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UNIVERSITY EXAMINATIONS 2023/2024

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN MEDICAL MICROBIOLOGY

HMM 3221: HOST-MICROBE INTERACTIONS

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS:

Part I: Multiple Choice Questions (MCQs)

Part II: Short Answer Questions

Part III: Long Answer Questions

1. What is a host-parasite interaction?
 - a) The relationship between a predator and its prey
 - b) The relationship between a host and its symbiotic partner
 - c) The relationship between a host and a parasitic organism
 - d) The relationship between a plant and its pollinator
 2. Which of the following is an example of an ectoparasite?
 - a) Malaria parasite
 - b) Tapeworm
 - c) Head lice
 - d) Hookworm
 3. What factors can influence the outcome of a host-parasite interaction?
 - a) The virulence of the parasite
 - b) The host's genetic makeup and immune response
 - c) Environmental factorsAll of the above
 4. Which of the following is a defense mechanism that hosts can use against parasites?
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- a) Antibody production
 - b) Mucous production
 - c) Inflammation
 - d) All of the above
5. Which of the following would be a sign of an infection?
- a) Muscle aches
 - b) Headache
 - c) Fever
 - d) Nausea
6. Which of the following is an example of a noncommunicable infectious disease?
- a) Infection with a respiratory virus
 - b) Food poisoning due to a preformed bacterial toxin in food
 - c) Skin infection acquired from a dog bite
 - d) Infection acquired from the stick of a contaminated needle
7. In which stage of disease does a patient begin to present general signs and symptoms?
- a) Convalescence
 - b) Incubation
 - c) Illness
 - d) Prodromal
8. A communicable disease that can be easily transmitted from person to person is _____
- a) Contagious
 - b) Iatrogenic
 - c) Acute
 - d) Nosocomial
9. During an oral surgery, the surgeon nicked the patient's gum with a sharp instrument. This allowed *Streptococcus*, a bacterium normally present in the mouth, to gain access to the blood. As a result, the patient developed bacterial endocarditis (an infection of the heart). Which type of disease is this?
- a) Iatrogenic
 - b) Nosocomial
 - c) Vectors
 - d) Zoonotic
10. Which of the following would be a virulence factor of a pathogen?
- a) A surface protein allowing the pathogen to bind to host cells
 - b) A secondary host the pathogen can infect
 - c) A surface protein the host immune system recognizes
 - d) The ability to form a provirus
11. You have identified a new toxin. It is produced by a gram-negative bacterium. It is composed mostly of protein, has high toxicity, and is not heat stable. You also discover that it targets liver cells. Based on these characteristics, how would you classify this toxin?
- a) Superantigen
 - b) Endotoxin
 - c) Exotoxin

d) Leukocidin

12. Which of the following is a contagious disease?

- a) Malaria
- b) Filariasis
- c) Chicken pox
- d) Tetanus

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14. You have recently identified a new toxin. It is produced by a gram-negative bacterium. It is composed mostly of protein, has high toxicity, and is not heat stable. You also discover that it targets liver cells. Based on these characteristics, how would you classify this toxin?

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15. Match these organisms with the predominant mode of transmission. (4 Marks)

Pathogen

Mode of transmission

- | | |
|--------------------------------------|----------------------|
| a) Dengue virus | 1. Droplet infection |
| b) <i>Corynebacterium diphtheria</i> | 2. Vector borne |
| c) <i>Entamoeba histolytica</i> | 3. Blood borne |
| d) Hepatitis B virus | 4. Contaminated food |

16. Which of the following immune system components can function as an opsonin?

- a) Antibodies
- b) Histamine
- c) T-cell receptors
- d) Interferons

17. The following pathogens does not the ability to survive within macrophages?

- a) *Schistosoma mansoni*
- b) *Mycobacterium tuberculosis*
- c) *Listeria monocytogenesis*
- d) *Leishmania donovani*

SECTION B-SHORT ANSWER QUESTIONS. Answer ALL Questions

1. Giving specific example, explain the role of cell surface decorations in parasitic evasion of host immunity. (8 Marks)
2. Describe the Farenholz's rule and its relevance to host-parasite interactions. (8 Marks)
3. Outline the effect of bacterial capsules on phagocytosis. (8 Marks)
4. Using a diagram, describe the disease triad. (8 Marks)
5. Enumerate eight bacterial virulence factors. (8 Marks)

SECTION-C LONG ANSWER QUESTIONS Answer TWO Questions

1. Discuss the acquired immune responses after encounter with a pathogen. (20 Marks)
2. Give a detailed discussion on hypersensitivity reactions. (20 Marks)
3. Discuss the transmission of tuberculosis and explain the pathological changes that occur at the macroscopic level in relation to pulmonary TB. (20 Marks)

