



**THE KENYA POLYTECHNIC UNIVERSITY
COLLEGE**

SCHOOL OF HEALTH SCIENCES AND TECHNOLOGY

**DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCES AND
TECHNOLOGY**

DIPLOMA IN MEDICAL LABORATORY SCIENCES

FINAL YEAR EXAMINATION

VIROLOGY/IMMUNOLOGY

TIME: 3 HOURS

INSTRUCTIONS

This paper consists of TWO SECTIONS: A and B.

Answer ALL questions in SECTION A and B.

Circle the letters of ALL correct answers in each multiple choices questions

Any wrong answer for multiple choices will be penalized (0.5 marks)

SECTION A (40 MARKS)

1. Epstein-Barr Virus (EBV) is not associated with one of the following diseases
 - a) Infectious Mononucleosis
 - b) Hepatitis
 - c) Burkitt's lymphoma
 - d) Nasopharyngeal carcinoma

2. Which of the following is not true about Adenoviruses
 - a) Are associated with genital cancers
 - b) May cause gastroenteritis
 - c) May cause conjunctivitis
 - d) May cause pneumonia

3. Which of the following is not true about Papillomaviruses
 - a) HPVs are associated with genital cancers
 - b) HPVs are associated with benign tumors of squamous cells
 - c) Warts caused by papillomaviruses may respond to interferon therapy
 - d) Papillomavirus infection is commonly diagnosed by viral culture

4. Which of the following is not true of Respiratory Syncytial Virus (RSV)
 - a) May cause bronchiolitis
 - b) May cause croup
 - c) May cause pneumonia in infants
 - d) May be prevented by vaccination

5. Which of the following is false regarding Rubella Virus Infection
 - a) Is teratogenic
 - b) Congenital rubella is characterised by eye, ear and heart defects
 - c) Congenital rubella is diagnosed by interference with echo virus CPE
 - d) Infants with congenital rubella poses a great infectious risk.

6. HIV Infection may not lead to which one of the following
 - a) Chronic Diarrhoea
 - b) CMV retinitis
 - c) Thrush caused by candida albicans
 - d) Non-Hodgkin's lymphoma

7. The following is true of rabies virus EXCEPT
 - a) The majority of cases worldwide result from animal bites
 - b) Infection may be prevented by active and passive immunisation
 - c) Rabies vaccine is a live attenuated vaccine
 - d) The animal reservoir differ from country to country

8. The following are statements concerning rhinoviruses which one is false
- Rhinoviruses are one of the most frequent causes of the common cold
 - Rhinoviruses grow better at 33°C than at 37°C; hence they tend to cause disease in the upper respiratory tract rather than the lower respiratory tract
 - Rhinoviruses are members of the picornavirus family and hence resemble poliovirus in their structure and replication
 - The immunity provided by the poliovirus vaccine is excellent because there is only one serotype
9. Which one of the following statements concerning poliovirus infection is correct
- Congenital infection of the foetus is an important complication
 - The virus replicates extensively in the gastrointestinal tract
 - A skin test is available to determine prior exposure to the virus
 - Amantadine is an effective preventive agent
10. Which of the following statements about mumps is not true
- Mumps is a Myxovirus and hence has a single-stranded RNA genome
 - Meningitis is a recognized complication of mumps
 - Mumps orchitis in children prior to puberty often causes sterility
 - During mumps the virus spreads through the blood stream to various internal organs
11. The following viral diseases are characterized by maculopapular rash EXCEPT ONE:
- Measles
 - Rubella
 - Erythema infectiosum
 - Herpangina
12. The following viruses are associated with congenital infection EXCEPT ONE:
- Rubella virus
 - Cytomegalovirus(CMV)
 - Varicella
 - Respiratory Syncytial virus(RSV)
13. Which of the following antiviral drug inactivates reverse transcriptase
- Ribavirin
 - Vidarabin
 - Azidothymidin
 - Gancyclovir
14. Which of the following viruses will show haemadsorption activity on virally-infected cells?
- a) Adeno virus
 - b) Polioma virus
 - c) Influenza virus
 - d) Parvo virus
15. Lesions on chorioallantoic membrane are produced by?
- Vaccinia virus
 - Influenza virus
 - Rubella virus

- d) Measles virus
16. Which of the following clinical specimens cannot be used for the demonstration of rabies antigen by direct immunofluorescence technique?
- a) Salivary glands
 - b) Urine
 - c) Corneal smears
 - d) Conjunctival smears
17. Each of the following statements concerning adenovirus is correct except
- a) Adenoviruses are composed of a double stranded DNA genome and a capsid without an envelope
 - b) Adenoviruses cause both sore throat and pneumonia
 - c) Adenoviruses have only one serologic type
 - d) Adenoviruses are implicated as a cause of tumors in animals but not humans
18. The following are examples of viral genome detection (molecular methods) except
- a) Southern blot
 - b) Western blot
 - c) Branched DNA
 - d) Polymerase chain reaction
19. Which of the following is not a direct detection method
- a) Detection of rotavirus antigen in faecal specimens
 - b) CMV DEAFF test
 - c) Electron microscopy
 - d) Polymerase chain reaction
20. Koplik's spots are characteristic of which of the following infections?
- a) Mumps
 - b) Measles
 - c) Herpes
 - d) Rubella
21. Serum sickness occurs only
- A) when anti-basement membrane antibodies are present.
 - B) In cases of extreme excess of antibody.
 - C) When IgE antibody is produced.
 - D) When soluble immune complexes are formed.
22. Most autoimmune diseases are caused by a
- A) Single genetic defect.
 - B) Known infectious organism.
 - C) Constellation of genetic and environmental events.
 - D) Hormonal dysregulation.
23. Antigen-presenting cells that activate helper T cells must express which one of the following on their surfaces?
- A. IgE
 - B. gamma interferon

- C. class I MHC antigens
 - D. class II MHC antigens
24. T-cell antigen receptors are distinguished from antibodies by which of the following
- a) T-Cell receptors are glycosylated
 - b) T-cell receptors must interact with antigen uniquely presented by other cells but not with free antigen
 - c) T-Cell receptors bind various cytokines
 - d) T-Cell receptors bind complement to lyse cells
25. All of the following are true of antigen EXCEPT which one of the following?
- A. They contain epitopes.
 - B. They will react with antibodies.
 - C. They contain antigenic determinants.
 - D. They contain paratopes.
26. When a B-cell undergoes immunoglobulin class switching
- A. the variable region of the light chain changes, but its constant region remains the same
 - B. the variable region of the light chain remains the same, but its constant region changes
 - C. the variable region of the heavy chain remains the same but its constant region changes
 - D. the variable region of the heavy chain changes but its constant region remains the same
27. Which of the following is NOT true of interleukins?
- A. They are cytokines which can be produced by various cells of the immune system.
 - B. They are hormones which allow one cell to communicate with another cell.
 - C. They are in need of receptors on the target cell in order to mediate their effects.
 - D. They are able to bind antigen with a high level of specificity.
28. The major purpose of lymphokines is to
- A. bind to class I major histocompatibility molecules for cytotoxic function
 - B. specifically recognize antigens or their fragments
 - C. stimulate the production of complement
 - D. help control and regulate the cells of the immune system
29. Orthotopic transplantation is;
- a) Graft placed into its normal site

- b) Graft placed into different site
- c) Use of plasma
- d) Graft placed into different species

30. Hyperacute rejection occurs;

- a) 10 days after transplantation
- b) Few minutes to a few hours of transplantation
- c) 1 month
- d) 2 months

31. Wheal and flare response is characteristic of

- a) Type I hypersensitivity reaction
- b) Type II hypersensitivity reaction
- c) Type III hypersensitivity reaction
- d) Type IV hypersensitivity reaction

32. An immunological adjuvant is a substance that;

- a) Reduces the toxicity of the immunogen
- b) Enhances the immunogenicity of haptens
- c) Enhances hematopoiesis
- d) Enhances the immune response against the immunogen

33. Removal of the bursa of fabricus from a chicken results in;

- a) A marked decreased number of circulating lymphocytes
- b) Anaemia
- c) Delayed rejection of skin graft
- d) Low serum levels of antibody in serum

34. Converting a toxin to a toxoid

- a) Makes the toxin more immunogenic
- b) Reduces the pharmacologic activity of the toxin
- c) Enhances binding with antitoxin
- d) Induces only innate immunity

35. The classic complement pathway is initiated by interaction of C1 with

- a.) Antigen.
- b.) Factor B.
- c.) Antigen-IgG complexes.
- d.) Bacterial lipopolysaccharides.

36. MMR vaccine

- a) Single vaccine
- b) Triple vaccine
- c) Recombinant vaccine
- d) Serum derived vaccine

37. Rejection of the graft by recipient is called;

- a) Allograft reaction
- b) Xenograft reaction
- c) Vascularization
- d) Autograft reaction

38. When immune complexes from the serum are deposited on glomerular basement membrane, damage to the membrane is caused mainly by

- a) Gamma interferon.
- b) Phagocytosis.
- c) cytotoxic T cells.
- d) Enzymes released by polymorphonuclear cells.

39. Both class I and class II MHC molecules are;

- a) Composed of chains with variable and constant regions
- b) Expressed constitutively on all nucleated cells
- c) Part of the cell receptor for antigen
- d) Expressed on the B cell membrane.

40. Haemolytic disease of the newborn due to Rhesus incompatibility depends upon the...

- a). Mother possessing Rh antigens not present on the baby's red cells
- b) Inability of the baby to react against the mother's red cells
- c). Transplacental passage of IgM anti-Rh antibodies
- d). Transplacental passage of IgG anti-Rh antibodies

SECTION B (60 Marks)

41. a Discuss

a. The diagnosis of rabies infection. (10marks)

b. The pathogenesis of primary herpes simplex 1 infection (10marks)

42. a) State the characteristics of specific immunity (4marks)

b) Describe the Factors determining whether an antigen will stimulate an antibody response (10 marks)

c) Explain the Arthus reaction. (6 marks)

43. (a) Discuss the following characteristics of polio virus

i. Morphology

ii. Nucleic acid

iii. Antigenic types

iv. Transmission

v. Prevention

(10 marks)

(b) Describe the principles of the following immunological techniques

a) Complement fixation test. (5marks)

b) Indirect Elisa. (5marks)