



*"Investing in Africa's Future"*

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

**SLS 204 BACTERIOLOGY THEORY EXAMINATION  
END OF FIRST SEMESTER EXAMINATIONS**

**NOVEMBER 2018**

**LECTURER: E. MUGOMERI**

**DURATION: 3 HOURS**

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***INSTRUCTIONS***

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

**Section A (40 marks)**

Answer all questions in this section.

**Circle the correct answer**

Each correct answer (whether **True (T)** or **False (F)** carries  $\frac{1}{4}$  mark.

**Section B (20 marks)**

Answer all questions in this section.

**Section C (60 marks)**

Choose **three** questions. The whole section is out of 60.

Credit will be given for logical, systematic and neat presentations.

### SECTION A: TRUE (T) OR FALSE (F) QUESTIONS [40 MARKS]

1. Which of the following may contain fimbriae?  
T F A. Gram-positive bacteria  
T F B. Gram-negative bacteria  
T F C. Both (a) and (b)  
T F D. None of these
2. Bacteria having no flagella are unable to  
T F A. move  
T F B. reproduce  
T F C. stick to tissue surfaces  
T F D. grow in nutrient agar
3. Which of the following is true about cell wall of gram-positive bacteria?  
T F A. It consists of multiple layers  
T F B. It is thicker than that associated with gram-negative bacteria  
T F C. It contains teichoic acids  
T F D. All of these
4. The cell wall of gram-positive bacteria may contribute to the development of septic shock. Identify the component which is most associated with the induction of septic shock.  
T F A. Capsular protein  
T F B. Endotoxin  
T F C. Peptidoglycan  
T F D. Phospholipid
5. Which culture medium which would be most appropriate to isolate *Haemophilus influenzae* from this patient.  
T F A. Blood agar  
T F B. Chocolate bacitracin agar  
T F C. MacConkey agar  
T F D. Methicillin mannitol salt agar
6. The following areas of the human body are normally sterile  
T F A. small intestines  
T F B. colon  
T F C. mouth  
T F D. vagina
7. The cell walls of gram positive bacteria can be easily destroyed by the enzyme known as  
T F A. lipase

- T F B. lysozyme
- T F C. pectinase
- T F D. peroxidase

8. The gram-negative organisms is

- T F A. Actinomyces
- T F B. Bacillus
- T F C. Clostridium
- T F D. None of these

9. Catalase production is negative in which of the following?

- T F A. Streptococcus
- T F B. Salmonella
- T F C. Proteus
- T F D. Staphylococcus

10. The organisms that can be acid-fast stained is

- T F A. Nocardia
- T F B. Tubercle bacilli
- T F C. Lepra bacilli
- T F D. all of these

11. Which of the following bacteria lack a cell wall and are therefore resistant to penicillin?

- T F A. Cyanobacteria
- T F B. Mycoplasmas
- T F C. Vibrio cholerae
- T F D. Spirochetes

12. Flagella move the cell by

- T F A. many flagella beating in a synchronous, whip-like motion
- T F B. an individual flagellum beating in a whip-like motion
- T F C. spinning like a propeller
- T F D. attaching to nearby particles and contracting

13. Which of the following bacterial components are likely to contain useful antigenic components for the identification of bacteria by serologic tests?

- T F A. Capsule
- T F B. Cell wall
- T F C. Flagella
- T F D. Ribosomes

14. Each of the following statements concerning the Gram stain is correct except:

- T F A. Escherichia coli stains pink because it has a thin peptidoglycan layer
- T F B. Streptococcus pyogenes stains blue because it has a thick peptidoglycan layer
- T F C. Mycoplasma pneumoniae is not visible in the Gram's stain because it does not have a cell wall

- T F D. Mycobacterium tuberculosis stains blue because it has a thick lipid layer
15. An outbreak of sepsis caused by Staphylococcus aureus has occurred in the newborn nursery. What is the most likely source of the organism?
- T F A. Nose
- T F B. Colon
- T F C. Vagina
- T F D. Throat
16. Each of the following organisms is an important cause of urinary tract infections except:
- T F A. Klebsiella pneumoniae
- T F B. Escherichia coli
- T F C. Bacteriodes fragilis
- T F D. Proteus mirabilis
17. A 30 year old woman has non-bloody diarrhea for the past 14 hours. Which one of the following organisms is least likely to cause this illness?
- T F A. Streptococcus pyogens
- T F B. Clostridium difficile
- T F C. Shigella dysenteriae
- T F D. Salmonella enteritidis
18. Each of the following agents is a recognized cause of diarrhea except
- T F A. Clostridium perfringens
- T F B. Vibrio cholerae
- T F C. Enterococcus faecalis
- T F D. Escherichia coli
19. Each of the following statements about the classification of streptococci is correct except
- T F A. Pneumococci (Streptococcus pneumoniae) are alpha-hemolytic and can be serotyped on the basis of their polysaccharide capsule
- T F B. Enterococci are group D streptococci and can be classified by their ability to grow 6.5% sodium chloride
- T F C. Viridans streptococci are identified by Lancefield grouping, which is based on the C carbohydrate in the cell wall
- T F D. Although pneumococci and the viridans streptococci are alpha-hemolytic, they can be differentiated by the bile solubility test and their susceptibility to optochin
20. Which of the following bacteria has the lowest 50% infective dose (ID<sub>50</sub>)?
- T F A. Campylobacter jejuni
- T F B. Salmonella typhi
- T F C. Vibrio cholerae
- T F D. Shigella sonnei
21. Which of the following disease is best diagnosed by serologic means?
- T F A. Pulmonary tuberculosis
- T F B. Gonorrhea

- T F C. Actinomycosis  
T F D. Q Fever

22. The coagulase test is used to differentiate

- T F A. Staphylococcus epidermidis from Neisseria meningitidis  
T F B. Staphylococcus aureus from Staphylococcus epidermidis  
T F C. Streptococcus pyogenes from Staphylococcus aureus  
T F D. Streptococcus pyogenes from Enterococcus faecalis

23. The infectiveness of the organism responsible for this urinary tract infection is associated with specific,

- T F A. Exotoxins  
T F B. K antigens  
T F C. Fimbriae  
T F D. Plasmids

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

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

25. A mutation in DNA gyrase is likely to result in resistance to which one of the following antibiotics?

- T F A. Amphotericin B  
T F B. Ciprofloxacin  
T F C. Penicillin  
T F D. Rifampin

26. Resistance of Staphylococcus aureus to methicillin is most often caused by

- T F A. Alternation of the major target for the drug  
T F B. cell membrane impermeability  
T F C. decreased uptake of the antibiotic  
T F D. Synthesis of a potent Beta Lactamase

27. The molecular basis for the effect of cholera toxin on duodenal mucosal cells is

- T F A. Activation of adenylate Cyclase  
T F B. increased generation of cyclic adenosine monophosphate (cAMP)  
T F C. Ribosylation of a guanosine triphosphate (GTP) binding protein.

28. Which one of the following factors, released by heating a suspension of sheep erythrocytes, is required for the growth of Haemophilus Influenzae in chocolate agar?

- T F A. Coagulase  
T F B. Nicotinamide adenine dinucleotide (NAD)  
T F C. Hemolysin

- T F D. Protein A
29. Which one of the following bacteria is most likely to be relatively resistant to antibiotics as a result of the relative impermeability of its cell wall?
- T F A. Haemophilus influenzae
- T F B. Pseudomonas aeruginosa
- T F C. Staphylococcus aureus
- T F D. Streptococcus pyogenes
30. 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
31. Which of the following bacteria is not a most common bacterial pathogen causing diarrhea?
- T F A. Shigella spp
- T F B. Salmonella spp
- T F C. Enterococcus faecalis
- T F D. Campylobacter spp
32. Which of the following bacteria is rarely associated with urinary tract infections?
- T F A. coli
- T F B. Enterobacter spp
- T F C. Proteus spp
- T F D. Shigella spp
33. Which of the following statement regarding Campylobacter jejuni is not correct?
- T F A. It is commonly cultured in antibiotic containing media
- T F B. Incubation temperature is 42°C
- T F C. It is cultured in an atmosphere containing 5% O<sub>2</sub> and 10%CO<sub>2</sub>
- T F D. It is a normal flora of intestines
34. Which of the following bacteria is not most important causes of acute bacterial meningitis?
- T F A. Neisseria meningitidis
- T F B. Streptococcus pneumoniae
- T F C. Haemophilus influenzae
- T F D. Streptococcus pyogens
35. Which of the following Gram negative rod is not a blood borne bacterial pathogen?
- T F A. Shigella spp
- T F B. Escherichia coli
- T F C. Klebsiella pneumoniae
- T F D. Pseudomonas aeruginosa

36. Throat culture is not useful to diagnose  
T F A. Streptococcal sore throat  
T F B. Diphtheria  
T F C. Thrush  
T F D. Pneumonia
37. Stool culture is primarily recommended when the complaint is  
T F A. bloody diarrhea (dysentery, enterocolitis)  
T F B. watery diarrhea  
T F C. for both bloody and watery diarrhea  
T F D. an indication of anaerobic infection
38. Which of the following bacteria causing sexually transmitted disease cannot be grown on artificial media?  
T F A. Neisseria gonorrhoeae  
T F B. Chlamydia trachomatis  
T F C. Treponema pallidum  
T F D. Treponema pallidum and Chlamydia trachomatis
39. Which of the following test is not recommended for the diagnosis of Syphilis?  
T F A. VDRL test  
T F B. Culture  
T F C. FTA-ABS test  
T F D. MHA-TP test
40. The staphylococcal intoxication refers to presence of  
T F A. an enterotoxin  
T F B. neurotoxin  
T F C. mycotoxin  
T F D. All of these

## **SECTION B: SHORT ANSWERS [20 MARKS]**

**Answer all questions in this section**

- B1. Group A Strep infections are considered suppurative or pus-forming. Explain the source of the pus found in these infections
- What does pus consist of? (2)
  - Explain what non-suppurative sequelae mean (2)
  - Identify and describe two of the non-suppurative sequelae (6)

B2. Write principles of the following biochemical tests and give examples

- (i). Catalase test (2)
- (ii). Indole test (3)
- (iii). Citrate test (2)
- (iv). Bound and free coagulase test (3)

### **SECTION C: SHORT ANSWERS [60 MARKS]**

**Choose three questions in this section**

- C1. Distinguish the structural differences between Gram positive and Gram negative bacteria (20)
- C2. Discuss the different media types with examples (20).
- C3. Describe the steps in the process of establishment of an infection from attachment to tissue damage (20).
- C4. Describe the bacterial aetiology of the pneumonia (20).
- C5. Describe the bacterial aetiology of meningitis (20).