



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 (Special exam) Direct entry

DATE: 14th APRIL 2025

TIME: 9am-11am

INSTRUCTIONS

- 1. All students will have two (2) hours to complete the examination**
- 2. This is an online exam, 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.**
- 7. Upon finishing the exam paper, on submission, the message 'Your examination has been submitted' will appear.**

TOTAL: _____/70

PERCENT: _____/100%

POINTS EARNED TOWARDS FINAL GRADE _____/70

Section A. Multiple choice question. Answer all the questions (30 Marks)

- Which of the following scientists is credited with discovering microorganisms?
 - Louis Pasteur
 - Robert Koch
 - Antonie van Leeuwenhoek
 - Alexander Fleming
- Which field of microbiology focuses on microorganisms in soil, water, and the environment?
 - Medical microbiology
 - Industrial microbiology
 - Environmental microbiology
 - Food microbiology
- Which of the following is NOT a prokaryotic microorganism?
 - Bacteria
 - Archaea
 - Fungi
 - Cyanobacteria
- Which of the following is NOT found in a bacterial cell?
 - Nucleus
 - Ribosomes
 - Plasma membrane
 - Peptidoglycan
- Mycobacterium tuberculosis* resists Gram staining because of:
 - Thick peptidoglycan layer
 - Presence of lipids in the cell wall
 - Lack of a cell wall
 - Absence of ribosomes
- What is the main structural difference between Gram-positive and Gram-negative bacteria?
 - Presence of a nucleus
 - Peptidoglycan thickness in the cell wall
 - Absence of ribosomes
 - Presence of mitochondria
- Which of the following is NOT a necessary condition for bacterial culture?
 - Nutrients
 - Temperature control
 - Oxygen supply
 - Light exposure
- Which type of culture media is specifically designed to promote the growth of only certain bacteria?
 - Differential media
 - Selective media
 - Enriched media
 - Complex media

9. What is the role of peptone in nutrient agar?
 - a) Acts as a carbon source
 - b) Provides nitrogen and amino acids
 - c) Maintains pH balance
 - d) Differentiates bacterial colonies
10. Which of the following is NOT a method of bacterial preservation?
 - a) Cryopreservation
 - b) Lyophilization
 - c) Heat sterilization
 - d) Freezing at -80°C
11. Which of the following Staphylococcus species is coagulase-positive?
 - a) *Staphylococcus epidermidis*
 - b) *Staphylococcus saprophyticus*
 - c) *Staphylococcus aureus*
 - d) *Staphylococcus hominis*
12. Which Gram-positive cocci grow in grape-like clusters?
 - a) Streptococcus
 - b) Enterococcus
 - c) Micrococcus
 - d) Staphylococcus
13. *Streptococcus pneumoniae* is classified under which hemolysis pattern?
 - a) Alpha hemolysis
 - b) Beta hemolysis
 - c) Gamma hemolysis
 - d) Double hemolysis
14. Which of the following Neisseria species is NOT pathogenic to humans?
 - a) *N. meningitidis*
 - b) *N. gonorrhoeae*
 - c) *N. lactamica*
 - d) *N. sicca*
15. Which Clostridium species is responsible for causing endometritis?
 - a) *C. difficile*
 - b) *C. tetani*
 - c) *C. perfringens*
 - d) *C. botulinum*
16. What is a major risk factor for *Clostridium difficile* infection?
 - a) Exposure to soil
 - b) Overuse of antibiotics
 - c) Consumption of undercooked meat
 - d) Insect bites
17. Which of the following conditions is associated with *Bacteroides fragilis*?
 - a) Urinary tract infections
 - b) Intra-abdominal abscesses
 - c) Meningitis
 - d) Tuberculosis
18. What distinguishes Rickettsiae from typical bacteria?

- a) They lack a cell membrane
 - b) They require host cells to multiply
 - c) They contain single-stranded RNA
 - d) They reproduce via binary fission in free media
19. Which of the following diseases is caused by *Chlamydia trachomatis*?
- a) Psittacosis
 - b) Syphilis
 - c) Lymphogranuloma venereum
 - d) Weil's disease
20. Which of the following is NOT a characteristic of Chlamydia?
- a) Obligate intracellular parasite
 - b) Contains both DNA and RNA
 - c) Can synthesize its own ATP
 - d) Causes trachoma
21. The most common cause of atypical pneumonia is:
- a) *Treponema pallidum*
 - b) *Mycoplasma pneumoniae*
 - c) *Chlamydia psittaci*
 - d) *Rickettsia rickettsii*
22. What is the primary reservoir of *Listeria monocytogenes*?
- a) Insects
 - b) Human respiratory tract
 - c) Soil, water, and animals
 - d) Contaminated surgical instruments
23. Which of the following forms of anthrax is considered the most lethal?
- a) Cutaneous anthrax
 - b) Gastrointestinal anthrax
 - c) Pulmonary anthrax
 - d) Injectional anthrax
24. The characteristic appearance of *Bacillus anthracis* colonies on culture media is:
- a) Smooth, round colonies with mucoid consistency
 - b) Beta-hemolytic colonies with swarming motility
 - c) "Medusa head" rough colonies with curled extensions
 - d) Small pinpoint colonies with yellow pigmentation
25. Fungi differ from bacteria because they:
- a) Lack a nucleus
 - b) Contain peptidoglycan in their cell walls
 - c) Have mitochondria
 - d) Are prokaryotic
26. The major sterol found in fungal cell membranes is:
- a) Cholesterol
 - b) Ergosterol
 - c) Phytosterol
 - d) Lanosterol
27. Asexual fungal spores that form within the hyphae are called:
- a) Chlamydoconidia

- b) Macroconidia
 - c) Basidiospores
 - d) Ascospores
28. The most common opportunistic fungal pathogen in immunocompromised patients is:
- a) *Histoplasma capsulatum*
 - b) *Candida albicans*
 - c) *Coccidioides immitis*
 - d) *Blastomyces dermatitidis*
29. What is the primary mode of action of tetanus toxin?
- a) Inhibits neurotransmitter release
 - b) Destroys red blood cells
 - c) Causes excessive mucus production
 - d) Induces fever
30. Bacteria multiply by:
- a) Mitosis
 - b) Binary fission
 - c) Meiosis
 - d) Budding

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

1. Explain the importance of sterilization in microbiology and list three sterilization methods. (4marks)
2. Describe the role of *Shiga toxin* in the pathogenesis of *Shigella* infections. (4marks)
3. What are the main sources and risk factors for *Clostridium botulinum* infections? (4marks)
4. Outline the major steps involved in the Gram staining procedure (4marks)
5. Explain how *Chlamydia trachomatis* causes disease in humans. (4marks)

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

1. Describe the significance of *Mycoplasma pneumoniae* in human infections, including diagnosis, treatment, and prevention. (20marks)
2. a. Describe the mode of action of cholera toxin and its effects on the body. (10marks)
b. Discuss the public health measures necessary to control and prevent cholera outbreaks. (10marks)