c. The plasma volume is increased
d. The plasma volume is decreased

27. Which of the following is/are characteristic(s) of megaloblastic maturation?
a. Cells of some leukocytic cell lines are smaller than normal
b. Nuclear maturation lags behind cytoplasmic maturation
c. Cytoplasmic maturation lags behind nuclear maturation
d. Erythrocytes are smaller than normal

28. If an alkaline (pH 8.6) electrophoresis is performed, hemoglobin E has the same mobility as hemoglobin
a. S
b. F
c. A
d. C

29. The most common erythrocytic enzyme deficiency involving the Embden-Meyerhof glycolytic pathway is a deficiency of:
a. ATPase
b. Pyruvate kinase
c. Glucose-6-phosphate dehydrogenase
d. Lactic dehydrogenase

30. The Luebering-Rapoport pathway
a. Permits the accumulation of 2,3-DPG
b. Promotes glycolysis
c. Produces cellular energy
d. Produces acidosis

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31. The average diameter of a normal erythrocyte is ___ um.
a. 5.2
b. 6.4
c. 7.2
d. 8.4

32. Which of the following is the term for erythrocytes resembling a stack of coins on thin sections of a peripheral blood smear?
a. Anisocytosis
b. Poikilocytosis
c. Agglutination
d. Rouleaux formation

33. If you are grading changes in erythrocytic size or shape using a scale of 0 to 4+ and many erythrocytes deviate from normal per microscopic field, the typical score would be:
a. 1+
b. 2+
c. 3+
d. 4+

34. The erythrocyte morphology associated with anemia in an otherwise healthy individual caused by acute blood loss is usually
a. Microcytic
b. Megaloblastic
c. Normochromic
d. Hypochromic

35. The peripheral blood smear demonstrates ____ red blood cells in IDA.
a. Microcytic, hypochromic
b. Macrocytic, hypochromic
c. Macrocytic, spherocytic
d. Either A or B

36. In megaloblastic anemia, the typical erythrocytic indices are:
a. MCV increased, MCH increased, and MCHC normal
b. MCV increased, MCH variable, and MCHC normal
c. MCV increased, MCH decreased, and MCHC normal
d. MCV normal, MCH increased, and MCHC normal

37. In IDA, the
a. Serum iron is severely decreased and the TIBC is increased
b. Serum iron is decreased and the TIBC is normal
c. Serum iron is normal and the TIBC is normal
d. Serum iron is increased and the TIBC is normal

38. The greatest portion of operational body iron is normally contained in what compound?
a. Hemoglobin
b. Ferritin
c. Cytochromes
d. Myoglobin

39. Hemolytic disruption of the erythrocyte involves
a. An alteration in the erythrocyte membrane
b. A defect of the hemoglobin molecule
c. An antibody coating the erythrocyte
d. Physical trauma

40. Heinz bodies are associated with the congenital hemolytic anemia
a. G6PD deficiency
b. Abetalipoproteinemia
c. Hereditary spherocytosis
d. Hemolytic anemias

41. The erythrocyte alteration characteristically associated with hemolytic anemias is:
a. Hypochromia
b. Macrocytosis
c. Spherocytosis
d. Burr cells

42. Paroxysmal nocturnal hemoglobinuria exhibits sensitivity of one population of red blood cells to:
a. Warm antibodies
b. Cold antibodies
c. Complement
d. Either A or B

43. Patients with suspected PCH can be confirmed by performing which of the following tests?
a. DAT
b. Donath-Landsteiner test
c. Osmotic fragility test
d. G6PD activity assay

44. In sickle cell disease, the abnormality is related to:
a. The rate of synthesis of hemoglobin
b. An abnormal molecular structure of hemoglobin
c. An acquired defect
d. A membrane dysfunction

45. In α-type thalassemia, with three inactive α genes, which of the following is characteristic?
a. Hb A2
b. Hb A
c. Hb H
d. Hb F and A2

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

46. The stages of neutrophilic granulocyte development are:
a. Promyelocyte, myeloblast, myelocyte, metamyelocyte, and band and segmented neutrophils
b. Myeloblast, promyelocyte, myelocyte, metamyelocyte, and band and segmented neutrophils
c. Myelocyte, myeloblast, promyelocyte, metamyelocyte, and band and segmented neutrophils
d. Myeloblast, promyelocyte, metamyelocyte, myelocyte, and band and segmented neutrophils

47. Marginating granulocytes in the peripheral blood can be found:
a. In the circulating pool
b. In the tissues
c. Adhering to the vascular endothelium
d. All of the above

48. The half-life of circulating granulocytes in normal blood is estimated to be:
a. 2.5 to 5 hours
b. 7 to 10 hours
c. 24 hours
d. 2 days

49. The earliest granulocytic maturational stage in which secondary or specific granules appear is:
a. Myeloblast
b. Monoblast
c. Promyelocyte
d. Myelocyte

50. A leukocyte with the morphological characteristics of being the largest normal mature leukocyte in the peripheral blood and having a convoluted or twisted nucleus is the:
a. Myelocyte
b. Metamyelocyte
c. Promonocyte
d. Monocyte

51. On the basis of the following data, calculate the absolute value of the segmented neutrophils. Total leukocyte count = 12 x 109/L; percentage of segmented neutrophils on the differential count = 80%. The absolute segmented neutrophil value is:
a. 2.5 x 109/L
b. 4.5 x 109/L
c. 6.5 x 109/L
d. 9.6 x 109/L

52. An increase in metamyelocytes, myelocytes, and promyelocytes can be referred to as:
a. Leukocytopenia
b. A shift to the right
c. A shift to the left
d. Pelger-Huet anomaly

53. Faggot cells are predominantly seen in which type of leukemia?
a. M1
b. M2
c. M3
d. M4

54. The most characteristic morphological feature of variant lymphocytes include
a. Increased overall size, possibly 1-3 nucleoli, and abundant cytoplasm
b. Increased overall size, round nucleus, and increased granulation in the cytoplasm
c. Segmented nucleus, light-blue cytoplasm, and no nucleoli
d. Enlarged nucleus, 6-8 nucleoli, and dark-blue cytoplasm

55. An abnormal plasma cell with red-staining cytoplasm is a
a. Russell body
b. Mott cell
c. Grape cell
d. Flame cell

56. Which antibody test has replaced the LE cell preparation in the diagnosis of SLE?
a. Rheumatoid arthritis factor
b. ANA test
c. Complement fixation test
d. Antibody Smith test

57. An acute leukemia can be described as being
a. Of short duration with many mature leukocyte forms in the peripheral blood
b. Of short duration with many immature leukocyte forms in the peripheral blood
c. Of short duration with little alteration of the leukocytes of the peripheral blood
d. Of long duration with many mature leukocyte forms in the peripheral blood

58. Characteristics of FAB M1 include:
a. Leukocytosis with maturation of the myeloid cell line in the peripheral blood
b. Leukocytosis with maturation of the lymphocytic cell line in the peripheral blood
c. Leukocytosis without maturation of the myeloid cell line in the peripheral blood
d. Leukocytosis with many mature leukocytes in the peripheral blood

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

59. The Sudan black B cytochemical stain differentiates
a. Acute myeloid from ALL
b. Acute monocytic from AML
c. Myeloid leukemia from a leukemoid reaction
d. Acute myeloid from acute myelomonocytic leukemia

60. Naphthol AS-D chloroacetate differentiates:
a. Granulocytic from the monocytic cell line
b. Promyelocytes from myelocytes
c. Monoblasts from myeloblasts
d. Metamyelocytes from myelocytes

61. CLL is classically a
a. T-cell disorder
b. B-cell disorder
c. Null cell disorder
d. Disorder of the young

62. The abnormal protein frequently found in the urine of persons with multiple myeloma is
a. Albumin
b. Globulin
c. IgG
d. Bence Jones

63. The ALP cytochemical staining reaction is used to differentiate between
a. CLL and AML
b. ALL and AML
c. CML and severe bacterial infections
d. Leukemoid reactions and severe bacterial infections

64. The Philadelphia chromosome is typically associated with
a. AML
b. Leukemoid reactions
c. ALL
d. CML

65. The primary treatment for PV is:
a. Therapeutic phlebotomy
b. Myelosuppressive agents
c. Radioactive phosphorus
d. Low-dose busulfan

66. The level of EPO in the urine is ____ in patients with PV compared with other kinds of polycythemia
a. Increased
b. The same
c. Variable
d. Decreased

67. The initiating stimulus to blood coagulation following injury to a blood vessel is:
a. Contact activation with collagen
b. Vasoconstriction
c. Stenosis
d. Release of serotonin

68. The cellular ultrastructural component(s) unique to the platelet is/are:
a. Cytoplasmic membrane
b. Glycocalyx
c. Mitochondria
d. Microtubules

69. Choose the incorrect statement regarding storage granules related to hemostasis in the mature platelet.
a. Alpha-granules contain platelet factor 4, beta-thromboglobulin, and platelet-derived growth factor
b. Alpha-granules contain platelet fibrinogen and von Willebrand factor
c. Dense bodies contain serotonin and ADP
d. Lysosomes contain actomyosin, myosin, and filamin

70. At all times, approximately ___ of the total number of platelets are in the systemic circulation.
a. One-fourth
b. One-third
c. One-half
d. Two-thirds

71. The reference range of platelets in the systemic circulation is:
a. 50-150 x 109/L
b. 100-200 x 109/L
c. 150-350 x 109/L
d. 150-450 x 109/L

72. If 10 platelets are seen per OIO, what is the approximate platelet count?
a. 50 x 109/L
b. 100 x 109/L
c. 150 x 109/L
d. 200 x 109/L

73. Aspirin ingestion has the following hemostatic effect in a normal person:
a. Prolongs the bleeding time
b. Prolongs the clotting time
c. Inhibits factor VIII
d. Has no effect

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

74. The bleeding time test measures
a. The ability of platelets to stick together
b. Platelet adhesion and aggregation on locally injured vascular subendothelium
c. The quantity and quality of platelets
d. Antibodies against platelets

75. This component is essential for normal platelet aggregation:
a. Calcium
b. Glycoprotein Ib
c. VWF
d. Glycoprotein IIb-IIIa complex

76. The clot retraction test is:
a. A visible reaction to the activation of platelet actomyosin (thrombosthenin)
b. A reflection of the quantity and quality of platelets and other factors
c. A measurement of the ability of platelets to stick to glass
d. A measurement of the cloudiness of blood

77. The extrinsic pathway of coagulation is triggered by the entry of ____ into the circulation.
a. Membrane lipoproteins (phospholipoproteins)
b. Tissue thromboplastin
c. Ca2+
d. Factor VII

78. Prothrombin to thrombin conversion is accelerated by:
a. A complex of activated factors IX and VII
b. Factor V and ionized calcium
c. A complex of phospholipids and factor VII
d. A complex of activated factors X and V

79. The phase contrast microscope is employed in which platelet count method?
a. Rees-Ecker
b. Brecker-Cronkite
c. Indirect
d. Coulter

80. If a pediatric preoperative patient has a family history of bleeding but has never had a bleeding episode herself, what test should be included in a coagulation profile in addition to the PT, aPTT, and platelet count?
a. Lee-White clotting time
b. Clot retraction
c. Bleeding time
d. FSPs

81. A patient with a severe decrease in factor X activity would demonstrate normal
a. aPTT
b. PT
c. Thrombin time
d. Bleeding time

82. Neither the aPTT nor the PT detects a deficiency of:
a. PF3
b. Factor VII
c. Factor VIII
d. Factor IX

83. Liver disease is characterized by all of the following, except:
a. Prolonged PT
b. Acanthocytosis
c. Decreased factor VIII
d. Decreased fibrinogen

84. If a child ingested rat poison, which of the following tests should be performed to test the effect of the poison on the child's coagulation mechanism?
a. aPTT
b. PT
c. Fibrinogen assay
d. Thrombin time

85. A patient has a prolonged aPTT and a normal PT. The aPTT is not corrected by factor VIII-deficient plasma but is corrected by factor IX-deficient plasma. In which factor does the patient appear to be deficient?
a. Factor II
b. Factor V
c. Factor VIII
d. Factor IX

86. Hemorrhagic disease of newborns is often due to hypoprothrombinemia. This condition may be prevented by giving expectant mothers adequate doses of:
a. Vitamin A
b. Vitamin C
c. Vitamin D
d. Vitamin K

87. Which of the following is/are characteristic of protein C?
a. It is not vitamin K-dependent
b. It is formed in response to thrombin generation
c. It inactivates factors Va and VIIIa
d. Both B and C

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

88. Laboratory results in acute DIC reflect abnormalities in which of the following coagulation components?
a. Platelet function
b. Excessive clotting and fibrinolysis
c. Accelerated thrombin formation
d. Fibrin formation

89. 5M urea or 1% monochloroacetic acid are reagents used in tests for which plasma factor deficiency?
a. VIII
b. IX
c. XII
d. XIII

90. A condition characterized by the presence of large platelets with Dohle-like bodies in leukocytes
a. Wiskott-Aldrich
b. May-Hegglin
c. Bernard-Soulier
d. Alport syndrome

91. A positive protamine sulfate test is suggestive of:
a. DIC
b. vWD
c. Glanzmann's thrombasthenia
d. Primary fibrinolysis

92. A platelet count of 100,000-150,000/uL is reported as:
a. Normal
b. Low Normal
c. Slightly decreased
d. Moderately decreased

93. What is the appropriate procedure and characteristic for the Westergren method?
a. The diluting solution lyses RBCs with propylene glycol and contains sodium carbonate and water
b. The procedure measures the rate of erythrocyte settling.
c. Ferrous ions are oxidized to the ferric state.
d. The diluting solution is either 1% HCl or 2% acetic acid.

94. What source of error will have the greatest effect on PCV?
a. Incorrect dilution of blood and diluent
b. Hemolysis of whole blood specimen
c. Excessive anticoagulant will produce shrinkage of cells
d. Incorrect gauge used in specimen collection

95. A normal blood smear should have no more than approximately ___ (maximum) number of platelets per OIF in an area where the erythrocytes are just touching each other
a. 10
b. 15
c. 20
d. 25

96. Leukocytes that demonstrate a positive reaction in the tartrate acid-resistant acid phosphatase cytochemical stain are the lymphocytes seen in:
a. Infectious lymphocytosis
b. Malignant lymphoma
c. ALL (non-T type)
d. Hairy cell leukemia

97. A decreased LAP score is seen in:
a. PV
b. CML
c. Leukemoid reactions
d. AML

98. In the LAP procedure, blood smears should be stained
a. Within 8 hours of specimen collection
b. Within 48 hours of specimen collection
c. Within 72 hours of specimen collection
d. Within 5 days of specimen collection

99. The reagent used in the traditional sickle cell screening test is
a. Sodium chloride
b. Sodium citrate
c. Sodium metabisulphite
d. Sodium-potassium oxalate

100. The abbreviation laser stands for:
a. Light-associated simulated emission of radiation
b. Largely amplified by simulated emission of radiation
c. Light amplified by stimulated emission of radiation
d. Liquid amplified by stimulated emission of radiation

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

1. In obese patients, veins may be neither readily visible nor easy to palpate. Sometimes the use of a blood pressure cuff can aid in locating a vein. The cuff should:
a. Inflated higher than 40 mm Hg and should be left on the arm for longer than 1 minute
b. Inflated higher than 40 mmHg and should not be left on the arm for longer than 1 minute
c. Not be inflated any higher than 40 mm Hg and should be left on the arm for longer than 1 minute
d. Not be inflated any higher than 40 mm Hg and should not be left on the arm for longer than 1 minute

2. Basophilic stippling represents:
a. DNA
b. Precipitated denatured hemoglobin
c. Granules of ribosomes and RNA
d. Aggregates of iron, mitochondria and ribosomes

3. Which of the following hematologic tests may not be part of the usual complete blood count?
a. Hematocrit
b. Hemoglobin
c. Platelet estimate
d. Reticulocyte count

4. When comparing von Willebrand's disease and Glanzmann's thrombasthenia, Glanzmann's thrombasthenia will demonstrate:
a. Absent ADP
b. Normal clot retraction
c. Abnormal ristocetin aggregation
d. Abnormal release of ADP

5. The Philadelphia chromosome is formed by a translocation between:
a. Chromosome 22 and chromosome 9
b. Chromosome 21 and chromosome 9
c. Chromosome 21 and chromosome 6
d. Chromosome 22 and chromosome 6

6. In measuring platelet aggregation, platelet-rich plasma can be treated with ___ to aggregate platelets
a. Saline
b. Collagen
c. Epinephrine
d. Both B and C

7. Which parameters are calculated rather than directly measured?
a. Hematocrit and erythrocyte distribution width
b. Erythrocyte count and leukocyte count
c. Leukocyte count and hematocrit
d. Platelet count and platelet volume

8. What is the first type of cell produced by the developing embryo?
a. Erythrocyte
b. Granulocyte
c. Lymphocyte
d. Thrombocyte

9. A manual WBC count is performed. Eighty WBCs are counted in the four large corner squares of a Neubauer hemocytometer. The dilution is 1:100. What is the total WBC count?
a. 4.0 × 10^9/L
b. 8.0 × 10^9/L
c. 20.0 × 10^9/L
d. 200.0 × 10^9/L

10. The type of hemoglobin that is detectable with the Kleihauer-Betke test is:
a. A
b. A2
c. F
d. S

11. A preanalytical error can be introduced by:
a. Drawing a coagulation tube before an EDTA tube
b. Mixing an EDTA tube 8-10 times
c. Vigorously shaking of blood tube
d. Transporting the specimen in a biohazard bag

12. The transfer of iron from the enterocyte into the plasma is regulated by:
a. Transferrin
b. Ferroportin
c. Hephaestin
d. Hepcidin

13. The major application of flow cytometry is:
a. Determining cell size and granularity
b. Sorting of cells and cellular identification using monoclonal antibodies
c. Treating cancer cells and identifying specific virus types
d. Counting leukocytes and platelets

14. A laboratory assay that can be used to differentiate a leukemoid reaction from chronic myelogenous leukemia is:
a. Leukocyte alkaline phosphatase (LAP) stain
b. Erythrocyte sedimentation rate (ESR)
c. Assessment of the shift to the left
d. Absolute neutrophil count

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

15. Acceptable limits of a control value must fall:
a. Within ±1 standard deviation of the mean
b. Between 1 and 2 standard deviations of the mean
c. Within ±2 standard deviations of the mean
d. Within ±3 standard deviations of the mean

16. All the megakaryocyte progenitor stages resemble ___ and cannot be distinguished by Wright-stained microscopy.
a. Lymphocyte
b. Monocyte
c. Neutrophil
d. Eosinophil

17. All are fibrin degradation products, EXCEPT:
a. Fragment E
b. Fragment X
c. Fragment Z
d. Fragment D

18. What is the best way to clean up blood that has dripped on the arm of a phlebotomy chair?
a. Absorb it with a gauze pad and clean the area with disinfectant.
b. Rub it with a damp cloth and wash the area with soap and water.
c. Wait for it to dry and then scrape it into a biohazard container.
d. Wipe it with an alcohol pad using an outward circular motion

19. Lymphocyte development in the thymus and bursal equivalent are:
a. Antigen-independent
b. Antigen-dependent
c. Antibody-independent
d. Antibody-dependent

20. A peripheral blood smear can be prepared from:
a. EDTA-anticoagulated blood within 1 hour of collection
b. Free-flowing capillary blood
c. Citrated whole blood
d. Both A and B

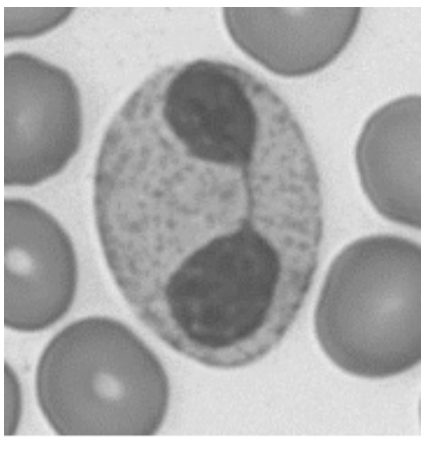
21. When encountering a patient with a fistula, the phlebotomist should:
a. Apply the tourniquet below the fistula
b. Use the other arm
c. Collect the blood from the fistula
d. Attach a syringe to the T-tube connector

22. RBC with membrane folded over:
a. Aplastic anemia
b. Iron deficiency anemia
c. Hemoglobin C, hemoglobin SC disease
d. Sickle cell anemia, thalassemia

23. A combined scatter histogram measure:
a. Overall size versus nuclear size
b. Cytoplasm-to-nucleus ratio
c. Cell size and granularity
d. Cell shape and cytoplasmic color

24. A hemoglobin molecule is composed of:
a. 4 heme, 4 globin, 2 iron
b. 4 heme, 2 globin, 2 iron
c. 2 heme, 2 globin, 2 iron
d. 4 heme, 4 globin, 4 iron

25. Study the picture below. Which of the following cells is being illustrated?



a. Reed-sternberg cell
b. Sezary cell
c. Reider cell
d. Pelger-Huet cell

26. Effect of increased amounts of 2,3-DPG to oxygen affinity of the hemoglobin molecule
a. Increases
b. Decreases
c. Do not alter
d. Variable

27. Vitamin K dependent coagulation factor:
a. II
b. V
c. VIII
d. XIII

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

28. In cold-type AIHA
a. IgM, usually anti-I is present
b. Rh antibodies are the most frequent cause
c. IgM usually occurs in newborn infants
d. Autoantibodies are present

29. Orthogonal Light Scatter is used to measure:
a. Cell nuclear volume
b. Internal complexity of the cell
c. Cellular granularity
d. Nuclear density

30. The extrinsic pathway of coagulation is triggered by the entry of ___ into the circulation.
a. Membrane lipoproteins
b. Tissue thromboplastin
c. Calcium
d. Factor VII

31. Which test result would be normal in a patient with dysfibrinogenemia?
a. Thrombin time
b. APTT
c. PT
d. Immunologic fibrinogen level

32. The fibrometer relies on the principle of:
a. Clot elasticity
b. Fibrin adhesion
c. Conduction or impedance of an electrical current by fibrin
d. Changes in optical density

33. Which of the following is NOT a characteristic of platelets?
a. Size of 2 to 4 µm
b. The presence of a nucleus
c. A discoid shape as an inactive cell
d. Cytoplasm is light blue with fine red-purple granules

34. The MPV is:
a. Analogous to the MCHC
b. A direct measure of the platelet count
c. A measurement of the average volume of platelets
d. A comparison of the patient's value to the normal value

35. The venipuncture needle should be inserted into the arm with the bevel facing:
a. Down and an angle of insertion between 15 and 30 degrees
b. Up and an angle of insertion less than 30 degrees
c. Down and an angle of insertion greater than 45 degrees
d. Up and an angle of insertion between 30 and 45 degrees

36. Insufficient centrifugation will result in:
a. A false increase in hematocrit (Hct) value
b. A false decrease in Hct value
c. No effect on Hct value
d. All of these options, depending on the patient

37. The cytochemical stain that can demonstrate iron, hemosiderin and ferritin is:
a. New methylene blue
b. Romanowsky
c. Prussian blue
d. Wright-Giemsa

38. According to the WHO classification, except in leukemias with specific genetic anomalies, the minimal percentage of blasts necessary for a diagnosis of acute leukemia is:
a. 10%
b. 20%
c. 30%
d. 50%

39. An unconscious inpatient does not have an ID band. The name on an envelope on the patient's nightstand matches with the requisition. What should you do?
a. Ask the nurse to verify the patient's ID and collect the specimen.
b. Complete the required procedure and then file an incident report.
c. Do not start any procedure until the nurse attaches an ID bracelet.
d. Make a computer entry to alert other phlebotomists of the issue.

40. Which of the following blood film findings indicates EDTA-induced pseudothrombocytopenia?
a. The platelets are pushed to the feathered end.
b. The platelets are adhering to WBCs.
c. No platelets at all are seen on the film.
d. The slide has a bluish discoloration when examined macroscopically.

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

41. Reticulated platelets can be enumerated in peripheral blood to detect:
a. Impaired production in disease states
b. Abnormal organelles associated with diseases such as leukemia
c. Increased platelet production in response to need
d. Inadequate rates of membrane cholesterol exchange with the plasma

42. If a blood smear is too long, the problem can be resolved by:
a. Decreasing the angle of the pusher slide
b. Increasing the angle of the pusher slide
c. Using a larger drop of blood
d. Pushing the slide slower in smearing out the blood

43. As a blood cell matures, the overall cell diameter in most cases:
a. Increases
b. Decreases
c. Remains the same
d. Variable

44. Detects lymphocytic cells and certain abnormal erythrocytic cells by staining of cytoplasmic glycogen:
a. MPO
b. SBB
c. PAS
d. Tdt

45. The primary pathophysiologic mechanism of anemia associated with chronic kidney disease is:
a. Inadequate production of erythropoietin
b. Excessive hemolysis
c. Hematopoietic stem cell mutation
d. Toxic destruction of stem cells

46. The defect in Paroxysmal Nocturnal Hemoglobinuria is a/an ___ associated defect of the RBC membrane.
a. Structural protein
b. Hemoglobin
c. Antibody
d. Enzyme

47. Platelets interacting with and binding with other platelets is referred to as:
a. Adhesion
b. Aggregation
c. Release
d. Retraction

48. The test reagent in PT contains which of the following substance(s)?
1. Calcium ions
2. Kaolin
3. Tissue thromboplastin
4. Celite

a. 1, 2 and 3 are correct
b. 1 and 3 are correct
c. 2 and 4 are correct
d. Only 4 is correct

49. The recommended cleaner for removing oil from objectives is:
a. Lens cleaner or Xylene
b. 70% alcohol or Lens cleaner
c. Xylene or 70% alcohol
d. NOTA

50. The size threshold range used by electrical impedance methods to count particles as platelets is
a. 0-10 fL
b. 2-20 fL
c. 15-40 fL
d. 35-90 fL

51. Delta checks identify:
a. Random error
b. Shift
c. Trend
d. Gross error

52. The RDW and MCV are both quantitative descriptors of erythrocyte size. If both are increased, the most probable erythrocytic abnormality would be:
a. Iron deficiency anemia
b. Acquired aplastic anemia
c. Megaloblastic anemia
d. Hemoglobinopathy

53. Which of the following is considered to be an advantage of the mechanical end-point detection methodology?
a. It has the ability to provide a graph of clot formation
b. It can incorporate multiple wavelengths into a single testing sequence
c. It is not affected by lipemia in the test sample
d. It can measure proteins that do not have fibrin formation as the end-point

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

54. The bleeding time test measures:
a. Ability of platelets to stick together
b. Platelet adhesion and aggregation of locally injured vascular subendothelium
c. Quantity and quality of platelets
d. Antibodies against platelets

55. The final common pathway of the intrinsic-extrinsic pathway is:
a. Factor X activation
b. Factor II activation
c. Factor I activation
d. Factor XII activation

56. Which is the first stage of erythrocytic maturation in which the cytoplasm is pink due to the formation of hemoglobin?
a. Reticulocyte
b. Pronormoblast
c. Basophilic normoblast
d. Polychromatic normoblast

57. Which characteristic is inaccurate with respect to the anticoagulant K3 EDTA?
a. Removes ionized calcium (Ca^{2+}) from fresh whole blood by the process of chelation
b. Is used for most routine coagulation studies
c. Is the most commonly used anticoagulant in hematology
d. Is conventionally placed in lavender-stoppered evacuated tubes

58. What does "S" in VCS Hematology Coulter Technology stands for?
a. Standard
b. Scatter
c. System
d. Slide

59. All of the following are acceptable sites for blood collection, EXCEPT
a. Palmar surface of the hand
b. Dorsal surface of the hand
c. Lateral sides of ankle
d. Ventral wrist

60. Relative polycythemia exists when:
a. Increased erythropoietin is produced
b. Total blood volume is expanded
c. Plasma volume is increased
d. Plasma volume is decreased

61. Which of the following can be found in a patient with classic megaloblastic anemia?
a. Ovalocytes and hypersegmented neutrophils
b. Hypochromic macrocytes and variant lymphocytes
c. Howell-Jolly bodies and Pappenheimer bodies
d. Lymphocytosis

62. Smudge cells are associated with:
a. Niemann Pick disease and Burkitt's lymphoma
b. CLL
c. Leukosarcoma
d. Natural artifact

63. Myeloid and monocytic acute leukemias are classified as FAB:
a. M1
b. M4
c. M5
d. L1

64. Which of the following is/are characteristic of protein C?
a. It is not vitamin K-dependent
b. It is formed in response to thrombin generation
c. It inactivates factors Va and VIIIa
d. Both B and C

65. The restriction of data analysis to one cell population is accomplished by:
a. Amplification
b. Gating
c. Compensatory monitoring
d. Data limitation

66. Which clinical or specimen condition will produce an increased Westergren ESR method test result?
a. Splenectomy
b. Rouleaux formation
c. Polycythemia
d. Hemolytic anemia crisis

67. The normal sequence of blood cell development is:
a. Yolk sac—red bone marrow—liver and spleen
b. Yolk sac—thymus—liver and spleen—red bone marrow
c. Yolk sac—liver and spleen—red bone marrow
d. Liver and spleen—yolk sac—red bone marrow

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

68. True of endoreduplication, EXCEPT
a. Duplicates DNA without cell division
b. Results in cells with ploidy values of 4n, 8n, 16n and 32n
c. Is unique to the megakaryocytic type of blood cell
d. Duplicates DNA with cell division

69. What happens if a coagulation specimen collection tube is underfilled?
a. The specimen clots and is useless
b. The specimen is hemolyzed and is useless
c. Clot-based test results are falsely prolonged
d. Chromogenic test results are falsely decreased

70. This component is essential for normal platelet aggregation:
a. Calcium
b. Glycoprotein Ib
c. VWF
d. Glycoprotein IIb-IIIa complex

71. Neither the APTT nor the PT detects a deficiency of:
a. Platelet factor 3
b. Factor VII
c. Factor VIII
d. Factor IX

72. RBCs are too pale and or red, WBCs are barely visible. All are probable causes, EXCEPT
a. Stain or buffer too acidic
b. Underbuffering
c. Over-rinsing
d. Heparinized blood sample

73. An increase in metamyelocytes, myelocytes and promyelocytes can be referred to as:
a. Leukocytopenia
b. Shift to the right
c. Shift to the left
d. Pelger-Huet anomaly

74. Thrombin
a. II
b. IIa
c. VIII
d. IV

75. A 7.0-mL EDTA tube is received in the laboratory containing only 2.0 mL of blood. If the laboratory is using manual techniques, which of the following tests will most likely be erroneous?
a. RBC count
b. Hemoglobin
c. Hct
. WBC count

76. A positive protamine sulfate test is suggestive of:
a. DIC
b. vWD
c. Glanzmann's thrombasthenia
d. Primary fibrinolysis

77. In an erythrocyte histogram, the erythrocytes that are larger than normal will be to the ___ of the normal distribution curve.
a. Right
b. Left
c. Middle
d. Variable

78. Which of the following is characteristic of Dohle body inclusions?
a. Gigantic peroxidase positive deposits
b. Precipitated mucopolysaccharides
c. Dark blue cytoplasmic inclusions
d. Single or multiple pale-blue staining inclusions

79. What single feature of normal RBCs is most responsible for limiting their life span?
a. Loss of the nucleus
b. Increased flexibility of the cell membrane
c. Reduction of hemoglobin iron
d. Loss of mitochondria

80. Fibrinogen is converted to thrombin monomers by
a. Prothrombin
b. Thrombin
c. Calcium ions
d. Factor XIIIa

81. Heparin inhibits clotting by
a. Preventing the activation of prothrombin
b. Chelation of calcium
c. Causing the liver synthesis of nonfunctional factors
d. Enhancing the function of antithrombin

82. If a small blood clot exists in an anticoagulated blood specimen, which blood cell parameter will be affected the most?
a. Leukocyte count
b. Erythrocyte count
c. Platelet count
d. Microhematocrit

83. Reticulocytes can be detected using ___ stain.
a. New methylene blue
b. Thiazole orange
c. Propidium iodide
d. Both A and B

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

84. What is the average diameter of RBCs?
a. 5.2 um
b. 6.4 um
c. 7.2 um
d. 8.4 um

85. What is the usual shape of platelets in citrated blood?
a. Cylindrical and beaded
b. Biconvex and discoid
c. Spherical or round with pseudopods
d. Round

86. The reference range of platelets in the systemic circulation is:
a. 50 to 120 x 10^9/L
b. 100 to 200 x 10^9/L
c. 150 to 350 x 10^9/L
d. 150 to 400 x 10^9/L

87. Acute leukemia can be described as being:
a. Short duration with many mature leukocyte forms in the peripheral blood
b. Short duration with many immature leukocyte forms in the peripheral blood
c. Short duration with little alteration of the leukocytes of the peripheral blood
d. Long duration with many mature leukocyte forms in the peripheral blood

88. Which of the following is NOT associated with hemolytic anemia?
a. Decrease hemoglobin and packed cell volume
b. Increased reticulocyte count
c. Increased serum haptoglobin
d. Decreased erythrocyte survival

89. Hypoxia stimulates RBC production by:
a. Inducing more pluripotent stem cells into the erythroid lineage
b. Stimulating EPO production by the kidney
c. Increasing the number of RBC mitoses
d. Stimulating the production of fibronectin by macrophages of the bone marrow

90. All of the following factors may influence the erythrocyte sedimentation rate (ESR), EXCEPT:
a. Blood drawn into a sodium citrate tube
b. Anisocytosis
c. Plasma proteins
d. Poikilocytosis

91. RU flag, EXCEPT:
a. Nucleated RBCs
b. RBC fragments
c. RBC agglutination
d. Cold agglutinins

92. Faggot cells are predominantly seen in which type of leukemia?
a. M1
b. M2
c. M3
d. M4

93. Which of the following inclusions is only visible with supravital staining?
a. Basophilic stippling
b. Cabot rings
c. Heinz Bodies
d. Pappenheimer bodies

94. What is the area counted for manual platelet count?
a. 0.2 mm^2
b. 1 mm^2
c. 1.5 mm^2
d. 4 mm^2

95. Normal adult hemoglobin has:
a. Two alpha and two delta chains
b. Three alpha and one beta chains
c. Two alpha and two beta chains
d. Two beta and two epsilon chains

96. If 10 platelets are seen per OIO, what is the approximate platelet count?
a. 50 x 10^9/L
b. 100 x 10^9/L
c. 150 x 10^9/L
d. 200 x 10^9/L

97. What are the fibrinogen levels in Hemophilia A, B, and C, respectively?
a. Increased, increased, increased
b. Normal, normal, normal
c. Decreased, decreased, decreased
d. Increased, decreased, increased

98. The least mature specific progenitor:
a. MK-I
b. BFU-Meg
c. LD-CFU-Meg
d. MK-III

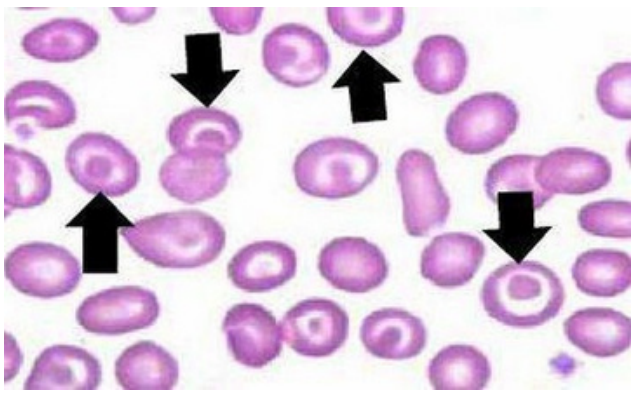
MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

99. What growth factor is produced in the kidneys and is used to treat anemia associated with kidney disease?

a. EPO
b. TPO
c. G-CSF
d. KIT ligand

100. Study the picture below. Which of the following poikilocytes is being illustrated?



a. Stomatocytes
b. Codocytes
c. Acanthocytes
d. Drepanocyte

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

1. Three standard deviations (3SD) from the mean in normal distribution curve would include
a. 99% of all values
b. 95% of all values
c. 75% of all values
d. 68% of all values

2. The delta check method of quality control
a. Uses the patient's own data to monitor population values
b. Uses batches of 20 samples to track MCV, MCH, and MCHC values
c. Compares the patient's leukocyte and platelet counts with his or her previous results
d. Monitors the patient's values within two SDs of the mean

3. Acceptable limits of a control value must fall
a. Within ± 1 SD of the mean
b. Between 1 and 2 SD of the mean
c. Within ± 2 SD of the mean
d. Within ± 3 SD of the mean

4. What is the average diameter of a normal erythrocyte in µm?
a. 5.2
b. 6.4
c. 7.2
d. 8.4

5. What is the average amount of blood in Liters?
a. 5 Liters
b. 6 Liters
c. 7 Liters
d. 8 Liters

6. Which of the following is the composition of hemoglobin?
a. 2 heme, 4 oxygen, 2 globin
b. 4 heme, 2 oxygen, 4 globin
c. 4 heme, 4 oxygen, 4 globin
d. 2 heme, 2 oxygen, 2 globin

7. The greatest portion of operational body iron is normally contained in what compound?
a. Hemoglobin
b. Ferritin
c. Cytochromes
d. Myoglobin

8. The presence of nucleoli is associated with:
a. Immature cells
b. All young cells, except myeloblasts
c. Only erythroblasts
d. Disintegrating cells

9. As blood cell matures, the overall cell diameter in most cases:
a. Increases
b. Decreases
c. remains the same
d. varies

10. The nucleated erythrocyte with a reddish-pink cytoplasm and condensed chromatin pattern is
a. Rubricyte
b. Basophilic normoblast
c. Metarubricyte
d. Either B and C

11. With a normal diet, an erythrocyte remains in the reticulocyte stage in the circulating blood for how many days?
a. 1 day
b. 2.5 days
c. 3 days
d. 120 days

12. The normal range for reticulocytes in adults is:
a. 0% to 0.5%
b. 0.5% to 1.0%
c. 0.5% to 2.5%
d. 1.5% to 2.5%

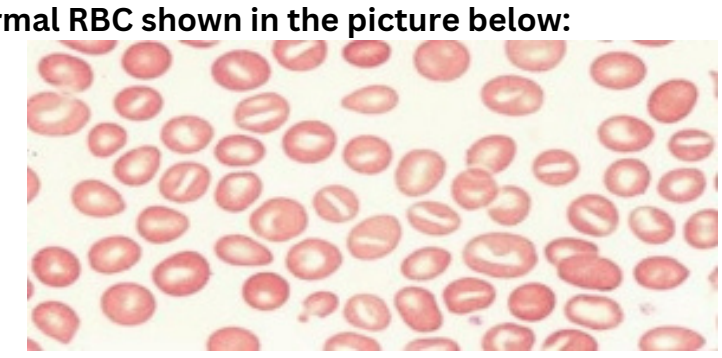
13. What is the appropriate reagent for the reticulocyte count?
a. New methylene blue
b. Phloxine B
c. Eosin Y
d. A and B

14. A morphological description of echinocytes is
a. Short, scalloped, or spike-like projections that are regularly distributed
b. Fragments of erythrocytes
c. The scooped-out part of an erythrocyte that remains after a blister cell ruptures
d. presence of irregularly spaced, spiky projections or thorn-like protrusions

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

15. Identify the abnormal RBC shown in the picture below:



a. Helmet cell
b. Burr cells
c. Spur cells
d. Stomatocyte

16. Which of the following represents an imbalance between erythrocytic and plasma lipids?
a. Sickle cell
b. Schistocytes
c. Macrocytes
d. Spur cell

17. Decreased amounts of 2,3-DPG _____ the oxygen affinity of the hemoglobin molecule?
a. Decreases
b. Increases
c. Does not alter
d. Variable

18. The following are classification of anemias is based upon, EXCEPT?
a. Impaired red cell production
b. Accelerated red cell destruction
c. Blood loss
d. Insufficient Hemoglobin

19. What is the initial laboratory test that are performed for the diagnosis of anemia?
a. CBC, iron studies, and reticulocyte count
b. CBC, reticulocyte count, and peripheral blood film examination
c. Reticulocyte count and serum iron, vitamin B12, and folate assays
d. Bone marrow study, iron studies, and peripheral blood film examination

20. Which is a characteristic of anemia of renal disease?
a. Severe hemochromatosis with microcystosis
b. Normocytic, hypochromic
c. Presence of burr cells in PBS
d. Normocytic, normochromic

21. Which of the following condition is characterized by the absence of CD55 (DAF) and CD 59 (MIRL) on the surface of RBCs rendering it susceptible to spontaneous lysis by complement?
a. PCH
b. PNH
c. HUS
d. DIC

22. Which of the following blood film findings indicate EDTA-induced pseudothrombocytopenia?
a. Platelets are pushed to the feathered end
b. Platelets are adhering to WBCs
c. No platelets at all are seen on the film
d. Slide has a bluish discoloration when examined macroscopically

23. If a small blood clot exists in an anticoagulated blood specimen, which blood parameter will be affected the most?
a. Leukocyte count
b. Erythrocyte count
c. Platelet count
d. Microhematocrit

24. What is the effect of insufficient centrifugation in hematocrit measurement?
a. False increase
b. False decrease
c. Increase
d. Decrease

25. If a blood smear is too long, the problem can be resolved by:
a. decreasing the angle of the pusher slide
b. increasing the angle of the pusher slide
c. using a larger drop of blood
d. pushing the slide slower in smearing out the blood

26. Which of the following should be observed macroscopically if the smear was properly stained?
a. Bluish-purple
b. Reddish-purple
c. Pink-Purple
d. Bluish-green

27. If a blood smear stains too red on microscopic examination of a Wright-stained preparation, possible causes include that:
I. the staining time was too long
II. the stain was too basic
III. the buffer was too acidic
IV. exposure time was too short

a. I and II
b. II and IV
c. I and III
d. III and IV

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

28. The screening test for Hb S that uses a reducing agent, such as sodium dithionite, is based on the fact that hemoglobins that sickle:

a. Are insoluble in reduced, deoxygenated form
b. Form methemoglobin more readily and cause a color change
c. Are unstable and precipitate as Heinz bodies
d. Oxidize quickly and cause turbidity

29. If an alkaline electrophoresis is performed Hemoglobin E has the same motility as hemoglobin

a. HbS
b. HbF
c. HbA
d. HbC

30. How does increased plasma proteins like fibrinogen and globulins affect ESR results?

a. Increased ESR
b. Decreased ESR
c. Normal ESR
d. Variable

31. The dark staining granules in the RBC when a bone marrow smear stained with Prussian blue stain is examined represent a defect of?

a. Membrane development
b. Hemoglobin synthesis
c. Globulin synthesis
d. Red blood cell aging

32. Earliest granulocytic maturational stage in which specific or secondary granules appear?

a. Myeloblast
b. Monoblast
c. Promyelocyte
d. Myelocyte

33. Which of the following cells originates from the Common Lymphoid Progenitor lineage?

a. T cell
b. Neutrophil
c. RBCs
d. Macrophage

34. Which of the following best describes Pelger— Huet anomaly?

a. Dark blue-black precipitates of RNA.
b. Five or more nuclear segments
c. Failure of the nucleus to segment.
d. Precipitated mucopolysaccharides

35. Leukocytes that demonstrate a positive reaction in tartaric acid-resistant phosphatase cytochemical staining are the lymphocytes seen in

a. Infectious mononucleosis
b. Malignant lymphoma
c. ALL
d. Hairy Cell Leukemia

36. The Philadelphia chromosome translocation:

a. 8;21
b. 15;17
c. 9;22
d. 8;14

37. The presence of Auer rods in the peripheral blood is associated with which of the following cells?

a. Lymphoblast
b. Myeloblast
c. Reactive lymphocyte
d. Shift cell

38. Using FAB classification of AML, Myelomonocytic leukemia is equivalent to:

a. M1
b. M2
c. M3
d. M4

39. Electrical impedance principle of cell counting was originally developed by:

a. Coulter
b. Abott
c. Beckman
d. Sysmex

40. A patient peripheral blood film demonstrates agglutinated RBCs, and the CBC shows an elevated MCHC. What other parameters will be affected by the agglutination of the RBCs?

a. MCV will be decreased and RBC count will be increased.
b. MCV will be decreased and RBC count will be decreased.
c. MCV will be increased and RBC count will be decreased.
d. MCV will be increased and RBC count will be increased.

41. The following are major systems in a flow cytometer, EXCEPT?

a. Fluidics
b. Optics
c. Electronics
d. Gating

42. Which parameters are calculated rather than directly measured?

a. Hematocrit and erythrocyte distribution width
b. RBC count and WBC count
c. WBC count and Hematocrit
d. Platelet count and platelet volume

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

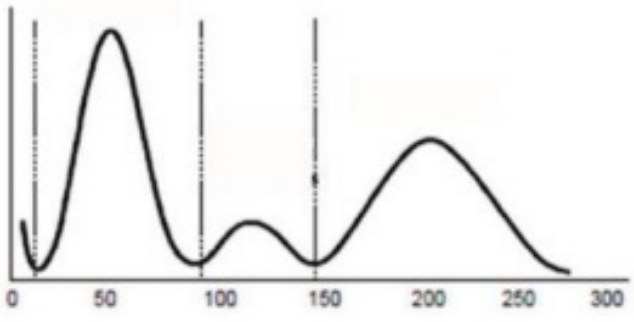
HEMATOLOGY EXAM

43. What does C in VCS hematology technology stand for?
a. Coagulability
b. Coulter
c. Conductivity
d. Counting

44. In an erythrocyte histogram, the erythrocyte that are larger than normal will be to the ____ of the normal distribution curve?
a. Left
b. Right
c. In the middle
d. Cannot be determined

45. Which of the following is sorted under mononuclear cells in a WBC histogram, EXCEPT?
a. Blast cells
b. Promyelocytes
c. Monocytes
d. Lymphocytes

46. In the WBC histogram, which cells are measured/ determined using the first peak?



a. Neutrophils
b. Basophils
c. Eosinophils
d. Lymphocytes

47. The sorting of leukocyte subpopulation in the WBC histogram determined by electrical impedance reflects the
a. Overall size
b. Relative size
c. Nuclear size
d. Chromatin pattern

48. The sorting of leukocyte subpopulation in the WBC histogram is primarily related to their?
a. Cytoplasmic size
b. Nuclear size
c. Concentration of granules
d. Cytoplasmic color

49. What measurement is made to determine the average volume of platelets?
a. MPV
b. PDW
c. RDW
d. MCV

50. The initiating stimulus to blood coagulation following injury to a blood vessel is
a. contact activation with collagen
b. vasoconstriction
c. stenosis
d. release of serotonin

51. Which of the following will NOT cause the thrombin time to be prolonged?
a. Fibrin degradation products
b. Heparin
c. Factory I deficiency
d. Factor II deficiency

52. Scott's syndrome results from
a. Defective granule secretion
b. Altered platelet aggregation
c. Altered expression of phospholipids on the platelet membrane
d. Deficiency of vitamin K-dependent clotting factors

53. Platelet aggregation will occur with the end product of:
a. Serotonin
b. Prostacyclin
c. Thromboxane A2
d. Prostaglandin

54. Most common acquired platelet dysfunction
a. HUS
b. DIC
c. Drug-induced
d. Heparin-induced

55. Which of the following is the most common of the hereditary platelet function defects?
a. Glanzmann thrombasthenia
b. Bernard-Soulier syndrome
c. Storage pool defects
d. Multiple myeloma

56. The clinical presentation of platelet-related bleeding may include all of the following EXCEPT:
a. Bruising
b. Nosebleeds
c. Gastrointestinal bleeding
d. Bleeding into the joints (hemarthroses)

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

57. If 10 platelets are seen per oil immersion field, what is the approximate platelet count?
a. 50 × 109/L
b. 100 × 109/L
c. 150 × 109/L
d. 200 × 109/L

58. If a pediatric preoperative patient has a family history of bleeding but has never had a bleeding episode herself, what test should be included in a coagulation profile in addition to the PT, aPTT, and platelet count?
a. Lee-White clotting time
b. Clot retraction
c. Bleeding time
d. Fibrin split products

59. Mucocutaneous hemorrhage is typical of:
a. Acquired hemorrhagic disorders
b. Localized hemorrhagic disorders
c. Defects in primary hemostasis
d. Defects in fibrinolysis

60. Which of the following is NOT a site of anatomic bleeding?
a. Orifices of the body
b. Soft tissue
c. Muscle
d. Joints

61. The coagulation factors referred to as "vitamin K□dependent" are
a. I,V,VIII,XIII
b. II,V,IX,XII
c. II,VII,IX,X
d. XI, XII, Fletcher, Fitzgerald

62. The following are a product of fragment X , EXCEPT?
a. Y
b. D
c. E
d. Z

63. What protein secreted by endothelial cells activates fibrinolysis?
a. Plasminogen
b. TPA
c. PAI-1
d. TAFI

64. What is the specimen of choice for the PT and APTT procedures?
a. platelet-rich plasma, citrated
b. PPP, citrated
c. serum
d. plasma, heparinized

65. In the photo-optical method, the change in light transmission versus the ____ is used to determine the activity of coagulation factors or stages.
a. Amount of patient's plasma
b. Amount of test reagent
c. Time
d. Temperature

66. Neither the aPTT nor the PT detects a deficiency of
a. Platelet factor 3
b. Factor VII
c. Factor VIII
d. Factor IX

67. The function of thromboplastin in the prothrombin test is to provide ____ to the assay
a. Kaolin
b. Fibrinogen
c. Phospholipoprotein
d. Thrombin

68. Which of the following is the appropriate principle or description of the antithrombin assay?
a. In the presence of heparin, thrombin is neutralized.
b. Measures the time require to generate thrombin and fibrin polymers via the intrinsic pathway
c. Measures inhibitors of specific factors
d. An in vivo measurement of platelet adhesion an aggregation on locally injured vascular subendothelium

69. Which laboratory test is used to investigate the hypercoagulable states?
a. thrombin time
b. plasminogen
c. APCR
d. euglobulin lysis

70. The following laboratory results were obtained from a 40-year-old woman: PT 20 seconds, APTT = 50 seconds, TT = 18 seconds. What is the most probable diagnosis?
a. Factor VII deficiency
b. Factor VIII deficiency
c. Factor X deficiency
d. Hypofibrinogenemia

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

71. Reference range for APTT
a. 2 to 8 minutes
b. 10 to 14 seconds
c. 20 to 35 seconds
d. 80% to 100%

72. What blood cell lineage is affected in Lazy Leukocyte Syndrome?
a. Lymphocytic Series
b. Erythrocytic Series
c. Neutrophilic Series
d. Monocytic Series

73. Excessive specimen agitation, called "cocktail Shaking", causes, EXCEPT:
a. Hemolysis or RBC rupture
b. Procoagulant activation
c. Platelet activation
d. Deterioration of clotting factors

74. Enucleation occurs at what stage of erythrocytic series?
a. Orthochromic erythroblast
b. Erythroblast
c. Reticulocyte
d. Mature RBC

75. What is the source of thromboplastin reagent in PT test?
a. Sheep lungs
b. Sheep brain
c. Rabbit liver
d. Rabbit brain

76. Which is True about flow cytometry?
a. In flow cytometry, the number of pulses generated is directly proportional to the number of cells counted
b. Flow cytometry has the advantage of being performed fast at the patient's bedside
c. Flow cytometry measures exclusively White blood cell volume and frequency
d. Flow cytometry can detect other particles like microorganisms, chromosomes, and proteins

77. What term is used to describe the ratio of yellow marrow and red marrow?
a. Bone marrow cellularity
b. Yellow marrow:red marrow index
c. M:E Ratio
d. Retrogression

78. Factor XII deficiency is associated with:
a. Hemorrhage
b. Epistaxis
c. Increased risk of thrombosis
d. Decreased risk of thrombosis

79. What is the characteristic appearance of platelets in Wiskott-Aldrich syndrome?
a. Giant
b. Tiny
c. Normal
d. Small

80. Which of the following coagulation factors is sensitive to PTT?
a. Factor VII
b. Factor XI
c. Factor X
d. Fibrinogen

81. Bluish coloration of the skin due to decrease oxygen level:
a. Hematoma
b. Cyanosis
c. Purpura
d. Petechiae

82. What initiates the extrinsic coagulation pathway?
a. Calcium
b. Factor VII
c. Tissue Thromboplastin
d. Platelets

83. A growth factor that is produced in the kidney and is used to treat anemia in patients with renal disorders
a. Kit Ligand (stem-cell growth factor)
b. Erythropoietin
c. Thrombopoietin
d. GM-CSF

84. The most predominant reported cases of AIHA (AUTO IMMUNE HEMOLYTIC ANEMIA):
a. WAIHA
b. CAIHA
c. Mixed CAIHA AND WAIHA
d. Drug Induced AIHA

85. Which of the following phenomena is not associated with conditions when blood samples for hemostasis are stored at refrigerated temperatures?
a. Activation of factor VII
b. Precipitation of Vwf
c. Activation of Prothrombin
d. Destruction of platelet activity and integrity

MEDICAL TECHNOLOGY LICENSURE EXAM PREPARATION IN THE PHILIPPINES

HEMATOLOGY EXAM

86. What is the reference method for manual platelet counting?
a. Slide counting
b. Brecher Cronkite method using Phase contrast microscope on Neubauer counting chamber
c. Fonio's method using bright field microscope
d. Platelet estimation

87. What is the gold standard for the anticoagulant therapy?
a. Heparin
b. Warfarin
c. Hirudin
d. Argatroban

88. IDENTIFY: represents granules composed of ribosomes and RNA that are precipitated
a. Heinz
b. Basophilic stippling
c. Howell Jolly
d. Auer rods

89. What is the least and earliest precursor of megakaryocyte series?
a. BFU-Meg
b. LD-CFU-Meg
c. MK-3
d. MK-1

90. This test measures the time required to generate thrombin and fibrin polymers via the intrinsic pathway
a. PT
b. CT
c. aPTT
d. Thrombin time

91. What is being replaced in hemoglobinopathies?
a. Heme
b. Amino acid
c. Peptide chain
d. Ferrous iron

92. Compute for the RPI. There are 20 reticulocytes counted in the 1000 total RBCs. The patient hematocrit is 43%.
a. 1.91
b. 2.50
c. 1.5
d. 19.1

93. What is the result being detected in Clauss fibrinogen assay?
a. Turbidity
b. Color change
c. Change in pH
d. Color intensity

94. Which of the following describes a stomatocyte?
a. Slit like opening on one side of the cell
b. Slit like opening on both sides of the cell
c. Zigzag like opening one side of the cell
d. Zigzag like one both side of the cell

95. The percent of blast needed to diagnose CML:
a. 30%
b. 20%
c. 15%
d. 50%

96. What is the light source used in flow cytometer?
a. Halogen lamp
b. Bunsen burner
c. Tungsten lamp
d. Mercury lamp

97. The normal appearance of a resting inactive platelet:
a. Discoid and biconcave
b. Discoid and biconvex
c. Spherical and biconcave
d. Spherical and biconvex

98. Usage of rough and chipped spreader slide in preparing a blood smear would produce what characteristic?
a. With irregularities
b. With streaks
c. With lines, and breaks
d. AOTA

99. What are the phases involved that leads in the formation of fibrin?
a. Stabilization
b. Stabilization, and polymerizatio
c. Proteolysis, polymerization, and stabilization
d. Transformation, proteolysis, polymerization, and stabilization

100.The main enzyme of the coagulation pathway with multiple key activities
a. Fibrin
b. Thrombin
c. VIIa
d. Xa