MULTIPLE CHOICE FORMAT

Each item or incomplete statement in this section is followed by answers or by completion of the statement. Circle the one lettered answer or completion that is best in each case.

Question 1. Which of the following are two hallmarks of the adaptive immune system?
A. Immediate and Broad
B. Specificity and Memory
C. Innate and Short
D. Non-Specific and Fast
E. Immediate and Passive

Question 2. All of the following are true about CD8 T cells EXCEPT that they
A. are part of adaptive immunity.
B. respond to antigenic peptides presented by MHC class I molecules.
C. respond to antigenic peptides presented by MHC class II molecules.
D. are major mediators of cytotoxicity against virus-infected host cells.
E. can make IFN-γ.

Question 3. All of the following are important functions of Type I IFNs EXCEPT that they
A. induce resistance to viral infections.
B. promote MHC class I expression.
C. activate NK cell cytotoxicity.
D. are important growth and proliferation factors for B cells.
E. are part of innate defense mechanisms.

Question 4. Hematopoietic stem cells are precursor cells for all of the following except
A. lymphocytes.
B. other stem cells.
C. erythrocytes.
D. vascular smooth muscle cells.
E. megakaryocytes.

Question 5. IL-12 is important for which of the following?
A. CD8 Expression
B. TNF Production
C. IFN-γ Production
D. Eosinophil Differentiation
E. CD28 Expression

Question 6. The Thoracic duct
A. facilitates transfer of maternal antibody to the fetus.
B. was a major aqueduct in ancient Rome.
C. is the lymphocyte port of entry to the blood for the lymphatic system.
D. is part of the air venting system in the BMC.
E. is the Dendritic cell port of entry for travel from the periphery to the lymph node.
Question 7. Upon his return from South America, an otherwise normal 12 year old boy is found to be infected with helminth parasites. He is doing well because of an endogenous Th2 type cytokine response. Which of the following would you expect to see?

A. IgA
B. CD4 T cell IFN-γ Production
C. IL-5
D. IL-12
E. CTL

Question 8. An individual is genetically deficient for the IFN-γ receptor. Which of the following would you expect to be blocked?

A. NK Cell Development
B. Cell Surface Expression of Functional T Cell Receptor for Antigen on Mature T Cells
C. Antimicrobial Defense
D. IgM Antibody Responses
E. Immunoglobulin Gene Rearrangement

Question 9. All of the following can be part of innate immune responses EXCEPT

A. alternate pathway of complement activation.
B. natural killer cells.
C. B cells.
D. MAC.
E. macrophages.

Question 10. The major pathways to Th1 type T cell responses during an infection includes all of the following EXCEPT

A. CD4 T cells producing IL-5.
B. innate IL-12.
C. NK cell IFN-γ production.
D. CD4 T cells producing IFN-γ.
E. iNOS.

Question 11. Which of the following can NOT be found in the lymph node?

A. lymphoid follicle
B. red pulp
C. B cells
D. cortex
E. T cells

Question 12. The proteasome is

A. the Cuisinard™ equivalent of antigen processing and presentation to CD8 T cells.
B. a component in phagolysosomes.
C. stored in the lytic granules of cytotoxic CD8 T cells.
D. associated with the invariant chain (Ii).
E. secreted into the blood.
Question 13. All of the following are functions of IgG EXCEPT
A. opsonize bacteria.
B. activate complement.
C. cross the placenta.
D. be secreted into mucus.
E. facilitate ADCC.

Question 14. Which of the following statements about endotoxic shock is NOT true?
A. It is induced by high concentrations of lipopolysaccharide endotoxin from gram negative bacteria.
B. The liver is affected.
C. It can result in conditions incompatible with life.
D. The cytokines TNF, IL-1 and IL-6 are induced under these conditions.
E. MHC class I molecules aggravate the condition.

Question 15. Which of the following segments of immunoglobulin light chain gene can be rearranged at the DNA level during antigen-independent B cell maturation and in which order?
A. D to J and then V to DJ
B. V to J and then VJ to CI \( \lambda \)
C. J to D and then V to JD
D. D to J and then V to DJ and then VDJ to C\( \gamma \)
E. V to J and then VJ to Cm\( \kappa \)

Question 16. The signal transducers and activators of transcription (STAT) molecules are important for which of the following?
A. Cytokine Binding By Cells of the Immune System
B. Activation of Apoptosis in Response to TNF
C. Promotion of Gene Expression Following Cell Exposure to Particular Cytokines
D. Release of Cytotoxic Granules from CTL or NK Cells
E. Activation of Erythrocytes

Question 17. Which of the following require the thymus?
A. Rearrangement of Genes for the T Cell Antigen Receptor and T Cell Maturation
B. Differentiation of Granulocytes
C. B Cell Differentiation
D. Rearrangement of Germline Gene Segments to Code for Variable Portions of Antibody Molecules
E. Antigen Processing and Presentation of Materials from a Peripheral Infection

Question 18. Essential steps in cytolysis of target cells by either CTL or NK cells include all of the following EXCEPT
A. positive stimulation of cytotoxic cell by target cell.
B. delivery of a lethal hit.
C. deposition of perforin on the target cell surfaces.
D. release of granzymes from the cytotoxic cells.
E. release of IFN-\( \gamma \) from the cytotoxic cells.
Question 19. Chemokines are
A. low molecular weight cytokines important in inflammation.
B. cytokines important in proliferation.
C. activators of complement.
D. factors promoting chaos.
E. differentiation cytokines.

Question 20. You would want the cells from a potential transplantation donor to have or do all of the following EXCEPT
A. a match for class II MHC.
B. a match for class I MHC.
C. stimulate proliferation of your peripheral white blood cells.
D. be free of HIV.
E. be matched for blood group antigens.

REALLY SHORT ANSWER FORMAT

Question 1. Which immune system components are most important for protection during secondary exposure to influenza virus? How do they work? Why are they important during challenges with this agent? Why are they less effective during primary infections?

Question 2. An individual has a mutation severely inhibiting the natural function of the transporter associated with antigen processing (TAP). Which antigen processing pathway would be rendered inefficient? What classes of agents would the individual have a problem attacking? Why?

Question 3. Describe the steps for immunoglobulin heavy chain class switching from IgM to IgG. Are the events antigen dependent? Do they always result in functional products? What are the functional consequences of successful completion to the host? Are the events antigen dependent, and does class switching always result in functional products? (Unlikely, since in the early maturation in the B cell, somatic hypermutation is occurring.) B cells containing IgM bind to T cell receptor, and vitamin D is needed for this process. The CD40 ligand activates the B cell, and the CD40 ligand activates the CD40 receptor expressed on the cell surface. If it can't bind to the cell surface, CD40 ligand won't get activated to become CTLs that would attack the infected cell.
Question 4. What the abbreviation TNF stand for? How is it induced? What does it do under low, intermediate and high dose conditions? Tumor necrosis factor. It is induced along with IL-1 + IL-6 in response to certain stimuli like LPS (endotoxin) from APC's, especially macrophages. Low dose: inflammation (acute) Intermediate: fever, stimulation acute phase protein production from the liver High: can lead to septic shock and death.

Question 5. What are the components of the T cell receptor for antigen (TCR)? CD3, CD4, CD8

Question 6. What are three functions of complement?

Question 7. You are a physician in the emergency room at Boston General. A young boy of about 8 years of age, has stepped on a rusty nail. His mother is not certain that he has ever been vaccinated for protection against tetanus toxin. Based upon what you have learned, what would you do? Administer both the tetanus vaccine and anti-tetanus gamma globulin. The immunoglobulin protects him now and the vaccine will protect him in the future. You do, however, have to administer them in separate areas of the body, so the Ig doesn't neutralize the vaccine.

Question 8. Explain delayed type hypersensitivity (DTH). How might you induce it? What components of the immune system are required? DTH = type IV hypersensitivity. Persensitized CD 4+ T cells encounter antigen again. CD 4+ T cells provide help to B cells (via cytokines) which secrete IgG antibodies. IFN-gamma and IL-12 stimulate CD 4+ T cells to become Th1, and in turn stimulate Th1 cells to produce IFN-gamma. You could induce it by exposing some to antigen and then later challenging them with the same antigen. (tuberculin skin test is one example of DTH). It is not an immediate response, but rather takes 48-72 hours to elicit. Both innate and adaptive immunity involved, and it is cell mediated.
Medical Microbiology Exam—Bacteriology Block
May 13, 2003

Instructions:
1. Fill in name and count pages—there should be 8 pp (42 questions).
2. Read questions carefully—format varies.
3. For multiple matching format, read through all the choices in order to pick the one that best, i.e., most specifically, fits each statement.

Short answer section. (Total of 28 points)

1. (2 pts.) One mechanism of host defense of deep tissue and blood is iron starvation. The human host utilizes the iron transport protein transferrin in order to keep free iron concentrations low in the blood. Identify one mechanism by which pathogenic bacteria are able to scavenge iron in the host.
   
   expressing transferrin/lactoferrin receptors for human transferrin/lactoferrin increases [Fe] in the blood

2. (4 pts.) Group A strep is capable of causing a variety of clinical syndromes. Name three of them.
   
   A. (3 pts.) Name three of them.
   
   pharyngitis
   impetigo
   toxic shock syndrome

B. (1 pt.) Describe one factor that is thought to contribute greatly to the diversity in clinical manifestations?
   
   horizontal genetic exchange between GAS bacteria
3. (7 pts.) Compare and contrast *Streptococcus pneumoniae* (pneumococcus) and *Mycoplasma pneumoniae* in terms of:


C. (1 pt.) Identify one virulence factor that contributes to the ability of the organism(s) named by you above in (B) to cause bacteremia.

D. (2 pts.) Are both bacteria generally susceptible to β-lactam antibiotics? Why or why not? *S. pneumoniae* is because it has a cell wall. *M. pneumoniae* is not because it lacks one.

4. (2 pts.) Both *Shigella* and enterohemorrhagic *E. coli* (EHEC) are notable for their low infectious dose following ingestion.

(A) Name a property of the bacteria that makes this behavior possible.

- Acid sensitivity

(B) EHEC and *S. dysenteriae* also cause hemolytic-uremic syndrome (HUS). What product do they produce that is primarily responsible for inducing HUS?

- Shiga (or shiga-like) toxin

5. (4 pts.) *Mycobacterium tuberculosis*

A. (1 pt.) Does infection by *Mycobacterium tuberculosis* necessarily mean that the person has active disease?

- No

B. (1 pt.) How is infection (vs. disease) most frequently recognized in people? (diagnosed)

- Positive PPD test

C. (1 pt.) What is the relative bacterial load in persons with disease vs. persons with simple infection?

- With disease: relatively high load. With infection: relatively low load.

D. (1 pt.) How does this affect how one pharmaceutically treats the two conditions? (don’t need to give any specific drug names.)

- Treat disease with 2 or more drugs. Treat infection with one.

6. (2 pts.) Identify two ways in which normal flora provides a measure of defense against disease.

- Compete for attachment sites
- Secretes bacteriocins
7. (3 pts.) Endotoxin.
   A. (1 pt.) What is endotoxin? [lipopolysaccharide]
   B. (1 pt.) What class of bacterium produces it? [gram \(-\)]
   C. (1 pt.) Identify the most important structural difference between endotoxin and exotoxins.
   [endotoxin is protein; exotoxin has a lipid core with sugar]

8. (2 pts.) A-B model toxins.
   A. What is the function of the B subunit?
   [binding specificity]
   B. Of the A subunit?
   [enzymatically active subunit]

9. (2 pts.) The first virulence factors identified were toxins. Describe two ways in which the toxins that had been identified were tested for a **bona fide** role in disease.
   - purified extract of the toxins could alone cause disease (elicit symptoms)
   - strains identical in every way except for ability to produce toxin:
     - no toxin \(\rightarrow\) no disease
     - toxin \(\rightarrow\) disease
Multiple choice section. (Total of 33 points)

Questions 10 to 14. Pick from the list of choices given below the one that best fits each statement. Each answer may be used once, more than once, or not at all.

A. *Salmonella typhi*  
B. *Yersinia pestis*  
C. *Listeria monocytogenes*  
D. *Group A streptococci*  
E. *Mycobacterium tuberculosis*  
F. *Borrelia burgdorferi*  
G. *Legionella pneumophila*  
H. *Mycoplasma pneumoniae*  
I. *Fusobacterium* species (an anaerobe)

10. This bacterium is of low inherent virulence, and is part of the flora found in all individuals. It causes disease only in conjunction with other bacteria. [ ]

11. Actin-based motility, which permits cell-to-cell spread without exposure to the extracellular environment, coupled with the ability to survive within macrophages, make this food-borne highly invasive in susceptible individuals. This group includes pregnant women, where the bacteria may cross the placental barrier and infect the fetus. [ ]

12. Certain serotypes of this genetically diverse pathogen tend to produce severe invasive infections in which spread occurs primarily along fascial planes. This form of infection, which had become rare, has increased in frequency in recent years. [ ]

13. This organism is transmitted to the host by the bite of an infected arthropod. It grows to high concentrations in the blood, in part by utilizing a type III secretion system. [ ]

14. This pathogen enters intestinal epithelial cells by using type III (contact dependent) secretion to inject proteins into the host cell, thereby inducing actin rearrangements that result in uptake of the organism. After penetrating the gut epithelium by this mechanism, the bacteria reside in macrophages and are spread systemically. [ ]
Questions 15 to 19. Pick from the list of choices given below the one that best fits each statement. Each answer may be used once, more than once, or not at all.

A. EHEC (enterohemorrhagic E. coli)
B. ETEC (enterotoxigenic E. coli)
C. EPEC (enteropathogenic E. coli)
D. Shigella sonnei
E. Shigella dysenteriae
F. Clostridium botulinum
G. Clostridium tetani

15. This pathogen secretes an AB model toxin that directly acts on neurons at the neuromuscular junction.  

16. This is an intracellular pathogen that can cause hemolytic-uremic syndrome.  

17. The most common cause of kidney failure in children under 10 years of age in the U.S. due to the secretion of a toxin that inhibits protein synthesis.  

18. This pathogen produces watery diarrhea due to the action of a cholera-like toxin.  

19. This pathogen attaches to enterocytes, causes loss of microvilli, and causes growth of a pedestal beneath the bacterium, but does not produce Shiga-like toxin to cause systemic symptoms.
Questions 20 to 25. Pick from the list of choices given below the one that best fits each statement. Each answer may be used once, more than once, or not at all.

A. Group A streptococcus (GAS)
B. Streptococcus pneumoniae
C. Borrelia burgdorferi
D. Mycoplasma pneumoniae
E. Legionella pneumophila
F. Mycobacterium tuberculosis
G. Clostridium botulinum
H. Clostridium tetani
I. Clostridium difficile
J. Vibrio cholerae

20. Spastic paralysis caused by blockade of inhibitory nerve conduction in the central nervous system is the hallmark of the disease caused by this organism. H

21. While colonization of the colon by this organism is not infrequent, suppression of the normal flora—often by antibiotic treatment—is required for growth and toxin production to reach levels high enough to cause serious disease. I

22. This organism produces an “A subunit” that ADP-ribosylates a host cell G protein. J

23. The exclusive reservoir of infection for this rod is humans; its spread is facilitated by a lipid-rich cell wall that allows it to withstand drying. F

24. This bacterium can chronically infect multiple tissues. It makes no toxins, but can elicit vigorous inflammatory reactions due to the large number of lipoproteins it expresses. C

25. May cause boils, furuncles, cellulitis, and pneumonia in previously healthy hosts. B X A
Questions 26 to 31. Pick from the list of choices given below the one that best fits each statement. Each answer may be used once, more than once, or not at all.

A. Group A strep (*Streptococcus pyogenes*)
B. *Streptococcus pneumoniae* (pneumococcus)
C. *Mycoplasma pneumoniae*
D. *Legionella pneumophila*
E. *Mycobacterium tuberculosis*
F. *Neisseria meningitidis*
G. *Neisseria gonorrhoeae*
H. *Treponema pallidum*

26. This pathogen, which is typically acquired from other individuals, can trigger rheumatic fever. **A**

27. This is an encapsulated pathogen that can avoid immune clearance in part by antigenic and phase variation of a variety of surface structures, such as pili and Opa proteins. **F**

28. An antiphagocytic mechanism of this pathogen is based on an abundant surface protein that is also used for typing outbreak strains. **A**

29. This sexually transmitted bacterium acquires iron by binding the host iron-transporting protein transferrin. **C**

30. This gram positive mucosal pathogen secretes a protease that specifically cleaves IgA. **B**

31. Outbreaks are associated with contaminated water systems that result in aerosol mists containing this pathogen growing within amoebae. **D**

Questions 32 to 34. ATYPICAL PNEUMONIA. Modified True-False.

A. *Mycoplasma pneumoniae*
B. *Legionella pneumophila*
C. Both of the above
D. Neither of the above

32. Acquired from infected individuals by respiratory droplets and secretions. **A**

33. In parasitizing the eukaryotic cell, this pathogen utilizes a specialized secretion system type IV related to those that transfer DNA from one bacterium to another. **B**

34. Has no cell wall and thus is not susceptible to antibiotics that inhibit cell wall synthesis. **A**
Questions 35 to 40. *Mycobacterium tuberculosis* and *Treponema pallidum*. Modified True-False

A. *Mycobacterium tuberculosis*
B. *Treponema pallidum*
C. Both of the above
D. Neither of the above

35. May remain latent in individuals for years. C

36. Testing for an immunological response to this organism is an essential element of diagnosis of this infection. A X (C)

37. Gram staining of this organism is an essential element of diagnosis of this infection. D

38. Toxin produced by this bacterium is responsible for the extensive tissue damage seen in chronic infection. D

39. Tough cell wall an essential aspect of its ability to withstand host defenses. A

40. Bacterial motility promotes spread of the organism throughout the body. B

Questions 41 to 42. AGENTS OF DIARRHEA. Modified True-False.

A. *Clostridium difficile*
B. *Vibrio cholerae*
C. Both of the above
D. Neither of the above

41. Diarrhea due to elaboration of bacterial toxin. C

42. The ability of this organism to sporulate allows it to persist for months on inanimate objects and contributes to its ability to cause recurrent infections. A

[Diagram]
Medical Microbiology Virology Block  
Mid-semester Exam—March 19, 2003

Read each question carefully. The format changes.

**PART 1 Answer as True or False by writing T or F next to each statement**

**Question 1.**

A. Viruses seldom have intracellular stages and infection of a host is primarily associated with viremia, an episodic wave of virus in the blood or extracellular body fluid  
**F**

B. Viruses typically contain both RNA and DNA as their genetic material  
**F**

C. Non-enveloped viruses are budding viruses that lack envelope protein but which possess host cell lipid as the major component on their exterior surface  
**F**

D. To yield a productive infection and cause disease, all viruses must at some point during the infection process produce -mRNA  
**T**

E. To yield a productive infection and cause disease all viruses must at some point during the infection process produce +mRNA  
**F**

F. Parenteral administration refers to administration via the alimentary tract such as oral administration of drugs  
**F**

G. Both Chickenpox and smallpox are caused by Pox viruses  
**T**

**Question 2:** Select & circle the one term/statement not usually associated with mature viral particles

a. Envelope  
b. capsid  
c. nucleocapsid  
d. lipid  
e. icosahedral or helical structure  
f. RNA or DNA  
g. mitochondria  
h. matrix protein

**Question 3:** Select and circle the one term/state/event not typically associated with any virus or not associated with the process of viral infection

a. Viremia  
b. cell lysis  
c. early genes  
d. late genes  
e. Fc receptor  
f. endocytosis  
g. mutation
QUEST 4-14. Circle the lettered choices of the answer you wish to select.

Question 4: **Circle** the statement that is **NOT TRUE** of picornaviruses.

a. Are large viruses similar in size to Poxviruses
b. Are RNA viruses
g. Includes all three serotypes of polioviruses
d. Insensitive to ethers, non-enveloped icosahedral structures
e. Includes Coxsackie virus which was first isolated in Coxsackie, NY
f. Includes all Rhinoviruses
g. Replicate in the cytoplasm
h. Some can cause hepatitis

Question 5: **Circle** the statement that is **NOT TRUE** of Alphaviruses.

a. Belong to the family Togaviridae
b. Are RNA viruses
c. Are transmitted by insects including mosquitoes
d. Are responsible for transmitting the Eastern, Western and Venezuelan Encephalitis
e. Are transmitted exclusively by blood transfusions

Question 6: **Circle** the statement that is **NOT TRUE** of mononegavirales.

a. Include the bullet-shaped Rhabdoviruses
b. Are negative strand RNA viruses
c. Are insensitive to ethers because they are not enveloped viruses
d. Includes the family paramyxovirus
e. Brings in and makes its own RNA polymerase
f. Has helical symmetry
g. Replicate in the cytoplasm

Question 7: **Circle** the statement that is **NOT TRUE** of Rotavirus.

a. Replicate in the cytoplasm
b. Have double stranded segmented RNA genomes
c. Are insensitive to ethers because they are not enveloped viruses
d. As their name implies, their appearance is round, like a wheel, and not rod-shaped
e. It is unclear whether it brings in its own RNA polymerase
f. Has helical symmetry

Question 8: **Circle** the statement that is **NOT TRUE** of HIV.

a. Establishes latency or persistence
b. Have -RNA genomes
c. All utilize and bring in their own reverse transcriptase
d. Have non-segmented genomes
e. Are budding viruses
f. Utilize receptors present on T cells and macrophages for infection

25 pts
Question 9: Circle the statement that is NOT TRUE of hepatitis B Virus

- Infects liver cells
- Have an RNA genome that is converted to a DNA genome
- Is a budding, enveloped virus
- Brings in its own reverse transcriptase/polymerase
- Is a close serotype of Hepatitis A and hepatitis C virus
- Can establish latency

Question 10: Circle the statement that is NOT TRUE of Papillomaviruses

- Some isolates can cause cancers
- Infects epithelial cells
- Is related to JC virus, BK and SV40 virus which are polyomaviruses
- DNA sequence for the virus is detectable in 95% of all cervical cancers
- Is always associated with cancers

Question 11: INFLUENZA virus causes one of the major epidemic diseases in the developing world. Which is NOT TRUE of the virus

- Its hemagglutinin and neuraminidase proteins undergo genetic variation
- Previous exposure ensures protection from subsequent exposure and infection
- Shows only antigenic drift but not antigenic shift
- Some animals can be reservoirs for certain strains
- Like hepatitis causing viruses, there are three major types
- Its segmented genome can undergo recombination

Question 12: Circle the statement that is NOT TRUE of Herpes viruses

- Epstein Barr Virus (EBV) is a herpesvirus and is the causative agent of infectious mononucleosis
- Herpes simplex 1, the agent most associated with cold sores, is an alphaherpesvirus
- Herpes simplex 2, the agent most associated with genital lesions, is an alphaherpesvirus
- Cytomegalovirus (CMV) is a betaherpesvirus.
- Herpes viruses do not cause Kaposi’s sarcoma

Question 13: Which of the following is not typically true of mutations

- Can occur during replication of viral nucleic acid
- Occurs at a higher rate with viruses using RNA polymerases to replicate their genomes
- Can be introduced into viral genomes by chemical and physical means
- Can be selected for by drugs such as AZT
- Attenuation is not a type of mutation.
Question 14: A 3 year old child presents with symptoms of coryza, conjunctivitis, low-grade fever and Koplik's spots. The causative agent of this disease most likely belongs to which group of virus? **Select the one answer that best fits**

- a. Paramyxovirus
- b. Orthomyxovirus
- c. Picornavirus
- a. Herpesvirus
- e. Hepadnaviridae
- f. Adenovirus

**FILL IN THE BLANKS BY GIVING THE NAMES/DEFINITIONS ECT. REQUESTED**

**Question 15:** Fill in the blanks, naming the type of infection that each definition describes. Ex: early infection, late infection, acute infection etc.

- a. In this infection virus is rapidly produced initially, but then production stops and remains dormant for unspecified periods of time. **Latent infection.**

- b. This type of infection describes low level of continuous production of virus. Typically the cells producing the virus are not killed and immunity is insufficient to eliminate the virus. **Persistent Infection**

- c. This type of infection describes rapid viral production in cells leading to cell bursting / immediate cell death. **Acute Infection**

**Question 16:** Define the terms below limiting your answer to the space provided.

- a. Transduction - the transformation of a virus from a non-cancerous form to a cancerous form, i.e. it will cause cancer when it transfers.

- b. Exanthem - rash on external surfaces (e.g. forehead)

- c. Enanthem - rash on internal surfaces such as the inside of the mouth / cheeks

**Question 17:** All of the following are members of the Paramyxoviridae family. For each of the genus/subfamily names given below, name one clinically significant example of the viruses.

- Paramyxovirus
- Rubulavirus
- Pneumovirus
- Morbillivirus

- **Mumps** - Parainfluenza Type 1 or 2
- **Germane** - Mumps or Parainfluenza 2
- **Respiratory syncytial virus**
- **Measles**
PART II . ANSWER 2 OF THE FOLLOWING 4 QUESTIONS

For each question in this section, circle the name of the virus you intend to describe and complete the information below for that virus.

If the request for an answer in not applicable, write NOT APPLICABLE

Question 1.

a. Family, Genus or Order

b. Disease:

peu (paralysis)

c. Modes of transmission

oral

d. Port of Entry/Infection surface

mucosa of GI

e. Immediate shedding From inoculation site?

YES or NO (Circle one)

f. Mode of dissemination in host

blood, lymph, tissues, organs

g. 1° Tissues/Organs Infection (replication)

blow, lymph nodes, larynx, laryng

h. 2° Tissues/Organs Infection (replication)

anterior horn of CNS

I. Cellular/subcellular basis Of disease

lysis

J. Significant clinical symptoms

paralysis

k. Control/Prevention

vaccines (SOB or attenuated)

self-killed

50
Circle the name of the virus you intend to give details for. Then, complete the information below for the virus selected giving answers that relate to infection in an otherwise healthy host. If the request for an answer is not applicable, write NOT APPLICABLE.

**Question 2.**: HEPATITIS B VIRUS or HUMAN IMMUNODEFICIENCY VIRUS:

a. Family, Genus or Order  
   - Hepatoviridae

b. Disease:  
   - AIDS

c. Modes of transmission:  
   - Vertical?  
   - Sexual, blood products, needle use

d. Port of Entry/Infection surface:  
   - Infects HB at inoculation site (muscle or folds of blood)

e. Immediate shedding from inoculation site?  
   - YES or NO (Circle one)

f. Mode of dissemination in host:  
   - Blood, lymph, w'u and CD4+ Tcells or it.

g. 1º Tissues/ Organs Infection (replication):  
   - Replicates in HB and CD4+ Tcells

h. 2º Tissues/ Organs Infection (replication):  
   - NOT APPLICABLE

I. Cellular/subcellular basis of disease:  
   - Destruction Tcells (CD4+) leads to immunodeficiency

j. Significant clinical symptoms:  
   - Persistent opportunistic infections (e.g., CMV + PCP)
   - CD4+ Tcell count

k. Control/Prevention:  
   - Safe sex (i.e., condom use), no IV drug use.
Circle the name of the virus you intend to give details for. Then, complete the information below for the virus selected giving answers that relate to infection in an otherwise healthy host. If the request for an answer in not applicable, write NOT APPLICABLE.

**Question 3. VIRUS:**

a. Family, Genus or Order

b. Disease:

c. Modes of transmission:

d. Port of Entry/Infection surface:

e. Immediate shedding From inoculation site? YES or NO (Circle one)

f. Mode of dissemination in host:

g. 1\(^\circ\) Tissues/Organs Infection (replication):

h. 2\(^\circ\) Tissues/Organs Infection (replication):

I. Cellular/subcellular basis Of disease

j. Significant clinical symptoms

k. Control/Prevention
Circle the name of the virus you intend to give details for. Then, complete the information below for the virus selected giving answers that relate to infection in an otherwise healthy host. If the request for an answer is not applicable, write NOT APPLICABLE

**Question 4. VIRUS:**  
HERPESVIRUS

i. Family: __________________________________________

ii. Subfamily and name one specific virus: Alpha, Beta or Gamma (Circle one)

iii. Disease: __________________________________________

iv. Mode(s) of transmission: (Indicate at least one mode)

v. Mode of dissemination in host

vi. 1° Tissues/ Organ Infection (replication)

vii. associated with any cancers? If yes, which one

viii. Cellular/subcellular basis of disease

ix. Significant clinical symptoms in absence of virus specific antibodies

x. Enveloped or Non-enveloped

xi. Control or Prevention