



**AMREF INTERNATIONAL UNIVERSITY**  
**SCHOOL OF MEDICAL SCIENCES**  
**DEPARTMENT OF REHABILITATION MEDICINE**  
**BACHELOR OF SCIENCE IN PHYSIOTHERAPY**

**END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2025**

**UNIT CODE: PHT 125**

**UNIT NAME: Microbiology Direct entry**

**DATE: 14th APRIL 2025**

**TIME: 9am-11am**

**INSTRUCTIONS**

1. All students will have two (2) hours to complete the examination
2. Attempt all questions as per the instruction
3. It is the student's responsibility to report any page and number missing in this paper.
4. Check that the paper is complete
5. Total number of pages is 5 including the cover.
6. Read through the paper quickly before you start.

1. A bacterium with flagella at both ends of the cell is termed:
  - a) Monotrichous
  - b) Peritrichous
  - c) Lophotrichous
  - d) Amphitrichous
2. Which of the following microorganisms is acellular?
  - a) Bacteria
  - b) Protozoa
  - c) Viruses
  - d) Fungi
3. Which microbial process is essential for producing yogurt and cheese?
  - a) Photosynthesis
  - b) Fermentation
  - c) Nitrogen fixation
  - d) Decomposition
4. The microbial technique used for sterilization by heat and pressure is called:
  - a) Pasteurization
  - b) Autoclaving
  - c) Filtration
  - d) Radiation
5. Which term describes bacteria that can grow with or without oxygen?
  - a) Obligate aerobes
  - b) Obligate anaerobes
  - c) Facultative anaerobes
  - d) Microaerophiles
6. What is the major function of the bacterial capsule in pathogenic bacteria?
  - a) DNA replication
  - b) Protection from the immune system
  - c) Energy production
  - d) Cell division
7. The phase in which bacteria adapt to new conditions before starting exponential growth is:
  - a) Lag phase
  - b) Log phase
  - c) Stationary phase
  - d) Death phase
8. What is the purpose of differential media in bacterial culture?
  - a) To select for a specific bacterial species
  - b) To differentiate bacteria based on biochemical reactions
  - c) To inhibit the growth of contaminants
  - d) To provide additional nutrients for bacterial growth

9. Which test is commonly used to differentiate *Staphylococcus aureus* from other staphylococci?
  - a) Catalase test
  - b) Coagulase test
  - c) Gram staining
  - d) Oxidase test
10. Which of the following bacteria is known for its resistance to penicillin due to beta-lactamase production?
  - a) *Streptococcus agalactiae*
  - b) *Staphylococcus aureus*
  - c) *Streptococcus pneumoniae*
  - d) *Streptococcus pyogenes*
11. What is the primary route of transmission for *Shigella*?
  - a) Airborne droplets
  - b) Fecal-oral route
  - c) Vector-borne transmission
  - d) Blood transfusion
12. *Salmonella* bacteria are typically:
  - a) Non-motile
  - b) Catalase-negative
  - c) Gram-negative rods
  - d) Spore-forming
13. *Vibrio cholerae* produces a toxin that primarily affects which part of the body?
  - a) Liver
  - b) Kidneys
  - c) Small intestine
  - d) Lungs
14. *Helicobacter pylori* infection is associated with:
  - a) Bacillary dysentery
  - b) Peptic ulcers
  - c) Cholera
  - d) Typhoid fever
15. *Clostridium perfringens* is associated with which of the following diseases?
  - a) Tuberculosis
  - b) Gas gangrene
  - c) Pneumonia
  - d) Tetanus
16. Which of the following treatments is effective against botulism?
  - a) Antitoxin administration
  - b) Beta-lactam antibiotics
  - c) Oxygen therapy
  - d) Surgical debridement

17. Which of the following is a characteristic of spirochaetes?
- Rigid spiral shape
  - Inability to move
  - Flexible spiral shape with rotary movements
  - Lack of a cell wall
18. What is the causative agent of syphilis?
- Borrelia recurrentis*
  - Treponema pallidum*
  - Leptospira interrogans*
  - Chlamydia trachomatis*
19. How is leptospirosis primarily transmitted to humans?
- Through insect bites
  - By consuming contaminated food
  - Through contact with urine-contaminated water
  - Via respiratory droplets
20. Mycoplasma species differ from other bacteria because:
- They lack a rigid cell wall
  - They produce endotoxins
  - They are visible under a light microscope without staining
  - They replicate within host cells only
21. The primary mode of transmission for epidemic relapsing fever is:
- Mosquito bite
  - Louse bite
  - Direct contact with infected individuals
  - Airborne inhalation
22. How is diphtheria primarily transmitted?
- Contaminated food and water
  - Droplet spread and direct contact
  - Vector-borne transmission
  - Sexual contact
23. *Listeria monocytogenes* is distinguished from Streptococci by:
- Its  $\beta$ -hemolytic activity
  - Catalase positivity
  - Its Gram-negative nature
  - Its ability to grow only under anaerobic conditions
24. Which of the following characteristics allows *Listeria monocytogenes* to persist in contaminated food?
- Growth at refrigeration temperatures
  - High salt tolerance
  - Spore formation
  - Biofilm resistance only

25. *Bacillus anthracis* is primarily a pathogen of:
- Humans only
  - Rodents
  - Herbivores
  - Reptiles
26. *Bacillus cereus* food poisoning is most associated with:
- Undercooked poultry
  - Improperly stored rice and pasta
  - Fresh dairy products
  - Leafy green vegetables
27. Which of the following is the main structural component of fungal cell walls?
- Peptidoglycan
  - Chitin
  - Cellulose
  - Teichoic acids
28. Thermally dimorphic fungi shift from a mold to a yeast form at:
- 25°C
  - 30°C
  - 37°C
  - 45°C
29. Which fungal genus is responsible for systemic candidiasis?
- Aspergillus
  - Cryptococcus
  - Candida
  - Trichophyton
30. Sabouraud's agar is commonly used to culture fungi because it:
- Contains high glucose and low pH to inhibit bacterial growth
  - Selectively enhances bacterial growth
  - Contains antifungal agents
  - Is used only for yeasts

**Section B. Short structured questions. Answer all the questions. (20 Marks)**

1. Explain how hyperbaric oxygen therapy is used to treat anaerobic infections. (4marks)
2. Differentiate between transformation, transduction, and conjugation in bacterial genetic exchange. (6marks)
3. Outline the stages of syphilis and the symptoms associated with each stage. (4marks)
4. Describe the clinical significance of *Staphylococcus aureus*. (3marks)
5. What is thermal dimorphism in fungi, and why is it important in pathogenesis? (3marks)

**Section C. Answer one of the following questions (20 Marks)**

1. Discuss the morphology, classification, and clinical significance of fungi in human infections. (20marks)
2. a. Discuss the pathogenesis of *Neisseria meningitidis*, including how it causes meningitis (10marks)  
b. Explain the epidemiology, including risk factors and modes of transmission. (10marks)