



AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF REHABILITATIVE MEDICINE

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2024

UNIT CODE: PHT 125

UNIT NAME: MICROBIOLOGY

DATE: 12TH APRIL 2024

TIME: 11.15AM-1.15PM

INSTRUCTIONS

1. All students will have two (2) hours to complete the examination
2. Attempt all questions as per the instruction

Section I: MCQs (30 Marks)

Attempt ALL questions.

1. Fungi reproduce asexually through the production of:
 - a) Spores.
 - b) Gametes.
 - c) Zygotes.
 - d) Hyphae.
2. Which bacterial genus includes species responsible for causing pneumonia and meningitis?
 - a) Escherichia.
 - b) Streptococcus.
 - c) Staphylococcus.
 - d) Bacillus.
3. In which fungal infection do patients often exhibit a "rose-garden" appearance of the lung on chest X-ray?
 - a) Aspergillosis
 - b) Coccidioidomycosis
 - c) Cryptococcosis
 - d) Candidiasis
4. Which antifungal drug is used in the treatment of candidiasis by inhibiting the synthesis of ergosterol, a fungal cell membrane component?
 - a) Penicillin
 - b) Amphotericin B
 - c) Fluconazole
 - d) Ciprofloxacin
5. Which of the following is NOT a method of sterilization commonly used in medical settings?
 - a) Autoclaving.
 - b) Filtration.
 - c) Pasteurization.
 - d) Ethylene oxide gas treatment.

6. Which bacterial structure is responsible for regulating the entry and exit of substances into and out of the cell?
- Capsule.
 - Cell membrane.
 - Ribosome.
 - Nucleoid.
7. Which fungal structure allows for the absorption of nutrients from the environment?
- Mycelium
 - Spore
 - Hypha
 - Capsule
8. Which bacterial structure allows for the exchange of genetic material through transformation?
- Plasmid.
 - Capsule.
 - Endospore.
 - Pilus
9. Which of the following is a Gram-negative bacterium?
- Staphylococcus aureus*
 - Escherichia coli*
 - Streptococcus pyogenes*
 - Clostridium perfringens*
10. The term "binary fission" refers to:
- The fusion of two bacterial cells
 - The process of bacterial conjugation
 - The formation of bacterial spores
 - Bacterial cell division into two identical daughter cells.
11. Which bacterial structure contains the enzyme responsible for synthesizing ATP?
- Ribosome.
 - Cell membrane.
 - Capsule.
 - Flagellum.

12. Fungal spores are primarily involved in:
- Reproduction
 - Locomotion
 - Digestion
 - Respiration
13. Which staining technique is commonly used to classify bacteria into Gram-positive and Gram-negative groups?
- Acid-fast staining.
 - Simple staining.
 - Gram staining.
 - Endospore staining.
14. Which of the following is a fungal pathogen responsible for causing athlete's foot?
- Candida albicans*
 - Trichophyton rubrum*
 - Aspergillus fumigatus*
 - Cryptococcus neoformans*
15. Which staining technique is used to visualize bacterial spores?
- Gram staining
 - Acid-fast staining
 - Capsule staining
 - Endospore staining
16. Which fungal genus is known for causing oral and genital infections, as well as invasive systemic infections in immunocompromised individuals?
- Trichophyton
 - Aspergillus
 - Candida
 - Cryptococcus
17. Fungal infections that affect the skin, hair, and nails are collectively known as:
- Mycoses.
 - Dermatophytoses.
 - Endophthalmitis.
 - Pneumocystosis.

18. Which of the following bacterial structures is composed primarily of peptidoglycan?
- Cell membrane
 - Capsule
 - Cell wall
 - Ribosome
19. Which fungal group includes the causative agent of thrush and vaginal yeast infections?
- Zygomycetes.
 - Ascomycetes.
 - Basidiomycetes.
 - Chytridiomycetes
20. Fungi can be classified based on their:
- Mode of reproduction.
 - Size.
 - Color.
 - All of the above
21. Which bacterial genus includes species responsible for causing the sexually transmitted infection gonorrhea?
- Neisseria
 - Treponema
 - Borrelia
 - Streptococcus
22. Which fungal infection is commonly associated with exposure to bird droppings in caves or old buildings?
- Blastomycosis.
 - Histoplasmosis.
 - Cryptococcosis.
 - Aspergillosis.
23. Which bacterial structure provides resistance to adverse environmental conditions and facilitates survival?
- Flagellum
 - Capsule
 - Ribosome
 - Plasmid

24. What is the primary purpose of using probiotics in managing bacteria in the human gut?
- To eliminate all bacteria from the gut
 - To introduce beneficial bacteria to promote a healthy gut microbiome
 - To replace antibiotics in the treatment of bacterial infections
 - To kill all bacteria, including beneficial ones
25. Antibiotics are most effective during which phase of bacterial growth?
- Lag phase
 - Exponential (log) phase
 - Stationary phase
 - Death phase
26. Which fungal genus is known for causing oral and genital infections, as well as invasive systemic infections in immunocompromised individuals?
- Trichophyton
 - Aspergillus
 - Candida
 - Cryptococcus
27. A facultative anaerobe can:
- Only grow in the presence of oxygen
 - Only grow in the absence of oxygen
 - Grow in the presence or absence of oxygen
 - Use oxygen for energy but cannot grow without it
28. Which of the following is NOT a characteristic of bacteria?
- Eukaryotic cells
 - Prokaryotic cells
 - Unicellular organisms
 - Can be spherical, rod-shaped, or spiral
29. Which bacterial structure is responsible for locomotion?
- Ribosome
 - Flagellum
 - Plasmid
 - Cell wall

30. Which of the following bacterial diseases is transmitted primarily through contaminated food and water?
- a) Tetanus
 - b) Cholera
 - c) Tuberculosis
 - d) Pneumonia

Section II: Short Answer Questions (20 Marks)

Attempt ALL questions.

31. [4 Marks]: Explain the significance of bacterial capsules?
32. [4 Marks]: Define the terms “opportunistic fungal infections” and provide examples of opportunistic fungal infections common in immunocompromised individuals.
33. [4 Marks]: Explain the process of bacterial transformation, transduction, and conjugation in relation to gene transfer and bacterial evolution.
34. [4 Marks]: Highlight on the main differences between fungi and bacteria in terms of cellular structure and reproduction.
35. [4 Marks]: What are biofilms, and how do they contribute to bacterial persistence and resistance to antibiotics.

Section III: (20 Marks) *Attempt any TWO (2) questions.*

36. [10 Marks]: With aid of a well-labelled diagram, describe the ultrastructure of a bacterium.
37. [10 Marks]: Describe categories of fungal infections and provide examples of each.
38. [10 Marks]: Explain the concept of antimicrobial resistance (AMR) and its impact on Public Health.