

# **Microbiology and Immunology**

## **Final Exam**

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**HSS 1100**

**Faculty of Health Sciences**

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*Version A*

**Name:** \_\_\_\_\_

**Student Number:** \_\_\_\_\_

**Instructions:**

- 1. This exam is worth 50% of the course.**
- 2. Nothing is allowed except for this exam booklet, a pencil, pen, eraser, and your student ID.**
- 3. You have three hours to finish the exam.**
- 4. Please answer every question.**
- 5. Please write your name and student number on every page of this exam booklet.**
- 6. Please indicate the version of the exam in the front of your scantron.**
- 7. Please circle your answers both on the exam booklet and the scantron.**

**Section A Multiple Choice (50 marks)**

1. Viruses have

- a. DNA
- b. RNA
- c. Both DNA and RNA
- d. DNA or RNA

2. The basic components of a virus are:

- a. nucleic acid, cell wall, surface antigens
- b. nucleic acid, endomembrane system, phospholipid bilayer
- c. nucleic acid, protein coat
- d. protein coat, surface antigens, phospholipid bilayer

3. The type of media viruses grow in include:

- A. cell cultures
  - B. living animals
  - C. embryonated eggs
- a. A only
  - b. B only
  - c. A and C only
  - d. A, B , and C

4. This type of virus has two types (types A and B) and undergoes frequent recombination

a. rhinovirus

b. influenza

c. adenovirus

d. it is a bacteria because only bacteria recombine via transformation, transduction, and bacterial conjugation

5. The treatment for respiratory syncytial virus is

a. antibiotics

b. live attenuated vaccine

c. subunit vaccine

d. reverse transcriptase

e. ribavizine

6. Humans are the only natural host in:

a. rotavirus

b. norovirus

c. coxsackieviruses

d. poliovirus

e. toxoplasma gondii

7. Which of the following is false regarding measles:

- a. blotchy appearance
- b. complications may include exacerbation of TB and leukemia
- c. confirmation tests can be single serum or paired sera
- d. vaccine is rarely effective due to frequent changes in surface antigens

8. Which of the following is false regarding rubella:

- a. very dangerous for non-immune pregnant women especially during second trimester
- b. localized birth defects include cataracts, deafness, heart defects
- c. similar to measles but milder
- d. life-long immunity after natural infection

9. Herpes Zoster

- a. is also known as shingles
- b. appears as a limited rash along the trajectory of one nerve
- c. is found mainly in adults
- d. represents a late recurrence of latent varicella infection in a partially immune individual
- e. all of the above

10. Papilloma virus

- a. is always sexually transmitted
- b. appears as common warts and genital warts
- c. has no vaccine available
- d. all of the above
- e. none of the above

11. Mumps causes

- a. glandular enlargement
- b. bilateral paralysis
- c. inflammation of the parathyroid gland
- d. all of the above

12. Epstein-Barr virus, also known as kissing disease is diagnosed by

- a. immunofluorescence
- b. the presence of immunoglobins in serum sample
- c. RBC agglutination
- d. none of the above

13. Which hepatitis is sexually transmitted?

- 1. A
  - 2. B
  - 3. C
  - 4. Delta agent
  - 5. E
  - 6. G
- a. B only
  - b. B and C
  - c. B, C, Delta agent, G
  - d. C only
  - e. C, G, Delta agent, A

14. A patient receiving a liver transplant is tested positive for CMV. The donor of the liver is also positive for CMV. How will the transplant proceed?

- a. the graft will be rejected
- b. the patient will be placed under a CMV induced coma
- c. ribavirin must be given in order to prevent complications from opportunistic pathogens
- d. the transplant will proceed as normal

15. The following is false regarding hepatitis C

- a. transmitted by blood and sexually
- b. initially a mild disease
- c. transmitted faecal-oral route
- d. no vaccine

16. Which regarding HIV is false?

- a. it causes depletion in T cells
- b. it disables B-lymphocytes from producing immunoglobins
- c. it undergoes frequent antigenic changes
- d. most recommended treatment is HAART

17. The following is seen very frequently in immunocompromised patients, especially AIDS patients.

- A. cryptococcus infection
- B. tuberculosis infection
- C. yeast infection

- a. A only
- b. B only
- c. C only
- d. A and B only
- e. A, B and C

18. What makes HIV extremely difficult to deal with is the fact that

- a. is able to lodge itself into the genome of host cell
- b. frequent antigenic changes
- c. targeting of B-lymphocytes
- d. all of the above
- e. none of the above

19. Which of the following is true regarding yellow fever virus?

- a. 50% mortality rate
- b. because of the virulence of the virus, a live attenuated vaccine is not recommended
- c. it causes bloody and mucoid diarrhea
- d. it is a CNS virus

20. When symptoms of rabies start to occur it is

- a. always fatal
- b. can be treated if injected with immunoglobins of human origin immediately
- c. it has a 50% mortality rate
- d. it appears as a qubit which is the fundamental unit for quantum computing

21. The factors that play an essential role in transmitting infections are

- A. source
  - B. fomites
  - C. host
- a. A only
  - b. B only
  - c. C only
  - d. A and C only
  - e. A and B only

22. The most efficient step in controlling nosocomial infections is

- a. proper sanitation
- b. identification of source
- c. proper handwashing
- d. education

23. The following is not a measure taken affecting the source

- a. detection
- b. isolation
- c. treatment of infections
- d. sterilization

24. The following is not a measure taken affecting the route of transmission

- a. sterilization
- b. disinfection
- c. ventilation
- d. vaccination

25. The following is not a measure taken affecting the host

- a. asepsis
- b. vaccination
- c. protective isolation
- d. disinfection

26. Universal precautions are not a substitute for

- a. isolation procedures
- b. proper hand washing procedures
- c. annual vaccination
- d. infection control services

27. An infection control committee includes:

- a. infection control nurse
- b. infection control physician
- c. infection control laboratory
- d. all of the above
- e. none of the above

28. A general term for destroying or removing harmful microorganisms, chemicals or radioactivity on an object or surface is

- a. decontamination
- b. disinfection
- c. sanitation
- d. sterillization

29. A physical or chemical means to totally destroy all types of microorganisms in or on an object is

- a. decontamination
- b. disinfection
- c. sanitation
- d. sterillization

30. The means of cleaning include:

- A. Physical means
- B. Chemical means
- C. Biological means

- a. A only
- b. B only
- c. C only
- d. A and C only
- e. A and B only

31. Antibodies are produced by

- a. TH1 cells
- b. TH2 cells
- c. B-lymphocytes
- d. macrophages

32. a substance capable of inducing a specific immune response is

- a. an antibody
- b. an antigen
- c. a foreign agent
- d. a virus or bacteria

33. establishment and multiplication in/on the body of a microorganism without producing any apparent or inapparent change is

- a. infection
- b. colonisation
- c. contamination
- d. a disease

33. deposition of microorganisms without multiplication is

- a. infection
- b. colonisation
- c. contamination
- d. a disease

34. The most common routes of entry are

- A. inhalation
  - B. ingestion
  - C. direct deposit
- a. A only
  - b. B only
  - c. C only
  - d. A and B only
  - e. A, B and C

35. The following is responsible for cell mediated immunity.

- a. TH1 cells
- b. TH2 cells
- c. B-lymphocytes
- d. macrophages

36. This cell "decides" whether cell mediated immunity or humoral immunity takes place.

- a. T cells
- b. B cells
- c. antigen presenting cells
- d. none of the above

37. Which is not an example of active immunization:

- a. live attenuated vaccines
- b. combined vaccines
- c. conjugate vaccines
- d. none of the above

38. The mechanisms of antibiotic resistance include:

- A. alteration of drug target
- B. production of inactivating enzymes
- C. decreased antibiotic uptake

- a. A only
- b. B only
- c. C only
- d. A and B only
- e. A, B and C

39. If the safranin step is omitted, gram positive bacteria and gram negative bacteria will appear \_\_\_\_\_ and \_\_\_\_\_ respectively under a light microscope.

- a. colorless, colorless
- b. purple, pink
- c. purple colorless
- d. both colorless because bacteria can only be seen under an electron microscope

40. Groups A strep are

- a. alpha-hemolytic
- b. beta-hemolytic
- c. delta-hemolytic
- d. gamma-hemolytic

41. Clostridium species are unique because they

- a. have a waxy outer layer
- b. are anaerobic
- c. are microaerophiles
- d. are the deadliest species of positive bacilli

42. Clostridium tetani is transmitted through

- a. puncture by rusty nail
- b. skin trauma by any object contaminated with spores
- c. eating improperly canned food
- d. all of the above

43. The following causes bloody and mucoid diarrhoea

- a. E. coli O157:H7
- b. Vibrio cholerae
- c. Shigellae
- d. Plasmodium

44. The following causes malaria

- a. E. coli O157:H7
- b. Vibrio cholerae
- c. Shigellae
- d. Plasmodium

45. This type of parasite can migrate to the brain

- a. *Giardia lamblia*
- b. *Cryptosporidium* spp.
- c. *Taenia saginata*
- d. *Taenia solium*

46. Which of the following is false about parasites?

- a. metabolically and physiologically dependant on host
- b. very common way of life
- c. can be beneficial to host in some cases
- d. none of the above

47. In the mantoux test tuberculin solution is injected

- a. intravenous
- b. intramuscular
- c. intradermal
- d. intraperitoneal

48. Syphilis is caused by

- a. *Borrelia burgdorferi*
- b. *Treponema pallidum*
- c. *Mycobacterium syphilis*
- d. none of the above

49. The levels of fungal infections in order are

- a. cutaneous, superficial, subcutaneous, systemic
- b. superficial, cutaneous, subcutaneous, systemic
- c. cutaneous, subcutaneous, superficial, systemic
- d. systemic, superficial, cutaneous, subcutaneous

50. In the event that you find an AIDS patient infected with a fungal infection, what fungus would you suspect first?

- a. histoplasmosis
- b. coccidioidomycosis
- c. cryptococcus
- d. systemic candidiasis

**Section B Short Answers (50 marks)**

1. Name the 5 steps in viral replication and briefly describe each step (5 marks, 1/2 mark for the name and 1/2 for the description).

1.

2.

3.

4.

5.

2. Name the two tests important for viral diagnosis (2 marks).

1.

2.

3. Name and describe the two types of serum tests (2 marks, 1 mark each, no part marks).

1.

2.

4. What is the name of the vaccine given for measles (1 mark)? \_\_\_\_\_

5. Name a similarity and difference between hepatitis A and hepatitis E (2 marks).

6. Explain what you would do to vaccinate against hepatitis delta agent and why such a method would be effective (2 marks).

7. Why are CNS viruses of an animal origin rare? (1 mark)

8. What are the steps you should take if you have been bitten by an animal infected with rabies virus? (5 marks)

1.

2.

3.

4.

5.

9. Name three factors that play an essential role in transmission of infections and one way each is controlled (3 marks).

1.

2.

3.

10. Name two different systems used for isolation procedures applied to infected patients (2 marks).

1.

2.

11. Name two different universal precautions (2 marks).

1.

2.

12. Name three classes of microorganisms that are resistant to disinfectants in decreasing order (3 marks).

1.

2.

3.

13. Name and describe the two types of immunization (4 marks).

1.

2.

14. What is the least used cell culture? (1 mark)

15. What type of vaccine would you give an employee who is going to a foreign country for one month? (1 mark)

16. What type of vaccine would you give an employee who is going to a foreign country for one year? (1 mark)

17. Name three harmful effects of the immune response (3 marks).

1.

2.

3.

18. Give a similarity and difference for *Clostridium tetani* and *Clostridium botulinum* (2 marks).

19. Name and describe the two forms of Chlamydiae (4 marks).

1.

2.

20. Name a parasite for each (4 marks).

1. Aquired through water:

2. Aquired through food:

3. Aquired sexually:

4. Aquired through animals: