Specific Examination Objectives

Question Topic	Total	Average Difficulty
Anemia	77	1.52
Bone Marrow	1	2.00
Macrocytic Anemia	1	3.00
Maturation	2	1.50
Megaloblastic Anemia	3	2.33
Myeloma	1	1.00
RBC Morphology	11	1.55
Reticulocytes	4	2.25

Exam ID	Total Questions	Average Difficulty
CLS 322 Lecture #1/CLS 432 Practice #4 2008	100	1.59

On this examination, the student will be expected to:

1. [Level 1/Hematology/Anemia/7]
   Describe the red cell morphology most often seen in aplastic anemia.
2. [Level 2/Hematology/Anemia/8]
   Identify the globin chains present in various types of hemoglobin, such as A, H, F, and Bart's.
3. [Level 1/Hematology/Anemia/10]
   Discuss the etiology of the anemia of chronic disease.
4. [Level 1/Hematology/Anemia/11]
   Evaluate the laboratory results of a patient having suspected iron deficiency anemia.
5. [Level 1/Hematology/Anemia/12]
   Contrast extrinsic/intrinsic and intravascular/extravascular hemolysis.
6. [Level 2/Hematology/Anemia/14]
   Define and state the expected laboratory findings in a patient with aplastic anemia.
7. [Level 3/Hematology/Anemia/15]
   Calculate a corrected reticulocyte count.
8. [Level 1/Hematology/Anemia/16]
   State the most common cause of iron deficiency anemia in the United States.
9. [Level 1/Hematology/Anemia/19]
   Correlate expected changes in Red Cell Indices with different morphologic types of anemia.
10. [Level 1/Hematology/Anemia/22]
    Evaluate the expected peripheral blood red cell morphology findings in a patient with thalassemia.
11. [Level 1/Hematology/Anemia/24]
    State the expected morphologic findings in a patient with lead (Pb) poisoning.
12. [Level 2/Hematology/Anemia/26]
    Contrast Sickle Cell Trait (Hgb AS) with Sickle Cell Disease (Hgb SS).
13. [Level 3/Hematology/Anemia/30]
    Evaluate expected laboratory results in anemia of chronic disease.

See last page for explanation of question levels.

14. [Level 2/Hematology/Anemia/34]

    Evaluate the usefulness of the Direct Antiglobulin Test (DAT) when attempting to determine the cause of a hemolytic anemia.

15. [Level 2/Hematology/Anemia/38]

    Describe laboratory findings associated with hemolytic anemia, with regard to red cell survival and heme catabolism.

16. [Level 2/Hematology/Anemia/49]

    Describe the pathophysiology of megaloblastic anemia.

17. [Level 1/Hematology/Anemia/51]

    Describe the clinical and laboratory findings of the most common type of non-spherocytic hemolytic anemia.

18. [Level 2/Hematology/Anemia/57]

    Describe the laboratory findings and clinical correlations of anemias caused by endocrine, liver, and kidney diseases.

19. [Level 2/Hematology/Anemia/67]

    State the mechanisms by which other disorders might mimic a clinical picture seen with Pernicious Anemia.

20. [Level 2/Hematology/Anemia/68]

    Describe the clinical and laboratory findings most often associated with the aplastic crises seen in Sickle Cell Anemia.

21. [Level 2/Hematology/Anemia/69]

    Explain how the effectiveness of iron therapy in the treatment of an anemia might be evaluated by the laboratory.

22. [Level 2/Hematology/Anemia/70]

    Evaluate the laboratory results of a patient having suspected iron deficiency anemia.

23. [Level 1/Hematology/Anemia/79]

    Evaluate the usefulness of the appearance of a Cabot ring on a Wright stained smear of peripheral blood.

24. [Level 2/Hematology/Anemia/81]

    Explain the usefulness of a Wright stained blood smear in making a differential diagnosis between beta thalassemia minor and iron deficiency anemia.

25. [Level 1/Hematology/Anemia/82]

    Correlate WBC and Platelet findings with other morphologic findings often seen in megaloblastic anemia.

26. [Level 2/Hematology/Anemia/83]

    Define megaloblastic, asynchronous maturation, and discuss conditions in which this is seen.

27. [Level 1/Hematology/Anemia/86]

    State another name for true erythrocyte (red cell) aplasia.

28. [Level 2/Hematology/Anemia/89]

    Compare the expected results of a reticulocyte count done on a person with Pernicious Anemia with that done on an individual with sickle cell disease (Hgb SS).

29. [Level 1/Hematology/Anemia/92]

    Discuss the morphological appearance of erythrocytes as seen in Beta Thalassemia Major and Minor.

30. [Level 2/Hematology/Anemia/93]

    Correlate the results of a reticulocyte count with the presence of hemolysis.

See last page for explanation of question levels.

31. [Level 1/Hematology/Anemia/95]

    Contrast the Morphologic and the Etiologic causes of anemia.

32. [Level 2/Hematology/Anemia/96]

    Describe the etiology of thalassemia.

33. [Level 1/Hematology/Anemia/98]

    Define, and describe the significance of hypochromia.

34. [Level 1/Hematology/Anemia/99]

    Describe how the Embden-Meyerhof pathway affects normal production of erythrocytes.

35. [Level 1/Hematology/Anemia/100]

    State the specific amino acid substitution found in Hemoglobin S disease.

36. [Level 1/Hematology/Anemia/101]

    Describe the etiology of Hereditary Elliptocytosis.

37. [Level 1/Hematology/Anemia/104]

    Explain the difference between a relative, and an absolute, anemia.

38. [Level 1/Hematology/Anemia/105]

    Define Heinz Bodies.

39. [Level 1/Hematology/Anemia/107]

    Evaluate the clinical usefulness of the Prussian Blue stain with respect to the diagnosis of anemia.

40. [Level 2/Hematology/Anemia/110]

    Discuss the significance of Cabot Rings and Howell Jolly bodies within erythrocytes.

41. [Level 2/Hematology/Anemia/114]

    Describe the clinical and laboratory characteristics of the Hereditary Spherocytic and Non-Spherocytic hemolytic anemias.

42. [Level 1/Hematology/Anemia/117]

    Discuss the expected Wright stain morphologic findings in a patient with Hemoglobin C disease (Hgb CC).

43. [Level 1/Hematology/Anemia/119]

    Describe expected peripheral blood smear findings in a patient with folic acid deficiency.

44. [Level 2/Hematology/Anemia/120]

    Describe the etiology of the bone marrow hypocellularity often seen with severe kidney disease.

45. [Level 2/Hematology/Anemia/122]

    Given laboratory data, calculate the MCV for a patient.

46. [Level 1/Hematology/Anemia/123]

    Be able to state the normal reticulocyte count for newborn infant cord blood.

47. [Level 1/Hematology/Anemia/127]

    Define thalassemia.

48. [Level 1/Hematology/Anemia/128]

    Correlate the Indices with expected red blood cell morphology.

49. [Level 2/Hematology/Anemia/129]

    Describe the clinical and laboratory findings associated with a patient having liver disease.

50. [Level 2/Hematology/Anemia/130]

    Evaluate the results of the TIBC in normal conditions, iron deficiency and thalassemia.

See last page for explanation of question levels.

51. [Level 2/Hematology/Anemia/131]

Evaluate why a person with polycythemia vera, who is being treated with therapeutic phlebotomy, could be in danger of developing iron deficiency anemia.

52. [Level 1/Hematology/Anemia/133]

Define anemia.

53. [Level 1/Hematology/Anemia/134]

Evaluate the necessity and expected laboratory results of the Shilling's test, performed in a patient with Pernicious Anemia.

54. [Level 1/Hematology/Anemia/135]

Compare the etiological descriptions of anemia and give examples of each.

55. [Level 2/Hematology/Anemia/136]

Evaluate laboratory findings associated with Beta Thalassemia Minor.

56. [Level 1/Hematology/Anemia/139]

Identify the most probable causes of anemia in a patient with chronic renal failure.

57. [Level 2/Hematology/Anemia/143]

Evaluate sources of error in performing hematocrit determinations, with regard to their effects on RBC indices.

58. [Level 1/Hematology/Anemia/150]

Describe the peripheral blood morphologic findings associated with megaloblastic anemia.

59. [Level 1/Hematology/Anemia/151]

Describe the characteristic morphology expected in a patient with Hereditary Elliptocytosis.

60. [Level 1/Hematology/Anemia/155]

Contrast the MORPHOLOGIC and ETIOLOGIC classifications of anemia.

61. [Level 2/Hematology/Anemia/157]

Evaluate the necessity and expected laboratory results of the Shilling's test, performed in a patient with Pernicious Anemia.

62. [Level 2/Hematology/Anemia/158]

Contrast the etiology of Paroxysmal Nocturnal Hemoglobinuria and Paroxysmal Cold Hemoglobinuria.

63. [Level 1/Hematology/Anemia/163]

Correlate the laboratory and blood smear findings seen in a patient with G6PD deficiency.

64. [Level 1/Hematology/Anemia/164]

Describe the etiology of the hemolysis found in paroxysmal nocturnal hemoglobinuria (PNH).

65. [Level 2/Hematology/Anemia/165]

State the expected laboratory findings in a patient with iron deficiency anemia, with respect to the Red Cell Indices and the Complete Blood Count (CBC).

66. [Level 2/Hematology/Anemia/166]

Identify the most significant indicator of hemolysis on a peripheral blood smear.

67. [Level 1/Hematology/Anemia/168]

Identify the antibody usually present in paroxysmal cold hemoglobinuria (PCH).

68. [Level 1/Hematology/Anemia/170]

Describe the etiology of the megaloblastic anemias.

69. [Level 1/Hematology/Anemia/171]

Identify the most characteristic morphologic finding on a blood smear of peripheral blood in a patient having Hemoglobin C disease.

See last page for explanation of question levels.

70. [Level 2/Hematology/Anemia/173]

Define polychromasia, and discuss its significance.

71. [Level 2/Hematology/Anemia/174]

Describe the causes of the hemolysis which is associated with G6PD and PK deficiency.

72. [Level 2/Hematology/Anemia/177]

Discuss the possibility of a finding of leukocytosis on a blood smear of a patient with severe megaloblastic anemia.

73. [Level 2/Hematology/Anemia/179]

Discuss the reasons for an increase in hemoglobin A2 in beta thalassemia minor.

74. [Level 2/Hematology/Anemia/183]

Identify the three components comprising the 'diagnostic triad' of pernicious anemia.

75. [Level 2/Hematology/Anemia/184]

Differentiate between iron deficiency anemia and beta thalassemia minor, utilizing expected laboratory findings.

76. [Level 2/Hematology/Anemia/185]

Discuss the rate of iron turnover with respect to the production of new erythrocytes by marrow.

77. [Level 1/Hematology/Anemia/186]

State the expected values for the reticulocyte count in a patient with aplastic anemia.

78. [Level 2/Hematology/Bone Marrow/285]

Describe the changes which normally occur as cells mature in the bone marrow.

79. [Level 3/Hematology/Macrocytic Anemia/1779]

Correlate clinical and laboratory data in Folic Acid and/or Vitamin B12 deficiency .

80. [Level 1/Hematology/Maturation/1810]

Define Azurophilic Granulation.

81. [Level 2/Hematology/Maturation/1817]

Describe the morphologic characteristics of a Rubricyte.

82. [Level 2/Hematology/Megaloblastic Anemia/1835]

Correlate clinical and laboratory hematologic findings of a patient with alcoholism.

83. [Level 2/Hematology/Megaloblastic Anemia/1865]

Identify specific anemias with respect to their MORPHOLOGICAL or ETIOLOGICAL classification.

84. [Level 3/Hematology/Megaloblastic Anemia/1872]

Correlate clinical and laboratory findings in a patient with macrocytic anemia.

85. [Level 1/Hematology/Myeloma/1965]

Describe the usefulness of the Erythrocyte Sedimentation Rate (ESR).

86. [Level 2/Hematology/RBC Morphology/2292]

Correlate changes in red cell indices with expected observations on a Wright stained blood smear.

87. [Level 2/Hematology/RBC Morphology/2298]

Correlate morphologic appearance of erythrocytes on a Wright Stained blood smear with calculated Red Cell Indices.

88. [Level 1/Hematology/RBC Morphology/2299]

Describe the erythrocyte morphology most commonly observed in Hereditary Elliptocytosis.

89. [Level 1/Hematology/RBC Morphology/2300]

Describe how one might measure the size of a normal erythrocyte on a peripheral blood smear, without using a micrometer.

See last page for explanation of question levels.

90. [Level 1/Hematology/RBC Morphology/2301]

Define and state the significance of rouleaux.

91. [Level 1/Hematology/RBC Morphology/2302]

Explain the purpose of an RDW (red cell distribution width).

92. [Level 2/Hematology/RBC Morphology/2304]

Discuss mechanisms by which schistocytes may appear on the peripheral blood smear.

93. [Level 2/Hematology/RBC Morphology/2308]

Contrast the expectation of visualizing 'sickle cells' in a person having Hgb SS disease, versus a person with sickle cell trait.

94. [Level 1/Hematology/RBC Morphology/2310]

Define and explain the significance of Pappenheimer bodies.

95. [Level 1/Hematology/RBC Morphology/2346]

Define hypochromia.

96. [Level 3/Hematology/RBC Morphology/2358]

Discuss the significant information that may be obtained from the visualization of a peripheral blood smear of an infant with suspected hemolytic disease.

97. [Level 2/Hematology/Reticulocytes/2495]

State reticulocyte count collection requirements for newborns and adults.

98. [Level 2/Hematology/Reticulocytes/2502]

Explain why reticulocytes stain as they do with supravital dyes such as New Methylene Blue.

99. [Level 3/Hematology/Reticulocytes/2522]

Given laboratory data, calculate the corrected reticulocyte count.

100. [Level 2/Hematology/Reticulocytes/2526]

Given laboratory data, calculate the reticulocyte count.

See last page for explanation of question levels.

Levels given in brackets at the beginning of the question objective indicate the level of difficulty for the actual question on this examination, NOT the level of difficulty for the stated objective. Levels of difficulty were developed using Bloom, et.al. Taxonomy of Educational Objectives. Also shown in the brackets are the Category of the question, the Topic of the question, and the number of the question in the database.

Explanation of Categories in the Cognitive Domain: (with Outcome-Illustrating Verbs)

Level 1: Recall

Knowledge of terminology; specific facts; ways and means of dealing with specifics (conventions, trends and sequences, classifications and categories, criteria, methodology); universals and abstractions in a field (principles and generalizations, theories and structures). Knowledge is (here) defined as the remembering (recalling) of appropriate, previously learned information.

* defines; describes; enumerates; identifies; labels; lists; matches; names; reads; records; reproduces; selects; states; views.

Level 2: Comprehension

Grasping (understanding) the meaning of informational materials.

* classifies; cites; converts; describes; discusses; estimates; explains; generalizes; gives examples; makes sense out of; paraphrases; restates (in own words); summarizes; traces; understands.

Level 3: Application

The use of previously learned information in new and concrete situations to solve problems that have single or best answers.

* acts; administers; articulates; assesses; charts; collects; computes; constructs; contributes; controls; determines; develops; discovers; establishes; extends; implements; includes; informs; instructs; operationalizes; participates; predicts; prepares; preserves; produces; projects; provides; relates; reports; shows; solves; teaches; transfers; uses; utilizes.

Taxonomy of educational objectives : the classification of educational goals ; / by a committee of college and university examiners ; Benjamin S. Bloom, editor [and others] IMPRINT New York : D. McKay Co., Inc., c1956-1964 (1971-72 printing) DESCRIPT. 2 v. in 1 : ill. ; 22 cm. NOTE Vol.2 by D.R. Krathwohl and others.

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See last page for explanation of question levels.