



*"Investing in Africa's Future"*

**COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES  
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES  
BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS**

**NLS 204 BACTERIOLOGY**

**END OF SEMESTER EXAMINATIONS**

**APRIL/MAY 2023**

**LECTURER: MR G.B HLEREMA**

**DURATION: 3 HOURS**

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***INSTRUCTIONS***

**The paper comprises of three sections (A, B and C).**

**Section A (20 marks)**

Answer all questions in this section.

Circle the correct answer

**Section B (35 marks)**

Answer all questions in this section.

**Section C (45 marks)**

Choose **three** questions. Credit will be given for logical, systematic and neat presentations.

**SECTION A: CIRCLE THE CORRECT ANSWER [20 MARKS]**

1 Which of the following is not a gram-negative organism?

- A Clostridium perfringens
- B Vibrio cholerae
- C Escherichia coli
- D Bordetella pertussis

2 Which of the following structures contains genes for enzymes and antibiotic resistance?

- A Plasmid
- B Pilus
- C Capsule
- D Plasma Membrane

3 Which of the following is not true concerning Staphylococcus aureus?

- A S. aureus is related to inflammation.
- B S. aureus can cause pneumonia
- C S. aureus can lead to acute bacterial endocarditis
- D S. aureus does not make coagulase

4 Which of the following microorganisms has not been linked to UTI's?

- A E. coli
- B Pseudomonas
- C Klebsiella
- D Haemophilus

5. A cluster of polar flagella is called

- A. lophotrichous
- B. amphitrichous
- C. monotrichous

D. petritrichous

6. Peptidoglycan accounts for \_\_\_\_\_ of the dry weight of cell wall in many gram positive bacteria.

A. 50% or more

B. About 10%

C. 11%+ 0.22%

D. About 20%

7. Which of the following is true about cell wall of gram-positive bacteria?

A. It consists of multiple layers

B. It is thicker than that associated with gram-negative bacteria

C. It contains teichoic acids

D. All of these

8. The organism which obtain their energy from chemicals are designated as

A. prototrophs

B. chemotrophs

C. organotrophs

D. autotrophs

9. The organism which grows best above 45°C are called

A. psychrophilic

B. mesophilic

C. thermophilic

D. any of these

10. Which of the following is/are not a gram-positive bacteria?

A. Streptococci

B. Pseudomonas

C. Mycobacteria

D. None of these

11. Which of the following is used for the proper maintenance and preservation of pure cultures?

- A. Periodic transfer to fresh media
- B. Preservation by overlaying cultures with mineral oil
- C. Preservation by lyophilization
- D. All of the above

12. Which of the following bacteria can grow in acidic pH?

- A. *Vibrio cholerae*
- B. *Lactobacilli*
- C. *Shigella*
- D. *Salmonella*

13. The production of sufficient acid by fermentation of glucose leads to decrease in pH such that pH of the medium falls below 4.5. Which of the following test can detect it?

- A. Indole test
- B. Methyl red test
- C. Citrate utilization test
- D. Voges-Proskauer test

14. An outbreak of sepsis caused by *Staphylococcus aureus* has occurred in the newborn nursery. You are called upon to investigate. According to your knowledge of the normal flora, what is the most likely source of the organism?

- A. Nose
- B. Colon
- C. Hand
- D. Throat

15. The coagulase test is used to differentiate

- A *Staphylococcus epidermidis* from *Neisseria meningitidis*
- B *Staphylococcus aureus* from *Staphylococcus epidermidis*
- C *Streptococcus pyogenes* from *Staphylococcus aureus*

D Streptococcus pyogens from Enterococcus faecalis.

16. The role of bacterial capsules as virulence factors is usually related to their ability to interfere with

- A Antibody binding
- B Antibacterial penetration of bacterial cells
- C Phagocytosis
- D The release of interferon gamma and other macrophage activating cytokines

17 Nutrient content and biological structures are considered as

- A Implicit factor for microbial growth
- B Intrinsic factor for microbial growth
- C Processing factor
- D None of the above

**TRUE (T) OR FALSE (F) QUESTIONS CIRCLE THE CORRECT ANSWER [3 MARKS]**

18 A patient develops explosive, watery diarrhea 24 hours after eating seafood. What bacterium is most likely involved?

- T F A. Campylobacter fetus
- T F B. Salmonella typhimurium
- T F C. Shigella flexneri
- T F D. Vibrio cholera

19 Which of the following bacteria is rarely associated with urinary tract infections?

- T F A. E coli
- T F B. Enterobacter spp
- T F C. Proteus spp
- T F D. Shigella spp

20 Which of the following bacteria is the most important cause of acute bacterial meningitis?

- T F A. Neisseria meningitidis
- T F B. Streptococcus pneumoniae
- T F C. Haemophilus influenzae
- T F D. Streptococcus pyogens

**SECTION B: SHORT ANSWERS [35 MARKS]**

**Answer all questions in this section**

B1. (i) Name the space found between inner membrane and outer membrane in gram negative bacterial cell wall and state its function. (3)

ii) Explain the structure of bacterial cell with the aid of a neatly labeled diagram. Also mention the roles of these structures. (7)

B2. List the four phases of bacterial growth and briefly describe what happens in each phase (8)

B3 Write principles of the following biochemical tests and give examples

i) Indole test (2)

ii) CLED test (3)

iii) Catalase test (2)

B4 i) Tuberculosis (TB) is an important infectious disease in sub Saharan Africa.

ii) Which organism causes TB? (1)

iii) Explain the structure of the cell wall for the causative organism (6)

iv) What virulence factors are associated with the pathogenicity of the causative organism (3)

**SECTION C: SHORT ANSWERS [45 MARKS]**

**Choose three questions in this section**

C1.a) Briefly describe contribution made by the following to the world of bacteriology?

i) Louis Pasteur ii) Robert Koch (5)

b) Describe the following terms used in bacteriology

(i) Normal flora (ii) Endospore (iii) Glycocalyx (iv) Plasmid (v) Conjugation (10)

C2. Write an essay on culture media, explaining the uses of different types of culture media in bacteriology (15).

C3.What you understand by bacterial toxins? (15).

C4. Describe the steps you would take to investigate the etiology of urinary tract infection from a urine sample (15).

C5. Describe the steps you would take to investigate the etiology of bacterial pneumonia from a throat swab (15)