

CHAPTER

17

Self-Assessment Test

Review Questions 1104

Review Answers 1128



review questions

INSTRUCTIONS Each of the questions or incomplete statements that follows is comprised of four suggested responses. Select the *best* answer or completion statement in each case.

1. What is the composition of the packing of a column in gas-liquid chromatography?
 - A. An inert material
 - B. A stationary phase
 - C. An inert material and a mobile phase
 - D. An inert material and a stationary phase
2. What is the principal estrogen produced during pregnancy?
 - A. Estrone
 - B. 17β -Estradiol
 - C. Estriol
 - D. 6β -Hydroxyestrone
3. Insecticides that are organic phosphorus compounds, such as parathion and tetraethyl pyrophosphate, may cause insecticide poisoning by inhibiting
 - A. Lactate dehydrogenase
 - B. Acid phosphatase
 - C. Cholinesterase
 - D. Glucose-6-phosphate dehydrogenase
4. Which of the following is a water-soluble vitamin?
 - A. A
 - B. C
 - C. D
 - D. E
5. Which of the following is a laboratory assay used for detecting cystic fibrosis?
 - A. Serum lipase
 - B. Serum amylase
 - C. Serum trypsin
 - D. Sweat chloride
6. In primary hypothyroidism one would expect the serum FT_4 level to be _____, the TSH level to be _____, and the TBG level to be _____.
 - A. Decreased, increased, slightly increased
 - B. Decreased, decreased, slightly increased
 - C. Increased, decreased, slightly increased
 - D. Decreased, increased, slightly decreased

7. A serum sample is moderately hemolyzed. Which of the following analyses would be most significantly affected by the hemolysis?
- Sodium
 - Potassium
 - Glucose
 - Urea
8. A black male 62 years of age is admitted in a semiconscious state experiencing shortness of breath and a temperature of 100°F. His skin is pale and cool, and he has been experiencing severe pain in his back and jaw for approximately 75 minutes. He experienced these same symptoms 2 days earlier. The laboratory data shows the following:
- Total CK—elevated
CK-MB—elevated
Myoglobin—elevated
cTnI—elevated
- Utilizing this information, what is the most likely diagnosis for this patient?
- Pulmonary infarction
 - Acute myocardial infarction
 - Muscular dystrophy
 - Angina pectoris
9. A blood specimen is drawn in the morning, and the serum is removed from the clot and left standing at room temperature until late in the afternoon. Which of the following parameters would be most severely affected by delayed analysis?
- Urea
 - Potassium
 - Alanine aminotransferase
 - Bilirubin
10. In ketoacidosis, the anion gap would most likely be affected in what way?
- Unchanged from normal
 - Increased
 - Decreased
 - Balanced
11. If the aspartate aminotransferase (AST) and the alanine aminotransferase (ALT) serum levels are increased 50-fold over the reference range, what would be the most consistent diagnosis?
- Extrahepatic cholestasis
 - Cirrhosis
 - Carcinoma of the liver
 - Viral hepatitis
12. A decreased bicarbonate level in the blood without a change in PCO_2 will result in what acid/base imbalance?
- Respiratory acidosis
 - Respiratory alkalosis
 - Metabolic acidosis
 - Metabolic alkalosis
13. Elevated serum levels of urea, creatinine, and uric acid would be suggestive of what disorder?
- Gout
 - Chronic renal failure
 - Cirrhosis
 - Malnutrition

14. The following results were obtained on a pregnant female patient following the ingestion of 75 grams of glucose as part of an oral glucose tolerance test.

Time Specimen Collected	Plasma Glucose
Fasting	124 mg/dL
1 hour	220 mg/dL
2 hours	170 mg/dL

Based on the preceding information, what would be the most likely diagnosis?

- A. Normal glucose metabolism
 - B. Diabetes mellitus
 - C. Gestational diabetes mellitus
 - D. Impaired glucose tolerance
15. Which of the following methods may be used to quantify total protein in serum, urine, or cerebrospinal fluid?
- A. Coomassie brilliant blue
 - B. Sulfosalicylic acid
 - C. Brom cresol green
 - D. Ponceau S
16. A patient who received a blood transfusion experienced a moderate transfusion reaction. Because of the presence of free hemoglobin in the plasma, which serum protein will exhibit a decreased level?
- A. Ceruloplasmin
 - B. Transferrin
 - C. α_2 -Macroglobulin
 - D. Haptoglobin
- 17. When employing a diazo method to quantify serum bilirubin, which of the following blood constituents when present in an elevated amount will cause a falsely depressed bilirubin result?
 - A. Ammonia
 - B. Creatinine
 - C. Hemoglobin
 - D. Uric acid
18. What quality incorporated into a spectrophotometer can sometimes improve the linearity of a chemistry procedure?
- A. Flow-through cuvette
 - B. Wider bandwidth
 - C. Narrower bandwidth
 - D. Chopper
19. What hormone plays a primary role in controlling the reabsorption of sodium in the tubules?
- A. Cortisol
 - B. Cortisone
 - C. Estriol
 - D. Aldosterone
20. Which of the following is associated with individuals diagnosed with Addison disease?
- A. Hypoglycemia
 - B. Casual plasma glucose ≥ 200 mg/dL
 - C. Fasting plasma glucose ≥ 126 mg/dL
 - D. 2-Hour post-load glucose ≥ 200 mg/dL
21. Which of the following tests when used together are helpful in monitoring treatment and identifying recurrence of testicular cancer?
- A. AFP and CEA
 - B. AFP and hCG
 - C. CEA and hCG
 - D. CA 125 and CA 19-9

22. To detect respiratory distress syndrome, what specimen is used for measuring the surfactant/albumin ratio by fluorescence polarization?
- Serum
 - Plasma
 - Urine
 - Amniotic fluid
23. High levels of cholesterol leading to increased risk of coronary artery disease would be associated with which lipoprotein fraction?
- LDL
 - VLDL
 - HDL
 - Chylomicrons
24. A female patient upon hospital admission exhibits a serum osmolality level of 350 mOsm/kg. Which of the following would *not* be a possible cause of this result?
- Elevated serum potassium level
 - Elevated serum sodium level
 - Elevated serum glucose level
 - Dehydration
25. If the ratio of bicarbonate to carbonic acid is 30:1, what would be the blood pH?
- Increased
 - Decreased
 - Stable
 - Normal
26. Upon what principle is nephelometric measurement based?
- Fluorescence produced
 - Phosphorescence produced
 - Light transmitted
 - Light scattered
27. Which of the following causes beta-thalassemia major?
- Amino acid substitution in both beta-globin chains
 - Deficiency of an enzyme needed for heme synthesis
 - Decreased rate of synthesis of both beta-globin chains
 - Presence of an unstable hemoglobin
28. The main source of erythropoietin is the
- Liver
 - Kidney
 - Bone marrow
 - Spleen
29. Red blood cell distribution width (RDW) is a measurement of the
- Average size of the red blood cells
 - Hemoglobin content of the red blood cells
 - Coefficient of variation of the red cell population
 - Various maturation stages of red blood cells
30. Aminolevulinic acid (ALA) synthase is an enzyme involved in
- Early stages of heme synthesis in the mitochondria
 - Intermediate stages of heme synthesis in the cytoplasm
 - Globin-chain synthesis
 - Embden-Meyerhof pathway
31. Hemoglobin A₂ consists of
- Two alpha- and two beta-globin chains
 - Two alpha- and two gamma-globin chains
 - Four beta-globin chains
 - Two alpha- and two delta-globin chains

32. Increased osmotic fragility test results could be expected in which of the following disorders?
- Sickle cell anemia
 - Iron-deficiency anemia
 - Beta-thalassemia minor
 - Hereditary spherocytosis
33. Which of the following conditions would *not* exhibit the red blood cell morphology seen in Color Plate 9■?
- Pyruvate kinase deficiency
 - Sideroblastic anemia
 - Post-transfusion
 - Iron-deficiency anemia post-treatment
34. Complement-induced red blood cell lysis and an abnormal sugar-water test are seen in which disorder?
- Glucose-6-phosphate dehydrogenase deficiency
 - Hereditary spherocytosis
 - Paroxysmal nocturnal hemoglobinuria
 - Paroxysmal cold hemoglobinuria
35. Which of the following will *not* be increased in polycythemia vera?
- Plasma volume
 - Leukocyte alkaline phosphatase
 - Platelet count
 - White blood cell count
36. Which of the following stains is used to visualize reticulocytes?
- Wright's
 - Crystal violet
 - Prussian blue
 - New methylene blue
37. The function of the hexose monophosphate shunt is to
- Produce adenosine triphosphate (ATP)
 - Produce 2,3-bisphosphoglycerate (2,3-BPG)
 - Prevent oxidation of hemoglobin
 - Participate in heme synthesis
38. Hemoglobin is measured spectrophotometrically at what wavelength?
- 410 nm
 - 472 nm
 - 540 nm
 - 610 nm
39. The red blood cells seen in Color Plate 8■ would most likely be associated with
- Sideroblastic anemia or beta-thalassemia major
 - Hereditary spherocytosis or warm autoimmune hemolytic anemia
 - Iron-deficiency anemia or beta-thalassemia minor
 - Aplastic anemia or chemotherapy
40. Amino acid substitutions on globin chains cause what disorders?
- Hemoglobinopathies
 - Thalassemias
 - Unstable hemoglobins
 - Porphyrias
41. The leukocyte first to migrate, engulf, and destroy a foreign body in the tissue is the
- Macrophage
 - Monocyte
 - Neutrophil
 - Lymphocyte
42. What immunoglobulin is increased in Waldenström macroglobulinemia?
- IgA
 - IgE
 - IgG
 - IgM

43. The leukocyte alkaline phosphatase stain is most helpful in the differentiation of
- Neutrophilic leukemoid reaction and degenerative left shift
 - Neutrophilic leukemoid reaction and chronic myelogenous leukemia
 - Chronic myelogenous leukemia and acute myelogenous leukemia
 - Acute myelogenous leukemia and acute lymphoblastic leukemia
44. Which cell line is normally the most numerous in the bone marrow?
- Lymphocytic
 - Megakaryocytic
 - Erythroid
 - Myeloid
45. Which FAB type of myelodysplastic syndrome is *least* likely to progress to acute myelogenous leukemia?
- Refractory anemia (RA)
 - Chronic myelomonocytic leukemia (CMML)
 - Refractory anemia with excess blasts (RAEB)
 - Refractory anemia with excess blasts in transformation (RAEB-t)
46. A 5-year-old girl has been recently diagnosed with acute lymphoblastic leukemia. Which of the following is *not* typical of this diagnosis?
- Using WHO criteria, bone marrow blasts will be $\geq 20\%$.
 - CALLA (CD10) positive type has a poor prognosis.
 - Central nervous system involvement is common.
 - Leukemic blast cells show PAS positivity.
47. Which of the following cells will stain positive when tartrate is added to the acid phosphatase (TRAP) stain?
- Sézary cells
 - Plasma cells
 - Hairy cells
 - Large granular lymphocytes
48. A 59-year-old patient is evaluated for severe anemia, thrombocytopenia, and neutropenia. What test(s) will provide the most useful information?
- Ham's and sugar-water tests
 - Bone marrow aspirate and biopsy
 - Reticulocyte count and immature reticulocyte fraction (IRF)
 - Test for heterophile antibodies
49. The Philadelphia chromosome is a consistent finding in patients with what disorder?
- Chronic myelogenous leukemia
 - Acute myelomonocytic leukemia
 - Myelodysplastic syndrome
 - Chronic idiopathic myelofibrosis
50. Pelger-Huët anomaly is associated with
- Large Döhle-like bodies and giant platelets
 - Large azurophilic granules in all leukocytes
 - Defective neutrophilic phagocytosis
 - Morphologically immature but functionally normal neutrophils
51. Plasma cells are found in large numbers in the bone marrow and occasionally in the peripheral blood of patients with what disorder?
- Multiple myeloma
 - Burkitt lymphoma
 - Acute lymphoblastic leukemia
 - Infectious mononucleosis

52. The blood smear shown in Color Plate 12■ is from a 16-year-old male with complaints of extreme fatigue and sore throat. His WBC, hemoglobin, and platelet count results are normal. Based on the clinical and laboratory information, which of the following is the most likely cause of his condition?
- Staphylococcal pneumonia
 - Infectious mononucleosis
 - Chronic lymphocytic leukemia
 - Non-Hodgkin lymphoma
53. Which of the following disorders is *not* associated with pancytopenia?
- Neutrophilic leukemoid reaction
 - Megaloblastic anemia
 - Paroxysmal nocturnal hemoglobinuria
 - Aplastic anemia
54. Inability to obtain a bone marrow aspirate is frequently encountered in patients with which of the following disorders?
- Acute monocytic leukemia and myelodysplastic syndromes
 - Chronic idiopathic myelofibrosis and hairy cell leukemia
 - Polycythemia vera and essential thrombocythemia
 - Erythroleukemia and acute megakaryocytic leukemia
55. The cytoplasmic inclusion present in the cell shown in Color Plate 17■ excludes a diagnosis of
- Acute myelogenous leukemia without maturation (FAB M1)
 - Acute promyelocytic leukemia (FAB M3)
 - Acute myelomonocytic leukemia (FAB M4)
 - Acute lymphoblastic leukemia
56. Which of the following is considered diagnostic for Hodgkin lymphoma?
- Sézary cell
 - Burkitt cell
 - Reed-Sternberg cell
 - Reider cell
57. The test of choice to detect abnormalities in the intrinsic pathway of secondary hemostasis is the
- Bleeding time
 - Thrombin time
 - Activated partial thromboplastin time
 - Prothrombin time
58. A patient experiencing bleeding problems has a prothrombin time of 23 seconds (control = 12.0 seconds) and activated partial thromboplastin time of 61 seconds (control = 33.0 seconds). Of the following, which one is probably *not* deficient?
- Factor II
 - Factor V
 - Factor XII
 - Factor X
59. Which of the following describes plasmin?
- Enzyme that can digest cross-linked fibrin into D-dimers
 - Activator of plasminogen
 - Circulates freely in the plasma ready to digest fibrin clots
 - Forms a complex with tissue plasminogen activators to digest fibrinogen
60. By what mechanism does aspirin ingestion impair platelet function?
- Blocks glycoprotein receptors on the surface of the platelet
 - Decreases thrombopoietin levels and subsequent bone marrow platelet production
 - Interferes with the ability of platelets to adhere to subendothelial collagen
 - Decreases thromboxane A₂ formation by inhibiting cyclooxygenase

61. Which of the following describes idiopathic thrombocytopenic purpura?
- Occurs only in a chronic form
 - A platelet autoantibody is responsible for platelet destruction.
 - Develops in the majority of cases after recovery from a bacterial infection
 - Causes decreased bone marrow synthesis of platelet precursors
62. The most important naturally occurring inhibitor to clotting is
- Antithrombin
 - Lupus inhibitor
 - Protein C
 - α_2 -Antiplasmin
63. The prothrombin time is usually *not* prolonged in patients with
- Hemophilia A
 - Severe liver disease
 - Factor VII deficiency
 - Venous thromboembolism treated with Coumadin®
64. An 18-year-old male was seen in the emergency department following a motorcycle accident. The patient was not wearing his helmet at the time of the accident. He was comatose and was admitted to the hospital with a diagnosis of severe closed head injury. The next day the patient was noted to have increased bleeding from venipuncture sites. Given the following results, what was the most likely diagnosis for this patient?
- | Tests | Patient Results | Reference Ranges |
|----------------|--------------------|-------------------------|
| PT | 25.0 seconds | 11.0–13.0 seconds |
| aPTT | 89.0 seconds | 22.0–38.0 seconds |
| Fibrinogen | 65 mg/dL | 150–400 mg/dL |
| Thrombin time | 45 seconds | 15–20 seconds |
| Platelet count | $32 \times 10^9/L$ | 150–450 $\times 10^9/L$ |
| FDP test | >20 $\mu g/mL$ | <5 $\mu g/mL$ |
| D-dimer | >1.0 $\mu g/mL$ | <0.5 $\mu g/mL$ |
- A. Hemophilia A
B. Primary fibrinogenolysis
C. Thrombotic thrombocytopenic purpura
D. Disseminated intravascular coagulation
65. Of the following conditions that cause bleeding, the most common is
- Hemophilia A
 - Thrombocytopenia
 - von Willebrand disease
 - Hemophilia B

66. Which of the following will patients with classic von Willebrand disease *not* exhibit?
- Easy bruising
 - Decreased platelet aggregation with ristocetin
 - Prolonged prothrombin time
 - Prolonged bleeding time
67. How are individuals with cellular immune deficiencies best identified?
- Determining serum complement concentration
 - Human leukocyte antigen (HLA) typing
 - Serum electrophoresis testing
 - Skin testing
68. Which of the following is characteristic of DiGeorge syndrome?
- Defective T lymphocyte production
 - Depressed B cell development
 - Suppressed intracellular killing by polymorphonuclear cells
 - Suppressed complement levels
69. The interaction between antigen-presenting cells and T helper cells is mediated by surface expressed antigen and
- Interferon gamma
 - Interleukin 2
 - Interleukin 3
 - MHC class II molecules
70. Which of the following cell types is an important mediator of antibody-dependent cellular cytotoxicity (ADCC) reactions?
- B cells
 - Cytotoxic T cells
 - Natural killer cells
 - Suppressor T cells
71. What is the portion of an antigen that binds specifically to the binding site of an antibody called?
- Epitope
 - Hapten
 - Idiotope
 - Paratope
72. Which of the following is *true* of the alternative complement pathway?
- Activated by bacterial polysaccharide
 - C3 is not involved.
 - C1 initiates activation.
 - Primarily activated by antibody
73. A type I hypersensitivity reaction requires
- IgA
 - IgD
 - IgE
 - IgG
74. A substance able to induce an immune response describes which of the following?
- Allotype
 - Antigen
 - Epitope
 - Immunogen
75. The B cell surface receptor for antigen is
- CD5
 - Immunoglobulin
 - Interleukin 2
 - MHC I antigen
76. Which of the following frequently functions as an antigen-presenting cell?
- Dendritic cell
 - Cytotoxic T lymphocyte
 - Natural killer cell
 - T helper cell

77. Which of the following cell types contains class II human leukocyte antigens?
- All nucleated cells
 - B cells only
 - Platelets only
 - White blood cells only
78. The presence of antinuclear antibodies is suggestive of a(n)
- Acute glomerulonephritis
 - Autoimmune disease
 - Cell-mediated immune deficiency
 - Humoral-mediated immune deficiency
79. Graves disease is an autoimmune disease primarily affecting the
- Adrenal gland
 - Nerve synapses
 - Pancreas
 - Thyroid
80. Which of the following markers is found on mature T helper cells?
- CD4
 - CD8
 - CD10
 - CD25
81. Which of the following is an example of a double diffusion assay?
- Immunofixation electrophoresis
 - Ouchterlony
 - Radial immunodiffusion
 - Rocket electrophoresis
82. Patients with hyper-IgM syndrome produce large amounts of IgM and markedly decreased IgG and IgA. What causes this phenomenon?
- Antigen is only presented to B cells capable of making IgM.
 - B cells capable of synthesizing IgG and IgA are lacking.
 - Lack of class switching occurs.
 - T cells secrete lymphokines that stimulate the production of IgM.
83. Which of the following is a nonphagocytic cytotoxic cell able to kill cells rapidly without having been previously exposed to antigens on that cell?
- Cytotoxic T cell
 - T helper cell
 - Natural killer cell
 - Suppressor T cell
84. Which of the following is a granulocytic cell with IgE receptors?
- Cytotoxic T cell
 - Mast cell
 - Natural killer cell
 - Plasma cell
85. Which of the following is an oncofetal antigen whose presence in adult serum is suggestive of carcinoma?
- α -Fetoprotein
 - C-reactive protein
 - Lymphocyte function-associated antigen 1
 - Nuclear antigens
86. An adaptive or specific immune response includes
- Antibody synthesis
 - Complement activation
 - Inflammation
 - Phagocytosis
87. Information obtained from a volunteer blood donor at the time of registration is designed to protect the health of both donor and recipient. Of the following responses, which would cause the donor to be deferred from the collection process?
- Received his last injection in a vaccine series for hepatitis B 3 weeks ago
 - Had a tooth filled 1 week ago
 - Took aspirin yesterday for a headache
 - Taking Tegison

88. Interpret the following reactions:

	A₁ cells	B cells		Anti- A	Anti- B
Patient serum	+ ^w	4+	Patient cells	3+ mf	0

- A. Group A₂ patient with anti-A₁ in his serum
 B. Group A patient having rouleaux
 C. Group A patient transfused with group O cells
 D. Group A patient with acquired B antigen
89. The inlet port on a closed unit of red blood cells collected in CP2D is defective, preventing the addition of Adsol®. What will be the resulting shelf life of the red blood cells?
 A. 24 hours
 B. 21 days
 C. 35 days
 D. 42 days
90. When testing blood donors for HIV, what is the major advantage of NAT over EIA testing for anti-HIV1?
 A. Simplicity of performance
 B. Less expensive
 C. Requires less “tech time”
 D. Increased specificity
91. What is the expiration date for fresh frozen plasma (FFP) that is stored at -18°C or colder?
 A. 1 year
 B. 3 years
 C. 5 years
 D. 7 years
92. A 35-year-old male is found to have a factor V deficiency. He should be treated for the deficiency with
 A. Cryoprecipitated AHF
 B. Red blood cells
 C. Fresh frozen plasma
 D. Pooled platelet concentrates
93. Which of the following donors would most likely be allowed to donate autologous blood for elective surgery if all other criteria are acceptable?
 A. 15-year-old girl with a hemoglobin of 12 g/dL
 B. 17-year-old boy with intermittent bacteremia
 C. 30-year-old man with aortic stenosis
 D. 25-year-old woman who had a baby 4 weeks ago
94. A 32-year-old female, pregnant with her fourth child, is seen in the emergency department for childbirth. There are no records of her prenatal care available. She is group AB, D-negative, weak D negative. She gives birth to a group O, D-negative, weak D positive girl. Her husband is group O, D-negative, weak D positive. Which of the following may explain these results?
 A. Nonpaternity
 B. Mother carries the *cis-AB* gene
 C. Father has been mistyped
 D. Child has been switched with another woman's infant
95. Hemophilia A and B (Christmas disease) both provide a classic example of which pattern of inheritance?
 A. X-linked recessive
 B. X-linked dominant
 C. Autosomal recessive
 D. Autosomal dominant

96. A and B blood group antigens are derived when glycosyltransferases add specific sugars to precursor H. What is the terminal sugar for the B antigen?
- Fucose
 - N*-acetylglucosamine
 - N*-acetylgalactosamine
 - D-Galactose
97. Which of the following does *not* characterize Rh_{null} individuals?
- Red blood cells lack all antigens in the Rh system.
 - Red blood cell morphology shows stomatocytes.
 - Red blood cell survival is shortened with compensated anemia.
 - Condition may be inherited or acquired.
98. Which of the following antigens is the most immunogenic after A, B, and D antigens?
- C
 - E
 - Fy^a
 - K
99. In a lymphocytotoxicity test, 80% of a patient's WBCs are highly refractile in the wells in which anti-HLA-A7 and anti-HLA-A12 were placed. The wells in which anti-HLA-A5 and anti-HLA-A27 were placed show no refractile patient WBCs. You would interpret these reactions as meaning that the patient is(has)
- HLA-A7 and HLA-A12 positive
 - HLA-A5 and HLA-A27 positive
 - Antibody to HLA-A7 and HLA-A12
 - An invalid test for HLA-A7 and HLA-A12
100. Following compatibility testing, for how long must the patient's blood sample and the donor's red blood cells be retained?
- 7 days after crossmatching
 - 7 days after transfusion
 - 9 days after crossmatching
 - 10 days after transfusion
101. An antibody screen gives the following results. What do the results indicate about the patient?
- | | SC I | SC II | Auto-control |
|--------------------|------|-------|--------------|
| IS | 1+ | 0 | 0 |
| 37°C LISS | 0 | 1+ | 0 |
| AHG (monospecific) | 0 | 3+ | 0 |
| CC | ✓ | | ✓ |
- Autoantibody reacting at all phases of testing
 - Alloantibody showing dosage
 - More than one alloantibody
 - Rouleaux reaction
102. The use of an autocontrol during antibody screening for pretransfusion testing
- Is required
 - Is optional
 - May be eliminated if a DAT is performed
 - May aid in detecting alloantibody

103. A “type and screen” established that a premature infant is group A, D-positive with a negative antibody screening test. Numerous small volume transfusions are predicted. If only group O RBC are to be transfused, how often must the infant be crossmatched?
- Before transfusion and whenever 3 days have elapsed before the next transfusion
 - Before transfusion and whenever 7 days have elapsed before the next transfusion
 - If during the same admission, not until he reaches 2 months of age
 - If during the same admission, not until he reaches 4 months of age
104. The serum from a patient with warm autoimmune hemolytic anemia is found to contain autoanti-e and alloanti-E. You would transfuse this patient with red blood cells that are
- E-negative, e+
 - e-Negative, E+
 - E-negative, e-negative
 - Rh_{null}
105. Following removal of plasma from a whole blood unit, the RBCs may be resuspended in an additive solution. Which of the following does *not* describe these solutions?
- Must be added within 72 hours after plasma separation
 - Contain inosine and pyruvate
 - Maintain increased levels of ATP in stored cells
 - Extend the shelf life of red blood cells to 42 days
106. Platelets prepared in polyolefin (PL-732) differ from platelets prepared in polyvinylchloride (PVC) because bags without plasticizers
- Increase platelet shelf life to 7 days
 - Allow platelet storage at 1–6°C
 - Promote improved gas exchange with environmental air
 - Promote accelerated lactic acid production
107. Using the chart below, what is(are) the most likely antibody specificity(ies) in this patient's serum?
- Anti-C and anti-Jk^a
 - Anti-K and anti-Jk^b
 - Anti-C showing dosage and anti-E
 - Anti-Jk^b

Cell #	D	C	E	K	Jk ^a	Jk ^b	AHG	CC
1	+	0	0	+	0	0	2+	
2	+	0	0	0	+	0	0	✓
3	+	+	+	0	+	0	0	✓
4	0	+	0	+	0	+	4+	
5	0	0	+	0	0	+	1+	

108. A blood warming device would most likely be used in which of the following situations?
- Transfusing a patient with PCH
 - Intrauterine transfusion
 - Transfusion of a patient having bacterial sepsis
 - Transfusing FFP to a patient with anti-Le^a
109. What is the most common cause of anemia leading to transfusion in sick neonates?
- Bleeding from the umbilicus
 - Red blood cell destruction because of HDN
 - Blood drawn for laboratory testing
 - Immature bone marrow response
110. What is the initial step to perform when a patient is suspected of having a transfusion reaction?
- Perform a DAT on a post-transfusion specimen
 - Compare the pretransfusion and post-transfusion serum for evidence of hemolysis
 - Check identification of the patient and donor blood
 - Stop the transfusion
111. Which of the following laboratory findings does *not* occur in hemolytic transfusion reactions?
- Hemoglobinuria
 - Haptoglobinemia
 - Hemoglobinemia
 - Bilirubinemia
112. To which organization must the hospital transfusion service laboratory report all cases of transfusion-associated disease?
- Blood-collecting facility
 - Centers for Disease Control and Prevention (CDC)
 - Food and Drug Administration (FDA)
 - State Health Department
113. To comply with the requirements of *AABB Standards*, which of the following tests must be performed on each unit before blood bank personnel may issue autologous units of blood drawn in their facility?
- ABO and Rh typing
 - HBsAg
 - Anti-HIV1
 - DAT
114. The CDC recommends that “standard precautions” be exercised by all health-care workers to prevent transmission of hepatitis B virus, HIV, and other blood-borne pathogens. What do these precautions include?
- Wearing protective clothing when testing blood specimens from patients in specific areas
 - Using special precautionary methods when testing blood specimens with a biohazard label
 - Handling every patient blood specimen as if it were infectious
 - Carefully recapping needles before discarding
115. To ensure proper reactivity, how frequently must all blood bank reagents be quality controlled?
- With each test
 - Daily
 - Each day of use
 - Weekly
116. What should one do to validate the reaction obtained in the antiglobulin test?
- Use green antiglobulin reagent
 - Add IgG-coated red cells to each test tube
 - Add IgG-coated red cells to each positive reaction
 - Add IgG-coated red cells to each negative reaction

117. Which of the following strategies will *not* help to minimize the outdate rate of blood in inventory?
- Providing transfusion guidelines
 - Implementing a first-in, last-out (FILO) policy
 - Monitoring crossmatch to transfusion (CT) ratios
 - Instituting a maximum surgical blood order schedule (MSBOS)
118. Clotting may be incomplete in blood specimens from patients treated with heparin. Which of the following alternatives will *not* provide an acceptable specimen for pretransfusion testing?
- Adding protamine sulfate
 - Adding thrombin
 - Adding chloroquine diphosphate
 - Using an EDTA specimen for testing
119. A person with the genotype *AO, HH, Sese, Lele* will have which of the following combination of substances in her secretions?
- A, H, Se, Le^a
 - Le^a, Le^b
 - A, H, Le^a, Le^b
 - A, O, Le^b
120. An immediate spin (IS) crossmatch or a computer crossmatch (if the computer system is validated for this use) may be used as the sole compatibility test when a patient has a confirmed blood type, a negative antibody screening test, and
- A negative DAT result
 - No history of unexpected antibody
 - No record of previous transfusion
 - The same ABO and Rh type as the donor
121. Within how many hours after pooling must pooled platelet concentrates be transfused?
- 4
 - 6
 - 8
 - 12
122. Pus with a blue-green color was aspirated from an empyema. A Gram stain of the aspirated material showed many white blood cells and numerous gram-negative bacilli. What would be the most likely etiologic agent?
- Legionella pneumophila*
 - Pseudomonas aeruginosa*
 - Morganella morganii*
 - Serratia marcescens*
123. In the early stages of typhoid fever, *Salmonella Typhi* is most likely to be recovered from which of the following specimen types?
- Blood
 - Feces
 - Urine
 - Skin lesions
124. Symptoms of gastritis and peptic ulceration are most closely associated with which of the following?
- Campylobacter jejuni*
 - Enterotoxigenic *Escherichia coli*
 - Helicobacter pylori*
 - Vibrio cholerae*

125. A patient with impaired cell-mediated immunity presents with evidence of a pulmonary abscess and neurologic involvement. A brain abscess was detected by MRI. Material from the abscess grew an aerobic, filamentous, branching gram-positive organism, which stained weakly acid-fast. What is the most likely etiologic agent?
- Propionibacterium acnes*
 - Nocardia asteroides*
 - Actinobacillus israelii*
 - Bacillus cereus*
126. The organism *Borrelia recurrentis* is the etiologic agent of
- Lyme disease
 - Relapsing fever
 - Undulant fever
 - Weil disease
127. Most cases of legionellosis are acquired from
- Environmental water sources
 - Person-to-person transmission
 - Mosquitoes
 - Farm animals
128. What chemical is commonly added to blood culture media as an anticoagulant?
- ARD
 - CNA
 - CIN
 - SPS
129. Which of the following statements is *true* regarding anaerobic infections?
- Anaerobic pulmonary infections are rare because lung tissue is well ventilated.
 - Because of the inaccessibility of organs such as the liver and brain to indigenous flora, they are seldom infected with anaerobes.
 - Bacteremia due to anaerobes is benign because anaerobes do not possess endotoxin.
 - Intra-abdominal abscesses, peritonitis, and wound infections can occur postoperatively when devitalized tissue is contaminated with bowel contents.
130. Foul-smelling pus aspirated from a postsurgical cholecystectomy patient grew a gram-positive bacillus. When cultured on an anaerobically incubated blood agar plate, it grew colonies surrounded by an inner zone of complete red blood cell lysis and an outer zone of incomplete cell lysis. What would be the most likely identification of this isolate?
- Fusobacterium nucleatum*
 - Clostridium perfringens*
 - Clostridium tetani*
 - Bacteroides fragilis*
131. A common cause of mild primary atypical pneumonia is
- Bordetella parapertussis*
 - Mycoplasma pneumoniae*
 - Pseudomonas aeruginosa*
 - Streptococcus pneumoniae*
132. Which of the following antimicrobial susceptibility tests would *not* provide the minimal inhibitory concentration?
- Agar dilution
 - Broth dilution
 - Disk diffusion
 - Gradient diffusion

133. Which of the following is associated with *Streptococcus agalactiae*?
- Common cause of pharyngitis in adults
 - Important cause of neonatal sepsis and meningitis
 - Is also called viridans *Streptococcus*
 - Is implicated in dental caries
134. The presence of spirochetes seen in material collected from a chancre is diagnostic for
- Chancroid
 - Lyme disease
 - Relapsing fever
 - Syphilis
135. Which of the following is associated with *Vibrio cholerae*?
- Sucrose fermentation negative
 - Requires media with high salt concentration
 - Is a component of the normal flora of the human intestine
 - Produces a toxin that causes increased secretion of water and electrolytes from the gut
136. A blood culture grew a small, pleomorphic, anaerobic, gram-negative rod. It grew on kanamycin-vancomycin laked-sheep blood agar, grew in the presence of 20% bile, and was esculin positive. This organism is most likely
- Bacteroides fragilis*
 - Clostridium perfringens*
 - Fusobacterium nucleatum*
 - Veillonella* sp.
137. A coagulase-negative *Staphylococcus* was isolated from a urine culture. It was identified as *Staphylococcus saprophyticus* on the basis of it being
- Coagulase positive
 - Resistant to novobiocin
 - DNase positive
 - Mannitol positive
138. A nonhemolytic gram-positive, catalase-negative bacterium isolated from a urine culture gave the following reactions: bile esculin positive and no growth in 6.5% NaCl. This microorganism should be identified as
- Streptococcus agalactiae*
 - Enterococcus faecalis*
 - Streptococcus mutans*
 - Streptococcus bovis* group
139. Refer to Color Plate 26■. The organism seen on this Gram stain was isolated from the cerebrospinal fluid of an infant. It grew on sheep blood agar with faint beta-hemolysis. It was catalase positive. What microorganism should be suspected?
- Bacillus subtilis*
 - Lactobacillus* sp.
 - Bifidobacterium dentium*
 - Listeria monocytogenes*
140. You isolate a small, pleomorphic, gram-negative rod from the cerebrospinal fluid of a 9-month-old infant. It fails to grow on sheep blood agar or MacConkey agar, but it grows well on chocolate agar incubated in 5% CO₂. What bacterium would you suspect?
- Escherichia coli*
 - Streptococcus agalactiae*
 - Haemophilus influenzae*
 - Listeria monocytogenes*

141. An oxidase-positive, gram-negative bacillus was isolated from a burn patient. It gave the following reactions: OF glucose open, acid; OF glucose closed, alkaline; OF maltose open, alkaline; positive for pyocyanin production; positive for fluorescein production; and good growth at 42°C. The microorganism is most likely
- Alcaligenes faecalis*
 - Pseudomonas aeruginosa*
 - Stenotrophomonas maltophilia*
 - Acinetobacter anitratus*
142. What is the etiologic agent of pseudomembranous colitis?
- Clostridium difficile*
 - Helicobacter pylori*
 - Streptococcus pyogenes*
 - Vibrio parahemolyticus*
143. A gram-negative bacillus was isolated on MacConkey agar and appeared as a non-lactose fermenter. It was oxidase negative and gave the following reactions: TSI-K/A with H₂S, motile, urease positive, and lysine negative. Which of the following would be characterized by these reactions?
- Salmonella Typhimurium*
 - Shigella sonnei*
 - Proteus mirabilis*
 - Edwardsiella tarda*
144. A patient with severe abdominal pain and diarrhea was admitted to the hospital. When the stool was cultured, no suspicious colonies were seen on Hektoen enteric or xylose-lysine-desoxycholate agars. However, on the MacConkey plate several non-lactose-fermenting colonies were observed. Biochemical results for these colonies gave the following reactions:
- TSI-A/A, no gas, no H₂S
Urease positive
Motility negative at 35°C;
positive at 22°C
Oxidase negative
- The most likely organism would be
- Shigella sonnei*
 - Vibrio cholerae*
 - Salmonella Typhi*
 - Yersinia enterocolytica*
145. A 45-year-old woman came to the emergency department after being bitten on the hand by her cat. The wound was extremely painful and produced a large amount of pus. The pus was cultured on sheep blood agar (SBA) and MacConkey agar. After 24 hours, growth was observed on the SBA plate as tiny colonies that produced a slight greening on the underlying medium. A Gram stain revealed tiny gram-negative rods. There was no growth on the MacConkey agar. Biochemical tests gave the following reactions:
- TSI-A/A
Oxidase positive
Nonmotile
Urease negative
- The most likely organism would be
- Pasturella multocida*
 - Corynebacterium diphtheriae*
 - Brucella abortus*
 - Bordetella pertussis*

146. Buffered charcoal yeast extract agar (BCYE) is the primary medium for the isolation of
 A. *Bartonella bacilliformis*
 B. *Chlamydia pneumoniae*
 C. *Legionella pneumophila*
 D. *Mycoplasma pneumoniae*
147. *Coccidioides immitis* produces arthroconidia when grown at room temperature. What form of the fungus is found in human tissue?
 A. Yeast
 B. Spherule
 C. Hyaline aseptate hyphae
 D. Macroconidia with budding yeast
148. Selective medium for the isolation of the dimorphic fungi often contain what agent to inhibit the growth of the saprophytic fungi?
 A. Cyclohexamide
 B. Chloramphenicol
 C. Sulfonamide
 D. Gentamicin
149. In regard to the true systemic dimorphic pathogens, the phase of growth that is most infectious is the
 A. Phase seen in tissue
 B. Phase that grows at 22–30°C
 C. Phase that grows at 37°C
 D. All phases are equally infectious.
150. Which of the following is the definitive host for *Plasmodium* spp.?
 A. Humans
 B. Mosquitoes
 C. Lice
 D. Ticks
151. What is the source of most human infections caused by *Toxoplasma gondii*?
 A. Cats
 B. Dogs
 C. Fleas
 D. Humans
152. Refer to Color Plate 43■. What is the infective form of this parasite?
 A. Ova
 B. Oocysts
 C. Filariform larvae
 D. Rhabditiform larvae
153. In what way are hepatitis B virus and human immunodeficiency virus similar?
 A. Ability to survive in the environment
 B. Have cross-reacting antigens
 C. Nucleic acid composition
 D. Require RNA-dependent DNA-polymerase for replication
154. The reactivation of varicella results in
 A. Chicken pox
 B. Cold sores
 C. Shingles
 D. Small pox
155. Material collected from the nasopharynx of a 1-year-old child with pneumonia is added to HEp-2 cells. In a few days, enlarged cells with several nuclei are seen. What is the most likely cause of the infection?
 A. Respiratory syncytial virus
 B. Rotavirus
 C. Coxsackie virus
 D. Adenovirus
156. Which of the following is an example of a signal amplification method?
 A. bDNA
 B. Ligase chain reaction
 C. Polymerase chain reaction
 D. Strand displacement amplification
157. Stringency can be decreased by increasing
 A. Incubation time
 B. Incubation temperature
 C. Ionic strength (e.g., NaCl)
 D. pH

158. In their correct order, what are the steps involved in the polymerase chain reaction?
- Denaturation of dsDNA, annealing of primers, synthesis of complementary DNA strand
 - Annealing of primers, denaturation of dsDNA, synthesis of complementary DNA strand
 - Synthesis of complementary DNA strand, denaturation of dsDNA, annealing of primers
 - Denaturation of dsDNA, synthesis of complementary DNA strand, annealing of primers
159. Sickle cell anemia is a genetic disease caused by a single base mutation in the beta-globin gene. The single change abolishes a *CvnI* restriction site. Using specific primers that target a portion of beta-globin gene, a 726 base pair PCR product is generated. After enzyme digestion of PCR products from normal individuals with *CvnI*, fragments of the following sizes are produced: 256 bp, 201 bp, 181 bp, and 88 bp. Which of the following restriction fragment patterns represent the results you would see in a patient homozygous for the sickle cell gene?
- Two bands—457 bp and 269 bp
 - Three bands—382 bp, 256 bp, and 88 bp
 - Four bands—382 bp, 201 bp, 181 bp, and 88 bp
 - Five bands—382 bp, 256 bp, 201 bp, 181 bp, and 88 bp
160. In a PCR assay, which control is necessary to distinguish between a true negative result and a false negative result?
- Blank (no DNA template) control containing all PCR reagents
 - Negative template control containing DNA sample known not to contain target sequence
 - Internal control containing second primer set to sequence found in all samples but unrelated to target sequence
 - Positive control containing target sequence
161. Real-time PCR (i.e., qPCR) is a target amplification technique that is both quantitative and highly sensitive. The primary level of specificity of the reaction is determined by the primers employed in the reaction; however, an additional level of specificity can be obtained by the use of probes that generate a fluorescent signal only when they hybridize to target sequences. Which of the following systems utilizes a probe that contains a short specific target specific sequence flanked by a short inverted repeat whose 5' end is a fluorescent reporter molecule that forms a stem and loop structure with a 3' end quencher molecule when not bound to the target sequence?
- SYBR green detection system
 - TaqMan probe detections system
 - Fluorescent resonance energy transfer detection system
 - Molecular Beacons® detection system
162. In what form does the reclamation of filtered bicarbonate ion in the proximal tubular cells occur?
- Carbonic acid
 - Carbon dioxide
 - Sodium carbonate
 - Sodium bicarbonate

163. In what area of the nephron does approximately 65% of renal reabsorption occur?
- Proximal tubule
 - Distal tubule
 - Bowman capsule
 - Glomerulus
164. What is the renal blood flow for a 70-kg male/female?
- 12 mL/min
 - 120 mL/min
 - 1200 mL/min
 - 12 L/min
165. The concentration of a solute in plasma at which no additional amount of the solute will be absorbed from the proximal tubule is known as the
- Plasma threshold
 - Tubular threshold
 - Renal threshold
 - Blood threshold
166. Which biochemical component would be present in an increased amount in a dark yellow-amber-colored urine?
- Biliverdin
 - Bilirubin
 - Urobilin
 - Blood
167. When should a 2-hour postprandial urine be collected?
- 2 hours after fluid ingestion
 - 2 hours after a renal drug ingestion
 - 2 hours after eating
 - 2 hours after voiding a fasting specimen
168. Peritoneal fluid is derived from which source?
- Abdominal cavity
 - Knee joints
 - Central nervous system
 - Space around the lungs
169. Which of the following formed elements are present in the high-power field seen in Color Plate 55■?
- Transitional epithelial cells, oval fat bodies, sperm
 - Renal epithelial cells, mucus, calcium oxalate
 - Red blood cells, squamous epithelial cells, white blood cells
 - Yeast, squamous epithelial cells, mucus
170. Which of the following is *true* about uromodulin (Tamm-Horsfall) protein?
- Measured using the conventional reagent test strips
 - Appears only in abnormal urine
 - Matrix of hyaline casts but not granular casts
 - Produced by renal tubules in small quantities
171. Which of the following procedures is used to assess glomerular permeability?
- Clearance test
 - Osmolality
 - 24-hour urine total protein
 - Renal blood flow
172. With which crystals are urinary uric acid crystals often confused?
- Calcium pyrophosphate
 - Cystine
 - Cholesterol
 - Calcium oxalate

173. In what sequence does urine formation occur?
- Proximal convoluted tubule, loop of Henle, distal convoluted tubule, collecting duct, Bowman's space
 - Glomerulus, Bowman's space, proximal convoluted tubule, loop of Henle, distal convoluted tubule, collecting duct
 - Bowman's space, glomerulus, proximal convoluted tubule, loop of Henle, distal convoluted tubule, collecting duct
 - Bowman's space, glomerulus, distal convoluted tubule, proximal convoluted tubule, collecting duct
174. Renal clearance tests are used to evaluate which of the following parameters?
- Concentrating ability
 - Glomerular filtration rate
 - Glomerular permeability
 - Tubular reabsorption
175. Which of the following do the formed elements present in the high-power field in Color Plate 46■ suggest?
- Nephrotic syndrome
 - Pyelonephritis
 - Excessive exercise
 - Diabetic nephropathy
176. The formed elements present in the high-power field in Color Plate 52■ can be detected by the appropriate reagent strip pad reacting with their
- Pseudoperoxidase
 - Esterase
 - Glucose oxidase
 - Acetoacetate
177. When using polarized light microscopy, which urinary sediment component exhibits Maltese cross formation?
- RBCs
 - WBCs
 - Yeasts
 - Oval fat bodies
178. Which urinary sediment component is frequently confused with the component in Color Plate 48■?
- Yeasts
 - WBCs
 - Parasites
 - Casts
179. Which of the following is a urinary ketone body that is measured using the acetetest?
- Acetyl CoA
 - Acetoacetate
 - β -Hydroxybutyrate
 - Sodium nitroprusside
180. What type of microscopy may also be used to observe the urinary components in Color Plate 50■?
- Polarized
 - Darkfield
 - Phase contrast
 - Electron
181. Which of the following urine biochemical results would be obtained in hemolytic anemia?
- Positive bilirubin
 - Negative blood
 - Positive nitrite
 - Positive urobilinogen
182. The absorbance of a 6 mg/L standard is 0.50. An unknown has an absorbance of 0.38. What is the value of the unknown?
- 7.9 mg/L
 - 6.3 mg/L
 - 4.6 mg/L
 - 2.3 mg/L

183. If 30 grams of H_2SO_4 (mol wt = 98) are dissolved in 500 mL of water, what is the normality of the solution?
- 0.82
 - 1.22
 - 2.94
 - 3.40
184. Which of the following statements describes standard precautions?
- Everyone should be careful before entering a patient room.
 - Treat all human blood and other potentially infectious materials as though they contained infectious particles.
 - Treat human blood as infectious only if it is known to be.
 - All human blood and other infectious material must be handled using a respirator.
185. Which of the following is *true* of a volumetric pipette?
- Blow out the last drop
 - Is labeled “to contain” (TC)
 - Is used for diluting control material
 - Is rinsed out
186. Which type of fire extinguisher should be used to deal with a laboratory fire consisting of ordinary combustibles (e.g., wood and paper)?
- A
 - B
 - C
 - D
187. What term describes the extent of agreement among repeated analyses?
- Random error
 - Precision
 - Accuracy
 - Reliability
188. Which of the following is the range of values described as the mean plus or minus some number of standard deviations, forming the basis of statistical rules for acceptance and rejection of quality control values?
- Variance
 - Degrees of freedom
 - Coefficient of variation
 - Confidence interval
189. Which of the following is material of known composition available in a highly purified form?
- Standard
 - Control
 - Technical reagent
 - Test analyte
190. Which coding system is a systematized series of numbers corresponding to all diseases, and other medical, surgical, and mental health conditions, published annually by the American Medical Association (AMA) for the purpose of standardizing and coding for statistical and billing activities in healthcare?
- CPT
 - HCPCS
 - ICD-9-CM
 - DRG
191. When pricing new tests, a laboratory must use a factor to calculate the allowance for the hospital’s cost for utilities, housekeeping, administration, and other services. What are these costs known as?
- Direct
 - Overhead
 - Depreciation
 - Indirect labor

192. What is the authority relationship from administration to department head to supervisor to staff known as?
- Line authority
 - Staff authority
 - Formal authority
 - Job-related authority
193. The verbs “comply with” and “support” would most likely be used in writing an objective in which of the following domains?
- Affective
 - Cognitive
 - Psychomotor
 - Technical
194. Classify the following *objective*: “The student will calibrate a spectrophotometer according to the procedure manual.”
- Cognitive domain
 - Psychomotor domain
 - Psychosocial domain
 - Affective domain
195. Which of the following testing items is easy to develop but difficult to grade?
- True/false
 - Multiple choice
 - Matching
 - Essay
196. Which of the following describes an interval scale with a true zero point?
- Interval scale
 - Nominal scale
 - Ordinal scale
 - Ratio scale
197. Which of the following is *not* part of a questionnaire?
- Short and clear questions
 - Double negative questions
 - Ask only important questions
 - Reference points or comparisons are used
198. Which of the following requires a continuous electrical supply to the computer for data retention?
- Hard disk
 - DVD
 - ROM
 - RAM
199. A laboratory information system can improve patient care by performing delta checks. What is a delta check?
- Plotting quality control results on a chart
 - Comparing the results of an analyte on a patient to previous results
 - Monitoring the system for security breaches
 - Monitoring data storage to be sure it is properly backed up
200. Tape drives are often used to archive digital data. This storage device is slower than most others because the data are stored
- Sequentially
 - Randomly
 - Magnetically
 - Optically



review

answers

- | | | | |
|-------|-------|-------|-------|
| 1. D | 25. A | 49. A | 73. C |
| 2. C | 26. D | 50. D | 74. D |
| 3. C | 27. C | 51. A | 75. B |
| 4. B | 28. B | 52. B | 76. A |
| 5. D | 29. C | 53. A | 77. A |
| 6. A | 30. A | 54. B | 78. B |
| 7. B | 31. D | 55. D | 79. D |
| 8. B | 32. D | 56. C | 80. A |
| 9. D | 33. A | 57. C | 81. B |
| 10. B | 34. C | 58. C | 82. C |
| 11. D | 35. A | 59. A | 83. C |
| 12. C | 36. D | 60. D | 84. B |
| 13. B | 37. C | 61. B | 85. A |
| 14. D | 38. C | 62. A | 86. A |
| 15. A | 39. B | 63. A | 87. D |
| 16. D | 40. A | 64. D | 88. C |
| 17. C | 41. C | 65. B | 89. B |
| 18. C | 42. D | 66. C | 90. D |
| 19. D | 43. B | 67. D | 91. A |
| 20. A | 44. D | 68. A | 92. A |
| 21. B | 45. A | 69. D | 93. A |
| 22. D | 46. B | 70. C | 94. B |
| 23. A | 47. C | 71. A | 95. A |
| 24. A | 48. B | 72. A | 96. D |

97. D 123. A 149. B 175. B
98. D 124. C 150. B 176. A
99. B 125. B 151. A 177. D
100. B 126. B 152. C 178. D
101. C 127. A 153. D 179. B
102. B 128. D 154. C 180. C
103. D 129. D 155. A 181. D
104. A 130. B 156. A 182. C
105. B 131. B 157. C 183. B
106. C 132. C 158. A 184. B
107. B 133. B 159. B 185. C
108. A 134. D 160. C 186. A
109. C 135. D 161. D 187. B
110. D 136. A 162. B 188. D
111. B 137. B 163. A 189. A
112. A 138. D 164. C 190. C
113. A 139. D 165. C 191. B
114. C 140. C 166. B 192. A
115. C 141. B 167. C 193. A
116. D 142. A 168. A 194. B
117. B 143. C 169. C 195. D
118. C 144. D 170. D 196. D
119. C 145. A 171. C 197. B
120. B 146. C 172. B 198. D
121. A 147. B 173. B 199. B
122. B 148. A 174. B 200. A