1. Leukocytes are attracted to a site of injury or disease by:
   a. diapedesis
   b. chemotaxis
   c. leukocytosis
   d. heparin
   e. leukomotosis

2. Leukocytes leave the blood circulation, forcing their way between cells of capillary walls, through the process of:
   a. chemotaxis
   b. leukocytosis
   c. leukomotosis
   d. diapedesis
   e. leukopoiesis

3. Which of the following is not primarily a phagocyte:
   a. neutrophil
   b. eosinophil
   c. monocyte
   d. basophil
   e. none of the above are phagocytic

4. A plasma cell within the blood circulation would be a(n):
   a. neutrophil
   b. eosinophil
   c. lymphocyte
   d. basophil
   e. monocyte

5. Lymphoid tissue forms:
   a. thrombocytes
   b. stem cells
   c. lymphocytes
   d. granulocytes
   e. megakaryocytes

6. Which of the following WBC counts would indicate leukopenia:
   a. 10,000
   b. 8,000
   c. 20,000
   d. 45,000
   e. none of the above

7. Which of the following would be a cause of leukocytosis:
   a. allergy
   b. pregnancy
   c. leukemia
   d. inflammation
   e. all of the above
8. Blood platelets (thrombocytes):
   a. grow into erythrocytes
   b. grow into leukocytes
   c. help start the blood clotting process
   d. release fibrinogen in clotting
   e. are phagocytic

9. Platelets are derived from:
   a. megakaryocytes
   b. lymphoid tissue
   c. the reticuloendothelial system
   d. yellow bone marrow
   e. the spleen

10. Which of the following is not primarily a phagocyte:
    a. lymphocyte
    b. neutrophil
    c. eosinophil
    d. monocyte
    e. macrophage

11. Basophils are involved in allergic reactions, specifically the swelling and other osmotic effects and consequences caused by permeability changes, due to their release of:
    a. thrombopoietin
    b. Christmas factor
    c. histamine
    d. heparin
    e. hyperosmolin

12. The life span of a leukocyte:
    a. minutes
    b. hours
    c. days
    d. years
    e. any of the above could be true

13. Which of the following would cause leukocytosis:
    a. inflammation
    b. allergy
    c. leukemia
    d. pregnancy
    e. all of the above

14. Which of the following would not be formed by lymphoid tissue:
    a. thrombocytes
    b. erythrocytes
    c. monocytes
    d. granulocytes
    e. all of the above are formed in bone marrow, not in lymphoid tissue
15. A leukocyte lives for about:
   a. one day
   b. one week
   c. one month
   d. one year
   e. any of the above, since their life spans can vary

16. The source of lymphocytes:
   a. red bone marrow
   b. hypothalamus
   c. spleen, lymph nodes and other lymphatic organs and tissues
   d. lymphopoietic organs, such as the thyroid, pituitary and adrenal
   e. none of the above

17. Which of the following is the most aggressive and multi-purpose phagocyte:
   a. monocyte
   b. lymphocyte
   c. basophil
   d. eosinophil
   e. neutrophil

18. Which type of leukocyte plays a controlling role in all facets of immunity:
   a. lymphocyte
   b. basophil
   c. neutrophil
   d. eosinophil
   e. monocyte

19. Stem cells first differentiate into:
   a. erythroblasts
   b. various types of colony forming units
   c. megakaryoblasts
   d. reticulocytes
   e. lymphoid precursor progenitors

20. The basic method of autonomous movement which is utilized by leukocytes is called:
   a. flagellated
   b. amoeboid
   c. chemotaxis
   d. diapedesis
   e. leukomotosis

21. The precursor of all granulocytes:
   a. mast cell
   b. reticulocyte
   c. myeloblast
   d. granuloblast
   e. megakaryoblast
22. Which of the following is not involved in the regulation of leukopoiesis:
   a. interleukin-1
   b. tumor necrosis factor
   c. G-CSF
   d. thromboplastin
   e. M-CSF

23. Spontaneous hemorrhaging from small vessels and increased bleeding time would be caused by:
   a. thrombocytopenia
   b. thrombocytosis
   c. leukocytosis
   d. leukopenia
   e. autoimmunity

24. Which of the following appears earliest during intrinsic coagulation:
   a. fibrin
   b. platelets
   c. thrombin
   d. product-I
   e. thromboplastin

25. Coagulation reactions are usually initiated by:
   a. heparin
   b. platelets
   c. fibrin
   d. thromboplastin
   e. chemotaxis

26. The last to appear during coagulation:
   a. product-I
   b. platelets
   c. thrombin
   d. fibrin
   e. thromboplastin

27. Which of the following, if absent, would prevent blood coagulation:
   a. antihemophilic globulin (factor VIII)
   b. thromboplastin
   c. prothrombin
   d. Christmas factor (IX)
   e. any of the above, since this would interrupt this series of interdependent reactions

28. A thrombus can be initiated by:
   a. air, from improper injection
   b. slow blood flow
   c. roughened vessel endothelium
   d. foreign substance
   e. all of the above
29. A dislodged intravascular clot is:
   a. thrombus
   b. embolus
   c. macrophage
   d. antigen
   e. thrombopoietin

30. Which of the following is an anticoagulant:
   a. heparin
   b. intrinsic factor
   c. erythropoietin
   d. serotonin
   e. histamine

31. Which of the following is the catalyst which causes fibrinogen to be converted to fibrin:
   a. Christmas factor
   b. calcium ions
   c. thrombin
   d. fibrinolysin
   e. product-I

32. Which of the following is a catalyst which causes prothrombin to be converted to thrombin:
   a. product-I
   b. thromboplastin
   c. fibrinogen
   d. proconvertin
   e. thrombotransferolubricin

33. Hemophilia or thrombocytopenia can cause:
   a. thrombosis and embolism
   b. polycythemia
   c. spontaneous hemorrhaging of small vessels
   d. leukocytosis
   e. immune suppression

34. A foreign substance in the blood, such as an air bubble from an improper injection, would produce:
   a. thrombocytopenia
   b. thrombus
   c. pernicious anemia
   d. diapedesis
   e. cell-mediated immune response

35. The correct order for the various degrees of hemostasis:
   a. vascular spasm _ platelet plug _ clot
   b. clot _ platelet plug _ vascular spasm
   c. platelet plug _ clot _ vascular spasm
   d. vascular spasm _ clot _ platelet plug
   e. clot _ vascular spasm _ platelet plug
36. The chances for thrombosis and embolism are decreased by:
   a. antithrombin
   b. heparin
   c. thrombomodulin and protein-C
   d. fibrinolysin
   e. all of the above are anticoagulants

37. The first step in hemostasis is:
   a. vascular spasm
   b. platelet plug
   c. clot
   d. thrombus
   e. embolus

38. Which of the following red blood cell counts is the most reasonable average (regardless of sex): [assume each is per mm³]
   a. 9 million
   b. 2 million
   c. 4 million
   d. 22 million
   e. 0.5 million

39. Hematocrit is:
   a. the amount of hemoglobin per 100 ml of blood
   b. the percentage of red blood cells in the blood, when packed
   c. the percentage of white blood cells, when packed
   d. typically greater in women than men
   e. due to the Rh-factor

40. A determination of the number or percentage of each type of leukocyte in the blood is called:
   a. an absolute count
   b. a differential count
   c. hematocrit or cell volume
   d. basal leukocyte rate
   e. none of the above

41. The least percentage of white blood cells should normally be:
   a. monocytes
   b. basophils
   c. neutrophils
   d. eosinophils
   e. lymphocytes

42. The most numerous leukocytes should be:
   a. basophils
   b. eosinophils
   c. neutrophils
   d. lymphocytes
   e. monocytes
43. The percentage of eosinophils in a differential count should be about:
   a. 3
   b. 65
   c. 10
   d. less than one
   e. 25

44. The percentage of monocytes in a differential count should be about:
   a. one or less
   b. 25
   c. 65
   d. 3
   e. between 3 and 8

45. The percentage of monocytes in a differential count should be about:
   a. 3 - 8
   b. 10
   c. less than one
   d. 65
   e. 25

46. The percentage of lymphocytes in a differential count should be about:
   a. 3
   b. 10
   c. less than one
   d. 65
   e. 25

47. Polycythemia can result from hemorrhage or low erythropoiesis.

48. Anemia can result from hemorrhage or low erythropoiesis.

49. It is possible for someone to have insufficient hemoglobin with a normal hematocrit and red count.

50. Low hemoglobin will always indicate low hematocrit and red count as well.

51. Leukocytes usually perform their essential functions out of the general blood circulation.

52. Erythrocytes usually perform their essential functions out of the general blood circulation.

53. Thrombocytes perform their function out of the blood circulation, within the tissue fluid.

54. Platelets are considered to be non-cellular fragments.

55. An erythrocyte is mostly composed of hemoglobin.
56. Some authorities consider blood as being a unique tissue type.

57. An erythrocyte lives for approximately 18 months.

58. Leukocytes leave or enter the blood circulation by the process of diapedesis.

59. An erythrocyte lives for approximately 120 days.

60. Acute leukemias are of longer duration and produce fewer abnormal cell types.

61. The term formed elements is derived from the debated cellular status of leukocytes.

62. Hemoglobin stability and O₂ reaction reversibility are the responsibilities of heme.

63. Thrombocytosis can be normal.

64. Polycythemia can be caused by normal circumstances.

65. Bleeding time is longer than coagulation time.

66. Bleeding time is shorter than coagulation time.

67. Blood will not clot within vessels, due to anticoagulants in the plasma.

68. The clotting reactions can be shorter under some circumstances.

69. An intravascular clot is a thrombus.

70. An intravascular clot is an embolus.

71. Coagulation is ultimately a physical phenomenon.

72. Coagulation is a purely chemical phenomenon.

73. Extrinsic coagulation does not involve platelets.

74. Extrinsic coagulation involves platelets.

75. Hemoglobin, hematocrit and RBC count are usually lower in women than men.
76. Hemoglobin, hematocrit and RBC count are usually higher in women than men.

77. A normal leukocyte count is about 8,000/mm$^3$.

78. A normal leukocyte count is about 2,000/mm$^3$.

79. A normal hematocrit is about 42% for males.

80. A normal hematocrit is about 47% for males.

81. A normal red cell count is about 8 million/mm$^3$ (national average) in males.

82. A normal red cell count is about 5.8 million/mm$^3$ (national average) in males.

83. RBC counts are usually lower in men than women.

84. Basophils are the most abundant leukocytes.

85. Basophils are the least numerous leukocytes.

86. The most numerous leukocytes are eosinophils.