

For the following questions (#1- 5), select the single best response.

1. ✓ *Mycobacterium tuberculosis*
 - A. Can cause chronic lung infections in man
 - B. Can cause infections in practically all organs of the body
 - C. Is acid fast
 - D. Is an obligate aerobe
 - E. All of the above

2. ✓ When a gram stain is performed on a culture of *Mycobacterium tuberculosis*, the microscopically observed result is
 - A. Clear cocci
 - B. Clear rods
 - C. Pink cocci
 - D. Pink rods
 - E. Purple cocci
 - F. Purple rods
 - G. None of the above

3. ✓ Hansen's bacillus is
 - A. *Mycobacterium africanum*
 - B. *Mycobacterium bovis*
 - C. *Mycobacterium kansasii*
 - D. *Mycobacterium leprae*
 - E. *Mycobacterium tuberculosis*

4. ✓ *Mycobacterium leprae* differs from *Mycobacterium tuberculosis* in that
 - A. It can survive inside normal macrophages
 - B. It can't be grown in vitro
 - C. It causes chronic granulomatous lesions
 - D. It is acid fast
 - E. All of the above

5. ✓ Leprosy
 - A. Is diagnosed by demonstrating acid-fast bacilli in scrapings from ulcerated lesions ✓
 - B. Is distinguished by its chronic granulomatous lesions ✓
 - C. Is distinguished by its chronic slow progress ✓
 - D. Is distinguished by its mutilating and disfiguring lesions ✓
 - E. Is highly contagious
 - F. Is transmitted when exudates of mucous membrane lesions and skin ulcers from lepers reach skin abrasions in people without the disease
 - G. All of the above
 - H. A, B, C, D, and F only
 - I. A, B, C, E, and F only

The following questions (#6 -11) deal with the "Achey Amoeba" case study. All questions are single best answer.

An 18-year-old healthy male had noted fatigue and some generalized muscle aches for several days. He awoke on the morning of October 31 (which he distinctly remembered, as he had been planning to go to a Halloween Ball as an amoeba) feeling chilly and suffering from a sore throat and a severe frontal headache. He also felt hot and recorded a temperature of 102°. Over the next several days he became increasingly bothered by a persistent non-productive cough, along with his headache and fever. He also noted increasing severity of muscle aches and pains. On November 2, he complained of a severe left earache, and the next day consulted a physician.

6. Your differential diagnosis, at this point, would include which of the following:
- A. Meningitis, "strep" throat, flu, pneumococcal pneumonia, Legionnaire's disease
 - B. Mycoplasmal pneumonia, Rocky Mountain spotted fever, shigellosis
 - C. Mycoplasmal pneumonia, "strep" throat, flu, chlamydial pneumonia, otitis media
 - D. Syphilis, gonorrhea, tetanus, dysentery, otitis media
 - E. "Walking" pneumonia, botulism, otitis media, psittacosis

The doctor determined that the young man lived alone and had no pets. He did not smoke and only very occasionally drank alcohol. He had a girlfriend with whom he had a monogamous relationship.

7. The young man's age and the fact that he did not smoke or drink would tend to rule out which of the following:
- A. Influenza
 - B. Legionnaire's disease
 - C. Mycoplasmal pneumonia
 - D. Otitis media
 - E. "Strep" throat

Physical examination by the doctor revealed a temperature of 101° and a pulse rate of 105/minute. Blood pressure was 124/76, and respirations were 24/minute. The patient looked reasonably well but was obviously in pain because of the earache and the distressing and persistent dry cough. The left tympanic membrane was slightly erythematous. A single tender enlarged cervical lymph node was palpable below the left ear lobe. Hematocrit was normal. Leukocyte count was 8000 cells per cubic millimeter, with a normal differential. No beta-hemolytic colonies from the throat culture grew on blood agar.

8. The lack of beta-hemolytic colonies from the throat culture indicates
- A. He does not have a sore throat caused by *Streptococcus pyogenes*.
 - B. He does not have influenza, as the flu virus produces beta-hemolytic colonies on blood agar.
 - C. He does not have Legionellosis.
 - D. He does not have mycoplasmal pneumonia.
 - E. He does not have otitis media caused by *Haemophilus influenzae*.

X-ray showed a stringy, poorly delineated infiltrate in the most posterior and inferior segment of the right lower lobe. A satisfactory sputum sample could not be obtained.

9. How does this x-ray differ from what would be seen with pneumococcal pneumonia?
- A. It is always bilateral in pneumococcal pneumonia.
 - B. The infiltrate would be only interstitial in pneumococcal pneumonia.
 - C. The position of the infiltrate would be different.
 - D. There would likely be more consolidation with pneumococcal pneumonia.
10. Most of the signs and symptoms indicate a diagnosis of mycoplasma pneumonia. The lack of a good sputum sample is one of the signs pointing to this diagnosis. Sometimes patients with this disease do produce some sputum, however. When they do, the following is seen on a gram stain:
- A. A few neutrophils and no bacteria
 - B. Gram-negative diplococci inside the white cells
 - C. Gram-positive cocci in bunches
 - D. Gram-positive lancet-shaped diplococci

11. Penicillin would not work in this disease because
- A. The organism has no cell wall
 - B. The organism has sterols in its cell membrane
 - C. The organism makes fried egg colonies
 - D. The organism produces a beta-hemolysin
 - E. The organism produces a beta-lactamase

For the following questions (#12- 35), select the single best response.

12. *Legionella pneumophila*
- A. Can produce two disease syndromes—Legionnaire's Disease and Pontiac Fever
 - B. Can survive inside normal macrophages
 - C. Is a gram-negative rod
 - D. Is easily killed by penicillin
 - E. All of the above
 - F. A, B and C only
13. The most prevalent rickettsial disease in the United States is
- A. Brill-Zinsser disease
 - B. Endemic flea-borne typhus
 - C. Epidemic louse-borne typhus
 - D. Rickettsial pox
 - E. Rocky Mountain Spotted Fever
 - F. Scrub typhus
 - G. Trench Fever
14. Which of the following organisms has an intracellular and an extracellular life form?
- A. *Chlamydia pneumoniae*
 - B. *Chlamydia psittaci*
 - C. *Chlamydia trachomatis*
 - D. ~~*Rickettsia akarii*~~
 - E. *Rickettsia prowazekii*
 - F. *Rickettsia rickettsii*
 - G. *Rickettsia tsutsugamushi*
 - H. All of the above
 - I. A, B and C only
 - J. D, E, F and G only
15. The organism that causes epidemic louse-borne typhus is
- A. *Rickettsia akarii*
 - B. *Rickettsia prowazekii*
 - C. *Rickettsia rickettsii*
 - D. *Rickettsia tsutsugamushi*
 - E. *Rickettsia typhi*
16. Which of the following STDs does not have mandatory patient-name reporting to the Public Health Department?
- A. Chancroid
 - B. AIDS
 - C. Gonorrhea
 - D. Lymphogranuloma venereum
 - E. Syphilis

17. Which of the following STDs is about as common as gonorrhea?
- A. Chancroid
 - B. Chlamydial infection
 - C. Granuloma inguinale
 - D. Hepatitis B infection
 - E. Syphilis
18. The origin of HIV-1
- A. Is due to chemical warfare and biologically altered virus
 - B. Is not known
 - C. is unimportant because we should concentrate on human exposure to the virus and vaccine development
 - D. Was recently confirmed by federally-supported scientists to have originated in a subspecies of chimpanzees native to west equatorial Africa
19. Important cellular components that are used to identify HIV-1 utilizing the Western Blot confirmation test are
- A. Aminoglycosides
 - B. Glycolipids
 - C. gp120, gp160, p24
 - D. RNA
20. This microorganism causes a sexually transmitted disease that is diagnosed by demonstrating large mononuclear cells containing dumbbell-shaped encapsulated rods
- A. *Bartonella bacilliformis*
 - B. *Bartonella henselae*
 - C. *Calymmatobacterium granulomatis*
 - D. *Neisseria gonorrhoeae*
 - E. *Plesiomonas shigelloides*
21. The polysaccharide capsule of *Bacteroides fragilis* serves two important pathogenic functions. These are
- A. Causing endotoxemia and inhibiting host defenses
 - B. Destroying tissue (through lecithinase activity) and protecting against oxygen toxicity
 - C. Enzymatically inactivating antimicrobial agents and causing endotoxemia
 - D. Promotion of abscess formation and rendering the microorganism resistant to killing by PMN leukocytes
 - E. Protection against both antimicrobial agents and enterotoxemia
22. An anaerobic, Gram positive, spore-forming bacillus is
- ~~A. *Bacillus anthracis*~~
 - ~~B. *Bacteroides fragilis*~~
 - ~~C. *Clostridium septicum*~~
 - D. *Lactobacillus acidophilus*
 - ~~E. *Peptostreptococcus magnus*~~
23. *Prevotella* and *Mobiluncus* are both
- A. Etiologic agents of female genital tract infections
 - B. Etiologic agents of gas gangrene
 - C. Gram negative anaerobic bacilli
 - D. Gram positive cocci
 - E. Spore formers
24. The most important treatment of gas gangrene is
- A. Intramuscular injection of gas gangrene toxoid
 - B. Intravenous administration of gas gangrene antitoxin
 - C. Intravenous administration of penicillin
 - D. Placing the patient under hyperbaric oxygen
 - E. Surgical debridement of diseased tissue

25. The most effective means of preventing tetanus neonatorum is
- A. Immunization of all adults
- B. Immunization of neonates with tetanus toxoid immediately after birth
- C. Outlawing septic midwifery
- D. Prophylactic administration of penicillin to all newborns immediately after birth
- E. Thorough cleansing of the umbilicus immediately after birth
26. The neurotoxin of *Clostridium botulinum*
- ~~A.~~ Blocks the release of the inhibitory transmitter
- ~~B.~~ Enzymatically destroys tissue permitting *C. botulinum* to spread from the initial inoculation site
- ~~C.~~ Is not inactivated by boiling
- D. Is rapidly inactivated by oxygen
- E. Prevents neurotransmission by preventing release of acetylcholine
27. The enterotoxin of *Clostridium perfringens* type A
- ~~A.~~ Causes necrosis in the large intestine
- B. Causes necrosis in the small intestine
- ~~C.~~ Is a heat labile protein that is part of the spore coat
- D. Is a potent neurotoxin that causes floppy baby syndrome
- E. Is inactivated by proteases in the intestinal tracts of healthy adults
28. Necrotizing infections are best treated with
- A. Antibiotics alone.
- B. Antibiotics and local antiseptics applied to the wound
- C. Surgical debridement repeated as necessary and systemic antibiotics
29. Which organism might you typically see in necrotizing fasciitis?
- A. *Candida albicans*
- B. Group A beta-hemolytic streptococci
- C. *Staphylococcus epidermidis*
30. The American Heart Association recommends which one of the following drugs for use in standard general prophylaxis against endocarditis if the patient is not allergic to penicillin?
- A. Amoxicillin
- B. Clindamycin
- C. Flagyl
- D. Gentamicin
- E. Vancomycin
31. The microorganism considered to be chiefly responsible for dental caries is
- A. *Candida albicans*
- B. *Herpesvirus hominis*
- C. *Lactobacillus acidophilus*
- D. *Streptococcus mutans*
- E. *Streptococcus pyogenes*
32. The etiology of dental caries is microbial in nature. Radiation therapy for head and neck cancer has been found to magnify the effects of microbes in the mouth by
- A. Altering the buffering action of saliva
- B. Increasing the risk of osteoradionecrosis secondary to tooth extraction
- C. Making the patient susceptible to radiation caries
- D. Reducing salivary flow
- E. All of the above

43. A 19-year-old male who was enrolled in a New England college close to home participated in an archeological expedition in the desert southwest of the US during the first summer semester. A few days into the second summer semester, the student visited the student health service with complaints of persistent respiratory symptoms. Pulmonary infiltration was confirmed by X-ray. However, the symptoms did not subside with antibacterial therapy. The most likely cause of a fungal infection is
- Aspergillus fumigatus*
 - Blastomyces dermatitidis*
 - Candida albicans*
 - Coccidioides immitis*
 - Histoplasma capsulatum*
44. A 49-year-old African American man from California was admitted to the hospital for heart bypass surgery. The patient had a central venous catheter placed on the day of surgery. Three days after surgery the patient had a fever. Improvement was not noted with anti-bacterial therapy. A *Candida* infection was suspected. The most likely risk factor for this infection is the patient's
- Age
 - Central venous catheter
 - Ethnic background
 - Home address
 - Sex
 - Underlying condition requiring surgery
45. A 29-year-old jogger had recurrent episodes of self-diagnosed athlete's foot (*tinea pedis*) that would improve but not usually resolve upon use of a non-prescription antifungal. Assuming that the self-diagnosis is correct, the most likely normal habitat of the causative agent as indicated by the pattern of infection and response to treatment is
- Animals (other than man)
 - Fresh water
 - Man
 - Plant debris
 - Soil
46. A patient presented with a number of hypopigmented lesions, primarily on the trunk of the body. The dermatologist suspected pityriasis versicolor. This diagnosis could be confirmed by microscopic observation of a skin scraping that showed
- Hyaline hyphae
 - Hyaline yeast cells
 - Hyaline yeast cells and short hyphae
 - Pigmented hyphae
 - Pigmented yeast cells
 - Pigmented yeast cells and short hyphae
47. A local Louisville, Kentucky company received a contract to demolish an abandoned four-story apartment building that had extensive vandalism to the windows such that birds were using the interior as a roost. Subsequently, seven of ten male workers involved in demolition and debris removal reported respiratory symptoms. This group of cases was subsequently identified as a localized outbreak of a fungal disease associated with exposure at the demolition site. The most likely diagnosis was
- Aspergillosis
 - Blastomycosis
 - Coccidioidomycosis
 - Histoplasmosis
 - Paracoccidioidomycosis
 - Sporotrichosis
- CRYPTOCOCCOSIS

48. A Hispanic male with a purulent nasal discharge was brought to the emergency room by family members. They reported that he was also diabetic. Discharge material was sent to the clinical laboratory for examination and culture. Microscopic examination revealed what appeared to be a portion of a fungal hypha that lacked septa. The most likely etiology of this infection is
- Aspergillus fumigatus*
 - Candida albicans*
 - Rhizopus oryzae*
 - Sporothrix schenckii*

49. Cellular targets for approved or in trial antifungal drugs

	<i>chitin biosynthesis</i>	<i>ergosterol biosynthesis</i>	<i>glucan biosynthesis</i>	<i>peptidoglycan biosynthesis</i>
A.	+	-	-	-
B.	-	+	-	-
C.	-	-	+	-
D.	-	-	-	+
<input checked="" type="radio"/> E.	+	+	+	-
F.	-	+	+	+
G.	+	-	+	+
H.	+	+	-	+
I.	+	+	+	+

50. Several virulence factors have been described for *Cryptococcus neoformans* in animal model infections, these factors include which of the following?
- Glial toxin
 - IgM degrading protease
 - Phenoloxidase (laccase)
 - Phospholipase
 - Toxin A
51. An 18-year-old female from El Paso was diagnosed with eumycetoma. The most likely activity that resulted in effective exposure to the etiologic agent was
- Breathing
 - Swimming
 - Taking care of a neighbor's pet
 - Walking barefoot in the yard
52. An AIDS patient presented with a several week history of fever and rapid breathing. Pulmonary X-ray showed a diffuse infiltration. An induced sputum stained with Giemsa show the presence of asci and ameboid shaped yeast cells. The causative organism most likely was
- Blastomyces dermatitidis*
 - Candida albicans*
 - Cryptococcus neoformans*
 - Histoplasma capsulatum*
 - Pneumocystis carinii*
 - Saccharomyces cerevisiae*

53. Chromomycosis and phaeohyphomycotic cysts share the common property of
- A. Airborne exposure to the infectious agent
 - B. Dematiaceous fungal etiologic agents
 - C. Occurring more frequently among immunocompromised individuals
 - D. Presence of hyaline hyphae in the lesion
 - E. Presence of yeast cells in the lesions

54. The partial acid-fastness of *Nocardia asteroides* is attributed to
- A. Actinomycolic acids
 - B. Arachidonic acids
 - C. Mycophenolic acids
 - D. Nocardic acids
 - E. Phenolic acids

55. Following treatment for a bacterial ear infection, a three-year old boy complains of discomfort on eating and drinking and of being hungry. White patches are noted on the buccal epithelia. The physician suspects thrush. Which of the following would confirm the diagnosis from a scraping of the white patch:
- A. Culture of *Actinomyces israelii*
 - B. Culture of *Candida utilis*
 - C. Microscopic observation of chlamydospores
 - D. Microscopic observation of yeast cells, hyphae and pseudohyphae
 - E. Microscopic observation of yeast cells with multiple buds

Use the following responses to select the virus family that has the characteristics named in the next four items (#56 - 59). A response may be used more than once.

- A. Adenoviridae ~~ENC~~ DNA
- B. Hepadnaviridae DNA
- C. Herpesviridae DNA
- D. Papovaviridae ~~RNA~~ DNA S
- E. Parvoviridae DNA DNA SS
- F. Poxviridae DNA

56. All steps of the replicative cycle take place in the cytoplasm Pox
57. Has a single-stranded genome Parvo
58. Has fibrils as its attachment protein Adeno
59. Produces alpha, beta, and gamma transcripts Herpes

Use the following responses to select the virus family that has the characteristics named in the next four items (#60 - 64). A response may be used more than once.

- A. *Arenaviridae* = SS ENV Seg
- B. *Bunyaviridae* = SS ENV Seg
- C. *Filoviridae* = SS ENV Non
- D. *Flaviviridae* + SS ENV
- E. *Orthomyxoviridae* = SS ENV Assoc Seg
- F. *Paramyxoviridae* = SS ENV Non
- G. *Picornaviridae* + + SS NAKED
- H. *Reoviridae* ds double capsid
- I. *Retroviridae*
- J. *Togaviridae* + SS ENV

- 60. ✓ Has a segmented negative-sense single-stranded genome *Arena + Bunya + Ortho*
- 61. ✓ The genome remains in the capsid for transcription *Reo*
- 62. ✓ In addition to the *Reoviridae*, which is a naked capsid virus? *Reo*
- 63. ✓ Can carry oncogenes *Reo*
- 64. ✓ Contains ribosomes and ambisense RNA *Arena*

Use the following responses to select the virus associated with the next three items (#65 - 67). A response may be used more than once.

- A. Epstein Barr virus
- B. Hepatitis B virus
- C. HIV-1
- D. HTLV-1
- E. Human herpes virus 8
- F. Human papillomavirus

- 65. ✓ Burkitt's lymphoma - *EBV*
- 66. ✓ Primary hepatocellular carcinoma *HBV*
- 67. ✓ Nasopharyngeal carcinoma *EBV*

For the following questions (#68 - 81), select the single best response.

- 68. ✓ Viruses enter cells by attaching via external proteins to receptors on the cell surface. This interaction
 - A. Can be prevented by specific antibodies to the external viral protein
 - B. Determines whether the naked genome of the virus is infectious
 - C. Determines whether the virus will replicate in the nucleus or cytoplasm
 - D. Occurs with the negative-sense single-stranded viruses but not others
- 69. ✓ Viruses that bud through the plasma membrane of the host at maturation
 - A. Include host cell lipids in the envelope
 - B. Insert polyproteins in the host membrane
 - C. Leave no trace of their presence
 - D. May not have an envelope

70. Analysis of a new virus isolated from the lungs of a patient with adult respiratory distress syndrome (pulmonary syndrome) reveals the genome to consist of a single piece of negative-sense single-stranded RNA. To which family is the virus most likely to belong?
- ~~B~~ ~~D~~ ~~E~~ A. *Arenaviridae* CRTH myxo Seg Non Seg
 B. *Bunyviridae* Bunyca or Paramyxo
 C. *Orthomyxoviridae* ARBMA Rhabdo
 D. *Togaviridae* Filo
71. The outcome of latency is associated with which virus?
- A. Ebola virus
 B. Herpes simplex virus
 C. Influenza virus
 D. Parvovirus B19
72. When the retrovirus genome enters a host cell, it is immediately
- A. Replicated into antisense DNA
 B. Replicated into antisense RNA
 C. Transcribed into messenger RNA
 D. Translated into polyproteins
73. Viral nonstructural proteins
- A. Determine species (host) specificity
 B. Elicit neutralizing antibody
 C. May have enzymatic activity
 D. A and B only
 E. A, B and C
74. The oral polio vaccine elicits which humoral immune response(s)
- A. IgA but not IgG
 B. IgE and IgA
 C. IgG and IgA
 D. IgG and IgE
 E. IgG but not IgA
75. Acyclovir is effective against herpes simplex virus because the drug
- A. Blocks budding of virions
 B. Blocks cell surface receptors
 C. Inhibits the replication of DNA
 D. Inhibits the viral RNA polymerase
76. The antiviral state
- A. Immediately protects the infected cell
 B. Is induced by dsRNA intermediates
 C. Is part of the antigen specific immune response
 D. A and B only
 E. A, B and C
77. Which step correctly continues the replicative cycle of HIV-1 after reverse transcription?
- A. Integration
 B. Replication
 C. Transcription
 D. Translation

78. Arthropod-borne togaviruses and bunyaviruses differ from each other in the ability to
- A. Cause enzootic infection only
 - B. Cause human infection only
 - C. Cause viremia
 - D. Establish vertical transmission in the vector
79. Epstein-Barr virus and cytomegalovirus differ from each other in
- A. Ability to establish latent infection
 - B. Asymptomatic shedding of virus
 - C. Their association with human cancer
 - D. A and B only
 - E. A, B and C
80. HTLV-1 and HIV-1 can be differentiated by the presence of
- A. *Gag, pol* and *env*
 - B. Integrase
 - C. Reverse transcriptase
 - D. *Tax* versus *tat*
81. The best approach to development of an antiviral vaccine against an oncogenic DNA virus would be
- A. Isolation of viral proteins from infected culture cells
 - B. Use of live attenuated temperature-sensitive virus
 - C. Microinjection of naked viral DNA
 - D. Use of whole killed virus

The following results were obtained from complement fixation tests for influenza A on several sets of paired acute and convalescent sera from different patients.

Patient	Acute serum	Convalescent
A	1:8	1:16 2X
B	<1:1	<1:1 1
C	1:256	1:256 1
D	1:2	1:64 32X

For the following three questions (#82 - 84), which set of results would substantiate each of the following diagnoses?

82. The patient had influenza in the distant past or had been vaccinated
 A C
83. The patient has never had influenza
 B
84. The patient had influenza when the first specimen was collected
 D

For the following questions (#85 - 90), select the single best response.

85. The usual outcome of the primary herpes simplex virus infection gingivostomatitis is establishment of viral latency in the
- A. B lymphocytes
 - B. Kidney cells
 - C. Skin cells
 - D. Trigeminal neurons
86. Chronic infection with hepatitis B virus can lead to
- A. Cirrhosis
 - B. Immune complex diseases
 - C. Primary hepatocellular carcinoma
 - D. A and B only
 - E. A, B, and C

87. In the United States, which of the following syndromes is associated most commonly with picornavirus infections?
 A. Hemorrhagic fever
 B. Infectious mononucleosis
 C. Meningitis
 D. Myoclonic jerks
 E. Poliomyelitis
88. The primary reason for administering rubella vaccine to infants and children is to prevent the occurrence of
 A. Congenital rubella syndrome
 B. Late sequelae in infected children
 C. Serious adult rubella
 D. Serious childhood rubella
89. A patient comes into the emergency room with multiple animal bites. He tells you he was camping when a raccoon entered his tent and began biting him. What type of care should you administer?
 A. Give him human rabies immune globulin
 B. Instill rabies antiserum into the wounds
 C. Immunize him with rabies vaccine five times over the course of a month
 D. Wash the wounds thoroughly with soap and water
 E. A, B and C only
 F. A, B, C and D
90. Large epidemics of influenza A virus infection occur because the virus undergoes shift in its
 A. Hemagglutinin
 B. Matrix protein 1
 C. Neuraminidase
 D. A and C only
 E. A, B, and C

Use the following case study to answer the next two questions (#91 - 92). Both questions are single best answer.

In January, a 6-month-old infant develops a cough and fever. Subsequently he has difficulty breathing. A chest X-ray shows a depressed diaphragm and hyperinflated lungs. The child is becoming cyanotic.

91. Which virus is most likely responsible?
 A. Influenza B virus
 B. Parainfluenza virus
 C. Respiratory syncytial virus
 D. Sin Nombre hantavirus
92. You decide to administer antiviral therapy to the child. Which antiviral should be given?
 A. Acyclovir
 B. Amantadine
 C. Ribavirin
 D. Saquinavir

For the following questions (#93 - 97), select the single best response.

93. A 45-year-old woman who had visited England in 1994 has come to you because she has increasingly been bothered by myoclonic jerks and loss of coordination. She had resided with relatives who raised sheep and cattle for over three months during her stay. Which of the following would demonstrate the likely etiologic agent of her infection?
 A. Autopsy demonstration of plaques, fibrils, and spongiform changes in brain tissue
 B. Electron microscopic demonstration of pleomorphic nucleocapsids
 C. Fluorescent detection of Negri bodies in neurons
 D. Demonstration of a four-fold rise in antibody titer to the agent
 E. Isolation of the viral genome from cerebrospinal fluid

94. A patient who has genital ulcers caused by herpes simplex virus type 2 has been using acyclovir periodically for prophylaxis against recurrent infections. The patient has come in because, this time, the virus erupted in spite of the drug. The most likely reason for the treatment failure is a mutation in the herpes simplex gene that encodes the
- A. Attachment protein gB
 - B. Immune evasion protein gE
 - C. RNA polymerase
 - D. Thymidine kinase
95. The E6 and E7 proteins of papilloma viruses, the E1A and E1B proteins of adenovirus, and the T antigen of polyoma viruses all function in a similar manner to induce transformation of host cells by
- A. Binding to and activating p53 and RB
 - B. Binding to and inactivating p53 and RB
 - C. Enhancing transcription of p53 and RB
 - D. Repressing transcription of p53 and RB
96. The report from the pathology laboratory on a patient's PAP smear includes a notation about the presence of koilocytosis. This word describes the presence of cytopathic changes in the epithelial cells indicating a possible infection with
- A. Cytomegalovirus
 - B. Herpes simplex virus
 - C. Human papillomavirus
 - D. Molluscum contagiosum virus
97. Two days following a meal at Café LeGrease, a patient comes in with severe diarrhea and vomiting that has lasted 24 hours. She reports that two of her friends who had also eaten at the Café were sick. The most likely etiologic agent of her infection is
- A. Coronavirus
 - B. Enterovirus
 - C. Norwalk virus
 - D. Rotavirus

Use the following case study to answer the next two questions (#98 - 99). Both questions are single best answer.

A mother calls you at 4:30 pm, concerned that her six-year-old child is napping excessively, lethargic, and has a temperature of 39°C (about 102°F). You ask her to keep watching the child and to call you if his condition changes. At 10:30 pm the mother calls again. The child has vomited several times, is still napping, and is complaining of a headache. You examine the child at 11:30 PM in the emergency room and note that the lethargy is now pronounced. The child rouses only when you turn his head and then he complains of headache. You also observe a faint rash over the child's back.

98. What is the likely agent of this disease?
- A. Alphavirus ^{EB}
 - B. Enterovirus
 - C. Flavivirus ^{MCV}
 - D. Hantavirus
99. Which diagnostic test(s) could provide you with immediate evidence that a virus is responsible for the child's disease?
- A. Culture of stool, throat, and cerebral spinal fluid for viruses
 - B. Examination of cerebral spinal fluid for cells, glucose and protein
 - C. Polymerase chain reaction testing of cerebral spinal fluid for viral genomes
 - D. Serologic testing of cerebral spinal fluid for viral antibodies

For the following questions (#100 - 114), select the single best response.

100. ✓ A previously healthy but unvaccinated child is brought to your office by her aunt. The child has coryza (runny nose), is coughing, and has pronounced conjunctivitis. She complains that the light hurts her eyes. What symptom would you expect the child to develop next? *measles*
- A. Encephalitis
- B. Koplik's spots
- C. Pneumonia
- D. Rash
101. ✓ A heroin addict who has been HBs antigen positive for 10 years, develops acute fulminant hepatitis and dies within 10 days. Which one of the following laboratory tests would contribute most to a diagnosis? D
- A. Anti-HBc antibody
- B. Anti-HBs antibody
- C. Delta agent detection
- D. HBe antigen detection
102. ✓ Hepatitis C virus infection
- A. Can be diagnosed easily by serology
- B. Carries little risk of chronic hepatitis
- C. Is caused by a flavivirus
- D. Is spread by the fecal-oral route
103. ✓ A traveler who had acquired a dengue infection while in Thailand a year ago recovered uneventfully after the disease ran its course. Now the patient, who has been traveling in Mexico and the Caribbean, has reported symptoms of fever, intense back and joint pain, and fever. What could happen to this patient?
- A. Development of concomitant encephalitis with paralysis
- B. Development of hemorrhagic fever and shock due to the previous antibodies
- C. Development of suppression of cell-mediated immunity
- D. Nothing more will happen, the previous antibodies will prevent viremia
104. ✓ Some of the oncogenic retroviruses carry oncogenes (*v-onc*) closely related to normal cellular oncogenes (*c-onc*). Which statement concerning oncogenes is correct?
- A. A retrovirus is required to turn on a *c-onc* gene
- B. Several human *c-onc* have been associated with cancers
- C. Several *v-onc* have been associated with human cancers
- D. The *c-onc* are closely related to transposons found in bacteria
105. A three-year-old child was diagnosed with chickenpox three days after visiting his grandfather who was undergoing chemotherapy for chronic lymphocytic leukemia. Ten days after the child's visit, the grandfather developed intense pain across his left chest, followed by the appearance of a crop of coalescing vesicles. What does the grandfather have and how did he get the infection?
- A. Chickenpox, a reactivation of his own virus
- B. Chickenpox, acquired from the grandchild
- C. Shingles, a reactivation of his own virus
- D. Shingles, acquired from the grandchild
106. ✓ The protein Tax produced by HTLV-1 transactivates its own LTR and
- A. Many other cellular and viral genes
- B. No other cellular or viral genes
- C. Other viral promoters only
- D. The cellular IL-2 gene only

107. You have a new patient whose EIA and Western blot for HIV-1 is positive. You want to begin antiviral therapy against the HIV-1. Which of the following constitutes appropriate HIV-1 therapy?
- A. Acyclovir, AZT, and ribavirin
 - B. AZT only
 - C. AZT, ddI, and saquinavir
 - D. Saquinavir only
108. In HIV-1, the first cell line infected and the type of infection caused is represented by which combination?
- A. CD4 lymphocyte, lytic outcome
 - B. CD4 lymphocyte, persistent outcome
 - C. Macrophage, lytic outcome
 - D. Macrophage, persistent outcome
109. The differences between a plus-sense single-stranded RNA (plus) virus and a negative-sense single-stranded RNA (minus) virus that infect humans include
- A. The (minus) virus carries its own RNA polymerase; the (plus) virus does not
 - B. The (minus) virus is always enveloped; the (plus) virus may be enveloped
 - C. The (minus) virus is translated immediately; the (plus) virus is not
 - D. A and B only
 - E. A, B, and C
110. A patient who has been under treatment for HIV-1 reports having night sweats, fever, and weight loss. His viral load has risen two logs and his CD4 count has dropped to 350/ml. What do you expect to occur next?
- A. Development of malignancies and/or neurologic symptoms but no opportunistic infections
 - B. Development of opportunistic infections and an increase in his CD4 counts over time
 - C. Development of opportunistic infections but no further manifestations
 - D. Development of opportunistic infections, malignancies, and/or neurologic symptoms
111. Four toddlers from a daycare center are kept home for a week with febrile diarrhea. Two days after they return to care, four more toddlers in their group go home with diarrhea. What virus is likely and how was it spread?
- A. Adenovirus, by the caregivers
 - B. Norwalk virus, by the toddlers
 - C. Rotavirus, by the caregivers
 - D. Rotavirus, by the toddlers
112. A family of five went on a picnic in the Ozarks (^{St. Louis}Missouri). They left the picnic grounds early because the mosquitoes were ferocious. Five days after the picnic, three of the family members developed fever, chills, and generalized aches. Two felt better in a few days, but the youngest (a child of 4 years) had continued fevers, developed limb palsy and tremors, and then suffered convulsions. What virus genus and species is most likely responsible for their infections?
- A. The alphavirus, eastern equine encephalitis virus
 - B. The bunyavirus, California encephalitis virus
 - C. The enterovirus, Coxsackie A virus
 - D. The flavivirus, St. Louis encephalitis
113. Development of a vaccine against HIV-1 is exceedingly difficult because the virus
- A. Carries a reverse transcriptase
 - B. Causes immunosuppression
 - C. Has a high mutation rate
 - D. Hides within macrophages
 - E. Is resistant to antiviral drugs

114. The primary rationale for administering inactivated poliovirus vaccine (IPV) first followed by oral poliovirus vaccine (OPV) for prevention of poliomyelitis is
- A. To allow the administration of OPV to immunocompromised patients
 - B. To obtain long-term immunity by including IPV in the regimen
 - C. To prevent spread of the OPV virus strains within the community
 - D. To provide antibodies to neutralize any virus that enters the blood

Use the following responses to select the one virus that is most often associated with each of the next six numbered symptoms/diseases (#115 - 120). A response may be used more than once.

- A. Adenovirus
- B. Coxsackie B virus
- C. Dengue virus
- D. Epstein Barr virus
- E. Herpes simplex virus
- F. Parainfluenza virus
- G. Parvovirus B 19
- H. Poliovirus
- I. Varicella zoster virus
- J. Yellow fever virus

115. Jaundice ✓ yellow fever
116. Croup ✓ Parainfluenza
117. Pharyngoconjunctivitis ✓ Adenovirus
118. Anemia ✓ Parvovirus
119. Nasopharyngeal carcinoma ✓ EBV
120. Myocarditis ✓ Coxsackie