



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

HML 106: BASIC VIROLOGY

DATE: MONDAY, 26TH MARCH 2012

TIME: 8.00 A.M. – 10.00 A.M.

Section A: Answer ALL questions (5 marks each)

1. State the contributions of the following early scientists to virology
 - a) Walter Reed
 - b) Loeffler and Frosch
 - c) Felix d'Herelle
 - d) Jonas Salk
 - e) Luc Montagnier

(5 marks)
2. Draw and label an enveloped virus that has a helical nucleocapsid

(5 marks)
3. a) Differentiate between monothetic and polythetic system of classification

(2 marks)

b) Copy and complete the table below

Family	Presence of envelope	Capsid symmetry
Retroviridae		
Hepadnaviridae		
Picornaviridae		

(3 marks)

Section B: Answer only ONE question (20 marks)

4. a) Discuss how a new pandemic Influenza virus can arise

(8 marks)

b) Write an essay on 'virus genomes'

(12 marks)
5. a) Describe virus receptors.

(5 marks)

b) Discuss horizontal transmission of viruses

(15 marks)

Section C: Answer ALL questions by circling the correct answer (½ mark each)

1. The first virus which was shown to be filterable is the one that causes
 - A. Tobacco mosaic virus
 - B. Diphtheria.
 - C. Foot and mouth virus
 - D. Rabies.
2. Viral envelopes are:
 - A. Characteristic of all viruses.
 - B. Found only among the DNA viruses.
 - C. Acquired as the virus "buds" from the host cell.
 - D. Structurally very different from the host cell membrane.
3. Viral glycoproteins are associated with the:
 - A. Capsid
 - B. Capsomeres
 - C. Ribosome
 - D. Envelope
4. Place the following viral replication steps in the proper order:
1. Uncoating 2. Release 3. Adsorption 4. Assembly 5. Penetration
 - A. 3-5-1-4-2
 - B. 3-1-4-2-5
 - C. 3-4-5-1-2
 - D. 3-5-2-1-4
5. Viruses may leave the host cell by:
 - A. Budding
 - B. Cell lysis
 - C. Fusion
 - D. A and B
6. Which of the following statements concerning viral replication is (are) true?
 - A. Most DNA viruses replicate their nucleic acid in the host's nucleus.
 - B. Most RNA viruses replicate in the cytoplasm of the host's cell.
 - C. Negative strand viruses must carry their own RNA polymerase within the virion.
 - D. All of the above
7. Which of the following may manifest itself as a latent viral infection?
 - A. Polio virus
 - B. Small pox virus
 - C. Ebola virus
 - D. Herpesvirus
8. Bacteriophages are:
 - A. Bacterial viruses.
 - B. Pathogenic bacteria.
 - C. Bacteria that parasitize other bacteria.
 - D. Animal viruses.
9. Animal viruses are classified on the basis of:
 - A. The presence of an envelope.
 - B. Capsid morphology.
 - C. Their nucleic acid (DNA or RNA).

- D. A and B only.
10. Which of the following are considered to be obligate intracellular parasites?
- A. *Chlamydiae*
 - B. *Rickettsiae*
 - C. Viruses
 - D. A, B, and C
11. Which of the following is (are) lacking in viruses?
- A. Ribosomes
 - B. An ATP-generating system
 - C. A true nucleus
 - D. All of the above
12. Which viral component protects the enclosed nucleic acid from both physical destruction and from enzymatic hydrolysis?
- A. Capsid
 - B. Cell wall
 - C. Peptidoglycan layer
 - D. Envelope
13. Which of the following statements concerning the capsid is (are) true?
- A. The capsid has binding sites that enable it to attach to the host cell.
 - B. The capsid is composed of capsomeres.
 - C. The protein coat surrounding the nucleic acid is a capsid.
 - D. All of the above
14. The nucleocapsid represents:
- A. The capsid.
 - B. The envelope.
 - C. The nucleic acid.
 - D. A and C
15. The transcription of viral RNA to form complementary dsDNA occurs in the:
- A. Herpes virus
 - B. Retrovirus
 - C. Adenovirus
 - D. All of the above
16. To which family does a small, non-enveloped single-stranded RNA virus most likely belong?
- A. Herpesviridae
 - B. Picornaviridae
 - C. Retroviridae
 - D. Togaviridae
17. In which of the following ways do viruses differ from bacteria?
- A. Viruses are obligate intracellular parasites.
 - B. Viruses don't have any nucleic acid.
 - C. Viruses are not composed of cells.
 - D. All of the above.
18. Which of the following provides the most significant support for the idea that viruses are nonliving ?
- A. They are not composed of cells.
 - B. They cannot reproduce themselves outside of a host.

- C. They cause diseases similar to those caused by chemicals.
 - D. They are chemically simple.
19. Which of the following would be the first step in biosynthesis of a virus with a - strand of RNA?
- A. Synthesis of DNA from an RNA template
 - B. Synthesis of + single-stranded RNA from an RNA template
 - C. Synthesis of + double-stranded RNA from a DNA template
 - D. Transcription of mRNA from DNA
20. An envelope is acquired during which of the following steps?
- A. Penetration
 - B. Adsorption
 - C. Uncoating
 - D. Release
21. For the host cell, the lytic cycle ends when
- A. it replicates.
 - B. it bursts open.
 - C. it collapses.
 - D. it becomes cancerous.
22. Assume you have isolated an unknown virus. It is a single-stranded RNA, enveloped virus. To which group does it most likely belong?
- A. Herpesvirus
 - B. Picornavirus
 - C. Retrovirus
 - D. Togavirus
23. Viral replication:
- A. Occurs by binary fission.
 - B. Requires host cell macromolecules.
 - C. Occurs within the host cell lysosomes.
 - D. Can be prevented by antibiotics.
24. Latency is an outcome particularly characteristic of which of the following viruses:
- A. Polio viruses.
 - B. Rhino viruses.
 - C. Herpes viruses.
 - D. Influenza viruses.
25. In all DNA containing viruses. DNA is synthesized in the nucleus EXCEPT for:
- A. Herpes viruses.
 - B. Adenoviruses.
 - C. Pox viruses.
 - D. Papovaviruses.
26. One of the following viruses is transmitted by mosquitoes:
- A. Rabies virus.
 - B. Polyomyelitis virus.
 - C. Yellow fever virus.
 - D. Measles virus.
27. Which of the following viruses does NOT contain DNA:
- A. Cytomegalovirus.

- B. Epstein Barr Virus.
 - C. Ebola virus
 - D. Adenovirus.
28. A virus capable of causing cancer in the host is a (an):
- A. Oncogenic virus
 - B. Prion
 - C. Rhabdovirus
 - D. Viroid
29. Which of the following is not true about glycoproteins?
- A. They are used for uncoating.
 - B. They are used for adsorption.
 - C. They are only found on enveloped viruses.
 - D. None of the above
30. Which of the following is not used as a criterion to classify viruses?
- A. Biochemical tests
 - B. Envelope presence/absence
 - C. Nucleic acid type
 - D. Capsid symmetry
