Pathology 621 **Exam 1** **NAME:** _____
Monday, September 15, 2003; 8-9:50 a.m.

DIRECTIONS: For each question, select the single BEST answer.

1. Recent experimental therapies for some renal diseases have included inhibition of transforming growth factor-beta (TGF-β). The therapy helps to slow the progression of chronic renal diseases. Anti-TGF-β therapy is effective because it:

   A. Inhibits acute inflammation
   B. Inhibits angiogenesis
   C. Inhibits chronic inflammation
   D. Inhibits fibrosis
   E. Inhibits tubular regeneration

2. A current research trial is underway to study ways to restore blood flow to an ischemic lower extremity by stimulating angiogenesis. Which of the following growth factors would you predict is being used?

   A. Epidermal growth factor (EGF)
   B. Hepatocyte growth factor/scatter factor
   C. Platelet-derived growth factor (PDGF)
   D. Transforming growth factor- β (TGF-β)
   E. Vascular endothelial growth factor (VEGF)

3. A chest X-ray of a 34 year-old marathon runner shows an enlarged heart. This finding represents which of the following?

   A. Pathologic hyperplasia.
   B. Pathologic hypertrophy.
   C. Physiologic hypertrophy.
   D. Physiological hyperplasia.

4. A 24 year-old man develops acute right lower quadrant pain with reduced bowel sounds, and rebound tenderness. His temperature is 104^0 F and his white blood cell count is elevated. At surgery, his appendix is swollen and covered by a yellow exudate. What will microscopic examination of the appendix demonstrate?

   A. Fibrinous inflammation
   B. Lymphocytic inflammation
   C. Plasma cells and eosinophils
   D. Purulent inflammation
   E. Serous inflammation

5. A 6 year-old girl develops a group-A β-hemolytic streptococcal infection of the skin after falling on the pavement. Which of the following events in the inflammatory response to the infection would occur first?

   A. Activation of neutrophils
   B. Infiltration of monocytes/macrophages
   C. Rolling of neutrophils on the endothelium
   D. Transmigration of neutrophils
   E. Vasodilation of local venules

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DIRECTIONS: For each question, select the single BEST answer.

6. A 7 year-old girl develops pyoderma (an infection of the skin) of her legs because mosquito bites have been infected with streptococci. Which of the following types of cells would be most prominent in the infected areas?

   A. Eosinophil
   B. Lymphocyte
   C. Macrophage
   D. Neutrophil
   E. Plasma cell

7. You are doing research to develop a new anti-inflammatory treatment. You decide to focus on blocking the rolling and sticking of neutrophils to the endothelial lining. Which of the following would be the best compound on which to focus?

   A. Chemokine blocker
   D. Complement inhibitor
   E. Histamine blocker
   C. L-selectin blocker
   B. PECAM inhibitor

8. A man is involved in an industrial accident at a nuclear plant. He is seen in an Emergency Room and is found to have acute radiation injury. Which of the following is occurring in acutely injured cells?

   A. Efflux of K^+ and Ca^{++}
   B. Efflux of Na^+ and K^+
   C. Influx of K^+ and Ca^{++}
   D. Influx of Na^+ and Ca^{++}
   E. Influx of Na^+ and K^+

9. A pathologist is looking at a microscopic slide of a high-grade lymphoma and observes that many cells are dying as a result of apoptosis. The intracellular enzymes that are activated in this form of cell injury, eliciting many of the intracellular responses during apoptosis, are known as:

   A. Alkaline and acid phosphatases
   B. Bcl-2
   C. Cyclooxygenases
   D. Endonuclease and caspases
   E. Lipases

10. A pathologist is looking at a microscopic section of a lung involved by a late stage of bacterial pneumonia. He notes numerous macrophages containing particles of cellular debris derived from dead neutrophils. Phagocytosis of this particulate material is best termed:

    A. Autophagy
    B. DNA fragmentation
    C. Heterophagy
    D. Lysosomal storage
    E. Pinocytosis

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DIRECTIONS: For each question, select the single BEST answer.

11. A 74 year-old man with a history of atherosclerotic peripheral vascular disease develops paralysis of his right arm and leg. One month later he dies 24 hours after a myocardial infarction. At autopsy, the left parietal lobe of his brain will most likely show which of the following?

A. Caseous necrosis
B. Coagulative necrosis
C. Enzymatic fat necrosis
D. Hydropic change
E. Liquefactive necrosis

12. A patient's platelets clump together and are counted as white blood cells by the automated cell counter. This is an example of

A. An analytical error
B. Bad luck
C. Interference
D. Normal range variability
E. Panic value

Questions 13 and 14 are based upon the following:
The data from a new test are as follows: true positives 98, false positives 12, true negatives 970, fals negatives 2.

13. Based upon these results what is the sensitivity of this test?

$\frac{98}{100}$

A. 10%
B. 25%
C. 76%
D. 90%
E. 98%

14. If the reference values for the above test were changed such that the test became more specific, which of the following would also most likely occur?

A. The accuracy would decrease
B. The incidence would increase
C. The precision would increase
D. The prevalence would increase
E. The sensitivity would decrease

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DIRECTIONS: For each question, select the single BEST answer.

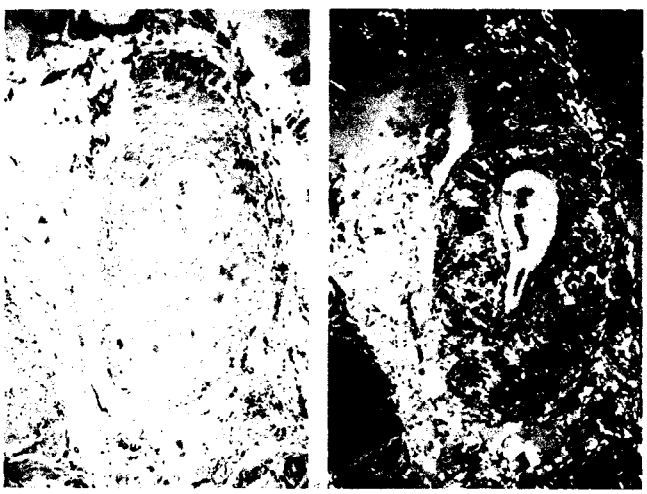
15. The type of renal allograft rejection shown in this photo is:

Eosin

Mononuclear Inf. Infiltrate w plasma cells & eosinophils

A. Accelerated
B. Acute cellular
C. Chronic
D. Hyperacute
E. Second-set

16. The pathological changes shown in these Congo red-stained sections (right frame is polarized) suggest the deposition of:



A. Amyloid
B. Collagen
C. Fibrillin
D. Fibrin
E. Immunoglobulin multimers

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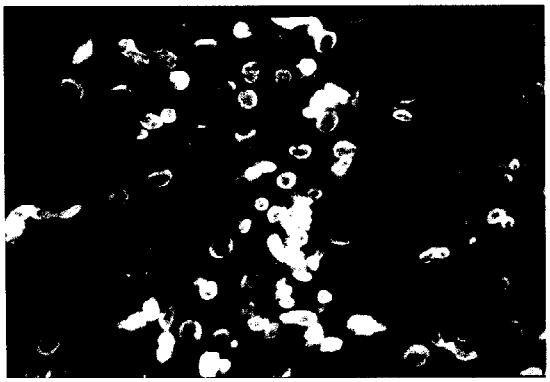
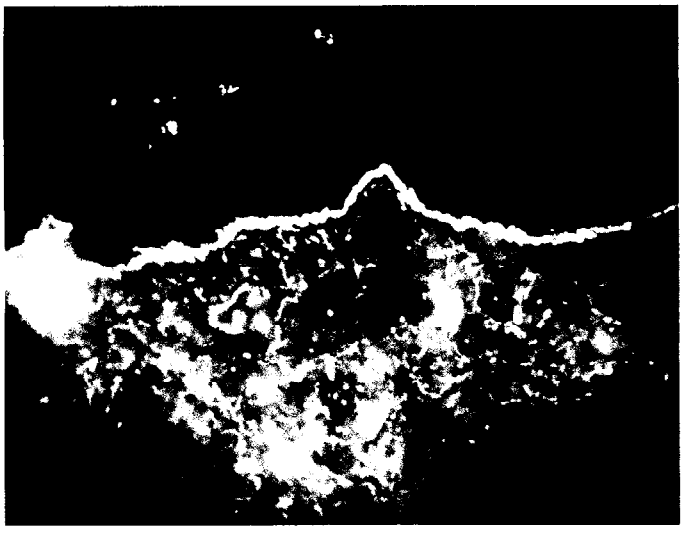
DIRECTIONS: For each question, select the single BEST answer.



17. This nuclear staining pattern with anti IgG represents the morphological equivalent of:

Rim Staining - ANA

(A) Anti-double stranded DNA autoantibodies
B. Anti-histone antibodies
C. Anti-Jo-1 autoantibodies
D. Anti-Scl-70 autoantibodies
E. Anti-Sm (Smith antigen) autoantibodies



18. Immunofluorescence examination of this biopsy of sun-exposed skin revealed the findings shown here in the anti-IgG, anti-IgM, anti-IgM, anti-IgA, anti-C1q and anti-C3 stained sections. The most likely diagnosis is:

A. Bullous pemphigoid
B. Dermatitis herpetiformis
(C) Lupus erythematosus
D. Pemphigus vulgaris
E. Porphyria cutanea tarda

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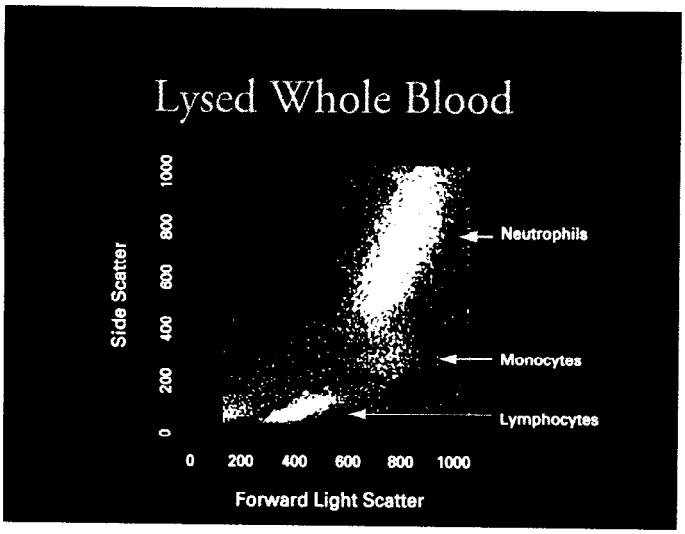
DIRECTIONS: For each question, select the single BEST answer.



19. In this flow cytometric dot plot, forward scatter (x axis) indicates.

A. Cell granularity
B. Cell number
C. Cell size
D. Channel number
E. Fluorescence intensity

20. The patient depicted in these photos experiences recurrent episodes of angioedema involving the gastrointestinal tract, larynx and skin. These photos show the patient before and after an attack that i attributable to:

A. Anaphylaxis
B. C1 esterase
C. Decay accelerating factor
D. Deficiency of C1 esterase inhibitor
E. Glomerulonephritis

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DIRECTIONS: For each question, select the single BEST answer.

21. The condition represented by these two photos (photo on right stained for IgG) is mediated by which of the following types of hypersensitivity?

A. Type I
B. Type II
C. Type III
D. Type IV
E. Type V

Arthus

22. Which of the following types of autoantibodies is associated with systemic lupus erythematosus-like illness induced by certain drugs?

A. Anti-centromere
B. Anti-double-stranded DNA
C. Anti-histone
D. Anti-Jo-1
E. Anti-Sm

23. A child presents with a history of congenital heart defects and severe hypocalcemia (due to hypoparathyroidism). He also has had recurrent and chronic viral, bacterial, fungal and protozoal infections. This child most likely has a diagnosis of:

A. Bruton hypogammaglobulinemia
B. DiGeorge syndrome
C. Hyper-IgE syndrome
D. Severe combined immunodeficiency
E. Wiskott-Aldrich syndrome

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DIRECTIONS: For each question, select the single BEST answer.

24. A 2-½ year-old male child presents with a history of recurrent pyogenic infections attributable to low levels of opsonizing IgG antibodies. He also has a history of *Pneumocystis carinii* pneumonia and defective T cell mediated immunity. His serum reveals normal to elevated levels of IgM and IgD but no IgA or IgE and extremely low levels of IgG. The number of B and T cells is normal. He also manifests autoimmune hemolytic anemia, thrombocytopenia and neutropenia. Which of the following is the most likely diagnosis?

A. Chronic granulomatus disease
B. DiGeorge syndrome
C. Hyper IgM syndrome
D. Infantile agammaglobulinemia of Bruton
E. Isolated IgA deficiency

25. Which of the following is true of Wiskott-Aldrich syndrome?

A. It is an autosomal recessive disease. X-linked
B. It is characterized by thrombocytosis.
C. Numbers of T-cells in peripheral blood and paracortical areas of lymph nodes are within normal limits.
D. Patients fail to form antibodies to both polysaccharide antigens and protein antigens
E. There are low IgG levels, elevated levels of IgM and normal IgA and IgE levels in serum.

26. The feature common to all patients with common variable immunodeficiency is:

A. Decreased risk of lymphoid malignancy.
B. Depletion of B cell areas of lymphoid tissues
C. Hypogammaglobulinemia
D. Occurrence predominantly in males
E. Reduced numbers of B cells

27. Reduced expression of MHC class I molecules by tumor cells or virus infected cells interrupts inhibitory signals, which leads to target cell killing mediated by which of the following?

A. CD4+ T cells
B. CD8+ T cells
C. Dendritic cells
D. Macrophages
E. NK cells

28. A cytokine that down-regulates immune responses is:

A. IL-2
B. IL-4
C. TGF-β
D. TNF-α
E. TNF-β

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DIRECTIONS: For each question, select the single BEST answer.

29. Which of the following is associated with type II mechanism of hypersensitivity?

A. Bullous pemphigoid
B. Contact dermatitis
C. Histoplasmosis
D. Transplant rejection
E. Tuberculosis

30. Which of the following immunologic processes results from a type II hypersensitivity mechanism?

A. Autoimmune hemolytic anemia
B. Immune complex mediated tissue injury
C. Polyarteritis nodosa
D. Rheumatoid arthritis
E. Systemic lupus erythematosus Type II + III mainly III

31. Clinically, type IV hypersensitivity reactions occur in which of the following situations?

A. Autoimmune hemolytic anemia
B. Contact hypersensitivity
C. Erythroblastosis fetalis
D. Pemphigus vulgaris
E. Transfusion reactions

32. A 16 year-old boy presents with blood in the urine and a history of coughing up blood. Immunofluorescence reveals a linear pattern of staining for IgG and C3 in both glomerular and alveolar basement membranes. Which of the following would be most consistent with this clinicopathologic picture?

A. Goodpasture syndrome
B. Hypersensitivity pneumonitis
C. Progressive systemic sclerosis
D. Systemic immune complex disease
E. Systemic lupus erythematosus

33. A 25 year-old woman presents with severe and longstanding palpitations associated with an enlarged thyroid gland. She has bulging eyes (exophthalmos), moist skin and fine hair. Which of the following hypersensitivity mechanisms plays the major role in the pathogenesis of her disease?

A. Antibody-dependent cell-mediated cytotoxicity
B. Type I anaphylactic hypersensitivity
C. Type II stimulatory hypersensitivity
D. Type III immune complex hypersensitivity
E. Type IV T cell-mediated hypersensitivity

Graves II

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DIRECTIONS: For each question, select the single BEST answer.

34. Which of the following is mediated mainly by both type II hypersensitivity and destructive lymphocytic infiltration?

A. Autoimmune hemolytic anemia
B. Chronic granulomatous disease
C. Contact dermatitis
D. Hashimoto thyroiditis
E. Systemic lupus erythematosus

35. A localized area of tissue necrosis, resulting from acute immune complex vasculitis, usually in th skin, is known as:

A. Arthus reaction
B. Goodpasture syndrome
C. Herxheimer reaction
D. Shwartzman reaction
E. Type IV hypersensitivity reaction

36. Organ-specific autoimmune diseases are principally mediated by which of the following hypersensitivity mechanisms:

A. Combined types I and III
B. Type I
C. Type II
D. Type III
E. Type IV

37. A 41 year-old white female presents to her physician with parotid gland swelling which was first incorrectly diagnosed as mumps. She also complains of dry, burning eyes, and dry mouth with difficulty swallowing. Which of the following autoantibodies would be expected in this patient?

A. Anti-centromere
B. Anti-Jo-1
C. Anti-nuclear RNP
D. Anti-Sm
E. Anti-SS-A(Ro) and Anti-SS-B(La)

38. A 32-year old woman presents with dysphagia, symmetrical edema and thickening of the fingers, Raynaud's phenomenon and antibodies to Sc1-70, a nonhistone nuclear protein. The most likely immunologic diagnosis is:

A. Dermatomyositis
B. Polymyositis
C. Progressive systemic sclerosis
D. Sjögren's syndrome
E. Systemic lupus erythematosus

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DIRECTIONS: For each question, select the single BEST answer.

39. In rheumatoid arthritis, rheumatoid factor (RF) is:

A. an IgM that reacts with the infectious agent that initiates the disease.
B. an IgM antibody that uses IgG as its antigen.
C. the cause of rheumatoid arthritis.
D. totally unlike the RF recognized in systemic lupus erythematosus.
E. a Gm determinant.

40. Anti-Jo-1 antibodies against histidyl-tRNA synthetase are most commonly associated with:

A. CREST syndrome
B. Goodpasture syndrome
C. Inflammatory myopathy
D. Progressive systemic sclerosis
E. Sjögren syndrome

41. Wegener granulomatosis of the kidneys is characterized by which of the following?

A. Anti-neutrophil cytoplasmic antibodies (ANCA)
B. Arterial and arteriolar intimal thickening causing stenosis or obstruction
C. Interstitial fibrosis
D. Thick glomerular capillary walls
E. Tubular atrophy

42. Secondary Sjögren syndrome is most frequently associated with

A. Mixed connective tissue disease
B. Polymyositis
C. Progressive system sclerosis
D. Rheumatoid arthritis
E. Systemic lupus erythematosus

43. After 3 years on hemodialysis, a 25 year-old diabetic patient with renal failure receives a cadaveric renal allotransplant even though laboratory testing revealed that she had a 90% positive panel reactiv antibody (PRA) level. Within minutes following surgical anastamosis of the vasculature, the transplanted kidney becomes cyanotic and flaccid, forms a few drops of bloody urine, and is removed. Histopathological examination of the kidney reveals fibrin-platelet thrombi in capillaries, vascular congestion, interstitial edema, neutrophilic infiltrates and neutrophil vasculitis with fibrinoid necrosis. This pathologic picture is most consistent with :

A. Acute rejection
B. Anaphylaxis
C. Chronic rejection
D. Hyperacute rejection
E. Renal vein thrombosis

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DIRECTIONS: For each question, select the single BEST answer.

44. Chronic renal allograft rejection is characterized by which of the following?

A. Arterial and arteriolar intimal thickening
B. Fibrin-platelet thrombi in capillaries
C. Interstitial edema and neutrophilic infiltrates
D. Neutrophil vasculitis with fibrinoid necrosis
E. Vascular congestion

45. An 8 year-old girl who received an allogeneic bone marrow transplant for treatment of aplastic anemia develops a generalized maculopapular skin rash, jaundice and bloody diarrhea 2 weeks following transplantation. Which of the following most accurately describes her condition?

A. Acute graft-versus-host disease
B. Acute host-versus-graft disease
C. Allogeneic inhibition
D. Chronic rejection
E. Hyperacute rejection

46. A 25 year-old woman has an erythematous rash over both facial cheeks and across the bridge of her nose. This rash is made worse by exposure to sunlight. She has also experienced muscle and joint pains for the past 3 to 4 months. Additional abnormalities of joints are revealed by x-rays. Which of the following laboratory findings would be most likely in her disease?

A. Anti-neutrophil cytoplasmic antibodies
B. Anti-Sm (Smith) antibody
C. Decreased absolute CD4 lymphocyte count
D. Elevated serum IgE levels
E. HLA-B27 genotype

47. In flow cytometry, side scatter indicates:

A. Cell number
B. Channel number
C. Fluorescence intensity
D. Granularity
E. Size

48. A 55 year-old man with a recent history of recurrent bacterial infections presents with bone pain and pathologic fractures. Laboratory studies reveal hypercalcemia and Bence-Jones proteinuria. Electrophoresis shows increased immunoglobulin in blood and light chains in the urine. A skull x-ray shows "punched-out" bone lesions in the calvarium. A renal biopsy reveals an amorphous, eosinophilic, hyaline fibrillar substance that has accumulated in the extracellular mesangial areas. Which of the following best describes the extracellular deposits in this patient?

A. β_2-microglobulin
B. α-fetoprotein
C. AA amyloid
D. AL amyloid
E. ATTR amyloid

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DIRECTIONS: For each question, select the single BEST answer.

49. The most accurate way to diagnose HIV-1 infection during the "window period" between exposure and the first appearance of antibody to gp120 is by detecting which of the following in the patient's blood?

A. Antibody to p24 antigen
B. gp120 antigen
C. gp41 antigen in blood
D. p24 antigen
E. Reverse transcriptase levels

50. An absolute CD4+ lymphocyte count below 200 cells/cu mm blood occurs in:

A. Acute-graft-versus-host disease.
B. Chronic granulomatous disease.
C. Clinical AIDS
D. Multiple myeloma
E. Wiskott-Aldrich syndrome

51. An obstetrician explains to a very concerned 24 year-old pregnant HIV-1+ woman that vertical transmission of AIDS from mother to infant may occur *in utero* by transplacental spread, during delivery through an infected birth canal, or after birth by ingestion of breast milk. What is the rate fo perinatal transmission?

A. 10%
B. 25%
C. 50%
D. 75%
E. 100%

52. A 29 year-old male intravenous drug abuser has been HIV-1 positive for 8 years but has recently stopped taking his cocktail of antiretroviral and protease inhibitor drugs. Which of the following is the best way to determine the degree of rapidity of progression of his HIV disease to the final crisis phase?

A. CD4/CD8 ratio
B. Decreased absolute CD4 lymphocyte count
C. Degree of weight loss
D. HIV-1 viral load
E. Presence of pulmonary opportunistic infections

53. A 3 year-old boy has experienced recurrent bacterial infections since birth, and has been treated with antibiotics and supportive therapy all of his life. His neutrophilic leukocytes are shown by the nitroblue tetrazolium (NBT) test to be deficient in NADPH oxidase. There is also a defective killing curve when the patient's neutrophils are combined with a culture of *E. coli*. Which of the following is the most likely diagnosis?

A. Acquired immunodeficiency syndrome
B. Chronic granulomatous disease
C. Hyper IgM syndrome
D. Severe combined immunodeficiency
E. Wiscott-Aldrich syndrome

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DIRECTIONS: For each question, select the single BEST answer.

54. A 23 month-old male has experienced repeated infections since he was six months old with such microorganisms as *Hemophilus influenzae, Streptococcus pneumoniae* and *Staphylococcus aureus*. These have induced pneumonia, otitis media and impetigo. *Giardia lamblia* infections of the gut have led to repeated bouts of diarrhea. Although his parents and sisters are unaffected, he had an older brother who experienced similar symptoms and died of infection. Laboratory studies on the current patient show markedly decreased immunoglobulins. Which of the following is most likely the cause of the condition described?

A. Adenosine deaminase deficiency
B. Diminished complement component C3
C. Diminished T cell-mediated immunity
D. Failure of B cells to differentiate into IgA-secreting plasma cells
E. Mutations in a cytoplasmic tyrosine kinase (*btk*) that block signal transduction for B cell maturation

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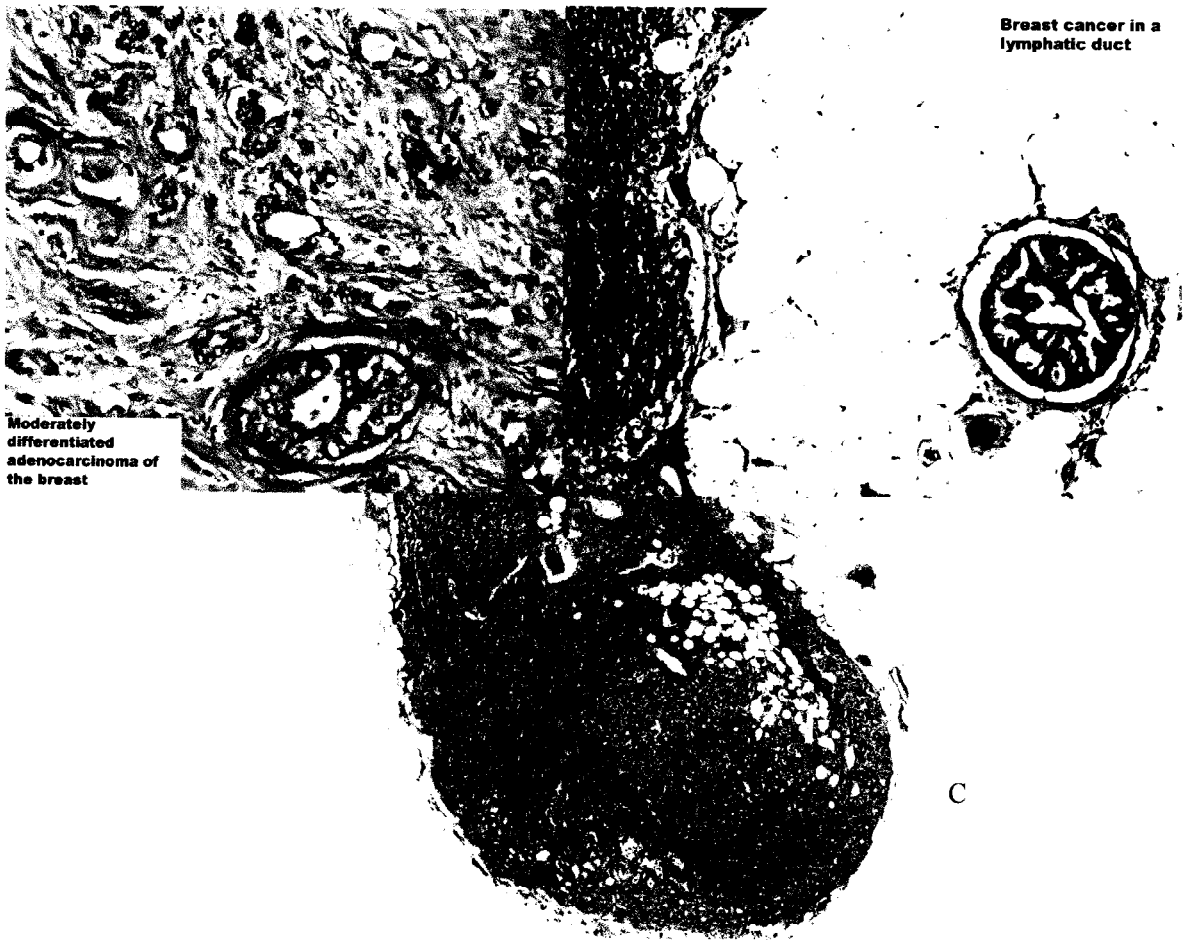
DIRECTIONS: For each question, select the single BEST answer.



Tumor staging depends upon three attributes that indicate the size of a tumor and the extent to which tumor has spread. A 'T' designation is given for the primary tumor depending on whether the tumor is confined to the organ of origin (T1 or T2) or whether it has invaded outside of the organ into adjacent tissues (T3 or T4). N is the designation of lymph node status. N0 means no lymph node metastases. Cases with lymph node metastases can be designated as N1 to N3 depending upon the size and location of the nodal metastases. NX means the lymph node status is not known. M is the designation for distant metastases. M0 indicates no distant metastases and M1 indicates the presence of distant metastases. MX indicates that the presence or absence of distant metastases is not known. For most cancer sites distant metastases means hematogenous metastases to a distant organ such as breast to lung or brain/ or colon to liver. Use these comments as a guide, when you answer the questions **55-58**.

55. A 52 year-old woman has had a mastectomy for carcinoma of the breast previously diagnosed by needle biopsy. Photo A is a microscopic section of the primary breast tumor that shows malignant tubule formation of a moderately differentiated adenocarcinoma. Photo B shows tumor cells within a small lymphatic channel beside a lymph node, and Photo C demonstrates tumor within the lymph node. Select the one best answer that indicates the status of this breast cancer.

A. The lymph node represents the direct extension of the tumor into an adjacent organ.
B. The lymph node represents the direct spread of tumor within a body cavity.
C. The lymph node shows a distant, hematogenous metastasis.
D. The tumor is best designated as T1, N1, MX.
E. The tumor is best designated as T1,N0,MX.

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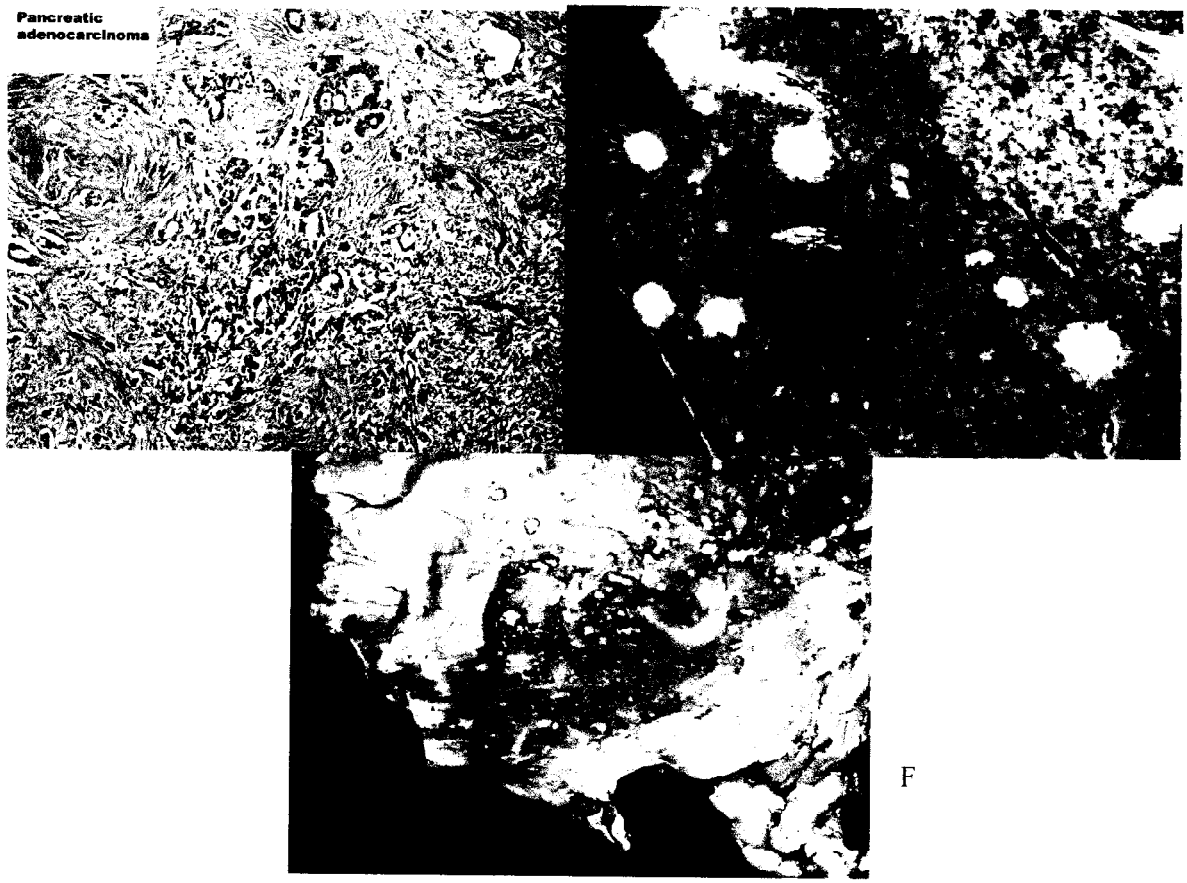
DIRECTIONS: For each question, select the single BEST answer.



56. A 64 year-old woman dies after a 16 month long clinical course characterized by obstructive jaundice and ascites in which malignant cells were seen cytologically in a specimen of ascitic fluid. An autopsy demonstrates a mass in the head of the pancreas. Photo D shows malignant tubule formation of a ductal adenocarcinoma of the head of the pancreas. Photo E shows multiple metastasis within the liver parenchyma. Photo F demonstrates tumor coating the peritoneal surface of her diaphragm. The tumor in the liver demonstrates the mechanism of:

A. A combination lymphatic metastasis and direct spread.
B. Contiguous invasion from the pancreas.
C. Direct spread within the abdominal cavity.
D. **Hematogenous metastasis***
E. Lymphatic metastasis.

57. In the case described in question 56, the tumor coating the diaphragm demonstrates the mechanism of:

A. A combination of hematogenous metastasis and contiguous invasion.
B. Contiguous invasion from the pancreas.
C. Direct spread within the abdominal cavity.
D. Hematogenous metastasis.
E. Lymphatic metastasis.

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DIRECTIONS: For each question, select the single BEST answer.

58. The patient described in questions 56 and 57 was known to have liver metastasis at the time of her initial diagnosis. The staging of her tumor was best designated as:

A. T1, N0, M0, stage 1.
B. T2, N0, M0, stage 2
C. T2, N1, M0, stage 3.
D. T2, NX, M1, stage 4.
E. T3, NX, M0, stage 3.

59. A 45 year-old male cigarette smoker is found to have a solitary pulmonary tumor. A thoracotomy is performed and the tumor is removed via a wedge resection of lung. The tumor is 3 cm in diameter, invades the overlying pleura, and is microscopically composed of moderately well differentiated glands. A regional lymph node contains a small focus of this neoplasm. This tumor is best diagnosed as a:

Adenocarcinoma

A. Adenoma.
B. Carcinoma.
C. Hamartoma.
D. Sarcoma.
E. Teratoma.

Adenoma - benign
This is malignant b/c it has s

60. A 23 year-old woman has an ovary removed that contains a cystic tumor containing hair, brain, skin, and gastrointestinal epithelium. This tumor is derived from:

A. Embryonal ectodermal cells.
B. Embryonal entodermal cells.
C. Embryonal mesoderm cells.
D. Embryonal nerve cells.
E. Pluripotential cells.

61. A 17 year-old girl has a firm well-circumscribed tumor removed from her breast. It is diagnosed as by the pathologist as a fibroadenoma. Which of the following is true of the growth characteristic of this neoplasm?

A. A benign tumor that can metastasize to distant sites.
B. A benign tumor that is poorly differentiated with respect to the normal breast.
C. A benign tumor that is well-differentiated and slow growing.
D. A benign tumor with highly disorganized cellular elements that infiltrates the surrounding normal tissue.
E. A malignant tumor that has no capacity to metastasize.

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62. A 56 year-old woman has developed obstructive jaundice. A fine needle aspiration biopsy of a pancreatic mass is performed by an interventional radiologist using CT (computerized tomography) guidance. The needle biopsy shows malignant cells having glandular or ductular differentiation. The best diagnoses is:

A. Adenocarcinoma.
B. Adenoma.
C. Liposarcoma.
D. Squamous cell carcinoma.
E. Teratoma.

63. A 36 year-old man has developed carcinoma of the colon. He has the colon resected and it shows hundreds of adenomatous polyps and at least two carcinomas. What is the feature of a neoplasm that best distinguishes the benign adenomas from the colonic carcinomas.

A. The capacity of tumor parenchyma to metastasize.
B. The degree of differentiation of the tumor parenchyma.
C. The expression of heterophilic adhesion molecules.
D. The presence of mutations in the tumor parenchyma.
E. The relationship of tumor parenchyma to stroma.

64. A 24 year-old man has a tumor in the deep tissues of his thigh that has been slowly growing in size for 18 months. It is removed with a resection of surrounding skeletal muscle, fascia, and adipose tissue. Grossly, the pathologist identifies a firm tumor that is densely attached to and invading adjacent normal tissues. Microscopically, the pathologist sees a neoplastic proliferation of well-differentiated fibrocytes having a low rate of mitotic activity. It is best diagnosed as:

A. Hamartoma.
B. Leiomyosarcoma. smooth m
C. Mixed tumor.
D. Poorly differentiated sarcoma that cannot be specifically classified.
E. Well-differentiated fibrosarcoma.

65. A 56 year-old man has metastatic renal cell carcinoma to the lungs. In an experimental trail, the patient's lymphocytes are harvested and incubated with lyophylized tumor tissue and interleukin-2 (IL-2). The lymphokine-stimulated lymphocytes are then injected back into the patient who shows a temporary regression of the size of the lung metastases. This is an example of the use of what type of tumor antigen:

A. Carcinoembryonic antigen.
B. Differentiation antigen.
C. Oncofetal antigen.
D. Tumor associated carbohydrate antigen.
E. Tumor specific antigen.

Pathology 621 **Exam 1** **NAME:** _____
Monday, September 15, 2003; 8-9:50 a.m.

DIRECTIONS: For each question, select the single BEST answer.

66. A 56 year-old man has a carcinoma of the sigmoid colon treated by a left hemicolectomy. The tumor has invaded into the muscularis propria and metastasized to local lymph nodes. The expression of integrins, or heterophilic adhesion molecules, on the surface of tumor cells is important in which aspect of the metastasis:

A. Digestion of the extracellular matrix.
B. Homing of tumor cells to extracellular sites.
C. Invasion of the extracellular matrix.
D. Loss of adherence in the primary tumor.
E. Stimulation of angiogenesis.

67. A 5.0 cm in diameter tumor is removed from the lung of a 34 year-old non-smoker. It consists of a parenchyma composed of poorly differentiated atypical epithelial cells having a high rate of mitotic activity with central necrosis. A pathologist makes a diagnosis of undifferentiated carcinoma. The tumor [redacted]s shrinks rapidly with chemotherapy and radiation. A tumor with the same histology is found a year later in the brain. The characteristic most favoring malignancy is:

A. Autonomous parenchymal cell growth.
B. Cellular atypia and mitoses.
C. Metastasis.
D. Necrosis.
E. Tumor size.

68. A 63 year-old man developed liver metastases on year after a colectomy for carcinoma of the colon. ELAM-1, the endothelial cell adhesion molecule to mucopolysaccharide surface receptors on tumor cells, is important in which phase of metastasis?

A. Attachment of tumor cells to the extracellular matrix.
B. Homing of tumor cells to the metastatic sites.
C. Invasion of the extracellular matrix.
D. Loss of adherence in the primary tumor.
E. Stimulation of angiogenesis.

69. Following an abnormal Pap smear, a 34 year-old woman has a cervical biopsy. The cervical epithelium demonstrates marked hyperchromasia and an increased nuclear/cytoplasmic ratio. The changes involve the full thickness of the epithelium and do not penetrate the basement membrane. A test for a carcinogenic agent is performed. You would predict that the test will show:

A. Epstein Barr virus.
B. Herpes simplex virus.
C. High-risk human papillomavirus.
D. Human herpesvirus-8.
E. Low-risk human papillomavirus.

Pathology 621 Exam 1 NAME: _____
Monday, September 15, 2003; 8-9:50 a.m.

DIRECTIONS: For each question, select the single BEST answer.

70. A 48 year-old woman developed pulmonary metastases one year after a mastectomy for carcinoma of the breast. The capacity of her breast carcinoma cells to metastasize depends upon which of the following factors.

A. Acquisition of homotypic adhesion molecules.
B. Acquisition of oncofetal antigens.
C. Acquisition of receptors to the extracellular matrix.
D. Acquisition of tumor specific antigens.
E. Loss of tumor specific antigens.

71. A 36 year-old man has developed carcinoma of the colon. He has the colon resected and it shows hundreds of adenomatous polyps and at least two carcinomas. The progression of colonic epithelial cells from a resting state to an adenoma to a carcinoma capable of invasion and metastasis is the result of:

A. A process involving multiple genetic mutations.
B. A single genetic mutation.
C. The derepression of genes silenced in adult tissues.
D. The development of tumor associated antigens.
E. The expression of both tumor specific and tumor associated antigens.

72. Two children in a family having three other unaffected children begin developing squamous cell carcinomas of the skin of the face, arms and hands at 4 years of age. Neither parent is affected. The children are diagnosed as having xeroderma pigmentosum. This condition is the result of a genetic defect that is characterized by:

A. A two-hit sequence of mutations in which both are acquired after birth.
B. Defects in the enzymatic systems that repair sunlight-induced DNA damage.
C. High rates of chromosomal breaks and structural chromosomal mutations.
D. Structural mutations of chromosome 14 and the development of lymphoma.
E. The development of soft tissue sarcomas and other neoplasms in 25% of cases.

73. A 2 year-old boy has developed a retinoblastoma of his right eye. His 3 year-old sister had a retinoblastoma successfully treated last year and an aunt died of metastatic retinoblastoma at 4 years of age. A molecular genetic study of the tumor shows a deletion of gene sequences (loss of heterozygosity) of a segment of chromosome 13q that includes 13q14, the locus of the retinoblastoma gene. This deletion is not present in the testing of DNA from the patient's lymphocytes. According to the Knudson hypothesis this patient has:

A. Acquired after birth a mutated retinoblastoma gene in tumor and lymphocytes.
B. Acquired after birth a mutated retinoblastoma gene in tumor but not lymphocytes.
C. Inherited a deleted retinoblastoma gene in retinal tissues but not lymphocytes.
D. Inherited a mutated retinoblastoma gene in tumor and lymphocytes.
E. Inherited a mutated retinoblastoma gene in tumor but not lymphocytes.

Both B & C

DIRECTIONS: For each question, select the single BEST answer.

74. A 45 year-old man has developed carcinoma of the kidney. His father and grandmother on the father's side have died of renal cell carcinoma. He has a genetic test in which the von Hippel-Lindau gene (*VHL*) is sequenced and a frameshift mutation is found at the 5´ end of exon 1. Which of the following statements best characterizes this point mutation?

A. It changes the nucleotide sequence of the coding region of *VHL*.
B. It duplicates chromosomal material that produces double minutes.
C. It is a fragile site where a chromosomal break commonly occurs.
D. It is the result of an abnormal mitotic event.
E. It is the result of the deletion of a chromosomal segment.

75. In a study of renal cell carcinoma in Mississippi, it is found that only 2.5% are familial and 97.5% ar sporadic or non-familial. Which of the following is a true statement about genetic mutations that cause the majority of renal cell carcinomas in Mississippi?

A. Mutations are involved in 2.5% of all renal cell carcinoma in Mississippi.
B. The mutations are inherited in the germline.
C. The mutations can be found in the tumor, in normal kidney, and in lymphocytes.
D. There is not likely to be any mutations involved.
E. They are acquired after birth and occur in the somatic cells of the kidney.

76. A 69 year-old man has advanced lung cancer. He is experiencing a progressive loss of body fat and muscle mass as well as extreme weakness and loss of appetite. These changes are characteristic of:

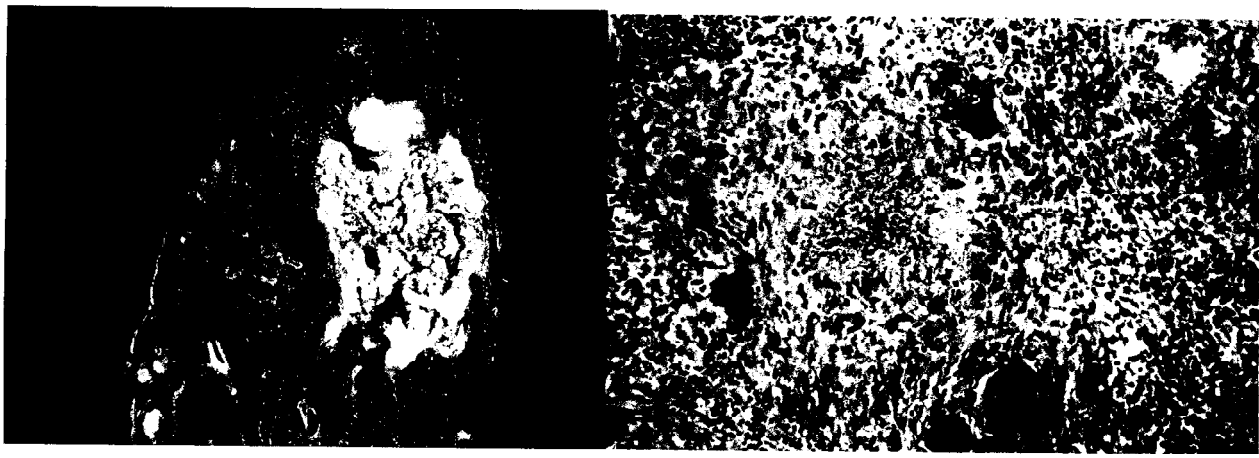
A. A hematologic paraneoplastic syndrome.
B. Anorexia and cachexia syndrome.
C. Eaton-Lambert myasthenic syndrome.
D. Paraneoplastic ACTH syndrome.
E. Paraneoplastic serum idiopathic ADH syndrome.

Pathology 621 **Exam 1** **NAME:** _____
Monday, September 15, 2003; 8-9:50 a.m.

DIRECTIONS: For each question, select the single BEST answer.

77. A 55-year-old man is admitted to hospital in shock, after a two-hour history of excruciating upper abdominal pain. Despite aggressive supportive measures, he expires. At autopsy, his pancreas appears as shown. Which type of necrosis is demonstrated in this photograph?

A. Caseous
B. Coagulative
C. Fat
D. Fibrinoid
E. Liquefactive



78. Chest x-ray of a 47-year-old smoker shows an isolated ("coin") lesion near the apex of the right lung. Open lung biopsy is as shown. Which of the following is present in this case?

A. Adenocarcinoma
B. Granulation tissue
C. Granulomatous inflammation
D. Liquefactive necrosis
E. Squamous cell carcinoma

Pathology 621 **Exam 1** **NAME:** _____
Monday, September 15, 2003; 8-9:50 a.m.

DIRECTIONS: For each question, select the single BEST answer.

79. A 70-year-old female is seen in the Emergency Department because of shortness of breath and left arm pain. She suddenly becomes pulseless and apneic, and cannot be resuscitated. A section of her left ventricle taken at autopsy is shown. The cause of this process was most likely:

A. Acute inflammation
B. Chemical injury
C. Chronic inflammation
D. Hypersensitivity
E. Ischemia

80. The tubules shown in this photo are from a renal biopsy on a 47-year-old man. Electron microscopy of these tubules will most likely show:

A. Amorphous mitochondrial densities
B. No changes
C. Nuclear pyknosis
D. Plasma membrane discontinuities
E. Swollen organelles

UNIVERSITY OF MISSISSIPPI MEDICAL CENTER

Test Analysis program - Student Grade Sheet Instructor: DR. ROGER GEISS

Number of students= 103 Number of Items= 80 Date: 09/16/03 (41 of 103)

Name: [redacted] Id: [redacted] Course: PATHOLOGY 621

Your Raw Score: 72.00 Your Percent Score: 90.00 Class Mean Raw : 70.79 Class Mean Percent: 88.48

1.25

91.25

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Item Number
Item Number                                1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 5
Item Number       1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
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Incorrect Items                          X     X           X               X                           X
Your Answers      D E C D E D D D D C E A E E C A A C C D C C B C D C E C D A B A C D A C E C B C A D D C A B D D D C
Correct Answers   D E C D E D D D D C E C E E B A A C C D B C B C D C E C A A B A C D A C E C B C A D D A A B D D D C

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Item Number       5 5 5 5 5 5 5 5 5 6 6 6 6 6 6 6 6 6 6 7 7 7 7 7 7 7 7 7 7 8
Item Number       1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
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Incorrect Items         X                           X           X
Your Answers      B D B D D D C D B E C A A E E C C B E C A B B A E A C C E E
Correct Answers   B D B E D D C D B E C A A E E C C B C C A B * A E B C C E E
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*.....ALL STUDENTS WERE GIVEN CREDIT FOR THIS ITEM

O.....ITEM WAS THROWN OUT

!.....ITEM HAS MORE THAN ONE CORRECT ANSWER. EACH ITEM IS LISTED BELOW FOLLOWED BY ITS CORRECT ANSWERS: