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University Examinations 2024/2025

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY

HML 3215: FUNDAMENTALS OF MEDICAL BACTERIOLOGY

DATE: JANUARY 2024

TIME: 3 HOURS

INSTRUCTIONS:

Answer *All* questions

Ensure that all your answers are properly numbered

Part I multiple Choice Questions (MCQ): Write the correct answer on the space provided in the answer booklet. Each MCQ is one mark

Part II: Short Answer Questions – Answer questions following each other on the answer booklet

Part III: Long Answer Questions – Answer each question on the answer booklet

SECTION A: MULTIPLE CHOICE QUESTIONS (20 marks)

- Which of the following structures contains genes for enzymes and antibiotic resistance?
 - Plasmid
 - Pilus
 - Capsule
 - Plasma Membrane
- Which of the following is the most important structure related to microbial attachment to cells?

- a) Flagellum
 - b) Plasmid
 - c) Peptidoglycan
 - d) Glycocalix
3. Which of the following is not a gram-negative bug?
- a) *Clostridium perfringens*
 - b) *Vibrio cholerae*
 - c) *Escherichia coli*
 - d) *Bordetella pertussis*
4. Which of the following is not true related to endotoxins?
- a) Endotoxins are secreted from cells.
 - b) Can be linked to Meningococemia
 - c) Produced by gram negative microorganisms
 - d) Can cause fever
5. Which of the following microorganisms stain well?
- a) *Escherichia coli*
 - b) *Legionella pneumophila*
 - c) *Treponema*
 - d) *Chlamydia*
6. Which of the following microorganisms are not matched correctly with the appropriate isolation media?
- a) Fungi — Sabourand's agar
 - b) *Neisseria gonorrhoeae* — Pink colonies media
 - c) *Haemophilus influenzae* — Chocolate agar
 - d) *Mycobacterium tuberculosis* — Lowenstein-Jensen agar
7. Which of the following diseases and bacteria are matched up incorrectly?
- a) Cellulitis — *Pasteurella multocida*

- b) Tularemia — *Francisella tularensis*
 - c) Gastritis — *Helicobacter pylori*
 - d) Lyme disease — *Yersinia pestis*
8. Which of the following diseases and bacteria are matched up incorrectly?
- a) *Treponema pallidum* — Syphilis
 - b) *Tinea nigra* — *Cladosporium werneckii*
 - c) *Borrelia burgdorferi* — Lyme disease
 - d) *Yersinia enterocolitica* — Diphtheria
9. 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
10. Which of the following signs and symptoms is not linked to *Haemophilus influenzae*?
- a) Otitis media
 - b) Pneumonia
 - c) Malaria
 - d) Epiglottitis
11. Nagler's reaction aids the laboratory in the identification of
- a) *Vibrio cholera*
 - b) *Salmonella typhi*
 - c) *Brucella abortus*
 - d) Alpha toxin produced by *Clostridium perfringens*.
12. Double zone of hemolysis on blood agar plate are associated with
- a) *Streptococcus pyogenes*
 - b) *Staphylococcus aureus*

- c) *Clostridium perfringens*
 - d) *E. coli*
13. *Bacillus anthracis* causes
- a) Wool sorter disease
 - b) Typhoid
 - c) Food poisoning
 - d) Undulant fever
14. The round terminal spore that has a "drum stick" appearance belongs to the following
- a) *Clostridium botulinum*
 - b) *Clostridium tetani*
 - c) *Bacillus anthracis*
 - d) *Clostridium welchii*
15. *Corynebacterium diphtheria*
- a) Is a gram negative
 - b) Easily decolourized by mineral acids
 - c) Exhibits marked pleomorphism in form of Chinese letters
 - d) Form spores
16. The difference between staphylococcus and streptococci may be based on
- a) Bile esculin
 - b) Bacitracin sensitivity
 - c) Coagulase reaction
 - d) Catalase reaction
17. Selenite— F broth is a selective enriched medium for the following organism
- a) *Salmonella*
 - b) *Proteus*
 - c) *Enterococci*
 - d) *Mycobacterium*

18. Which of the following organism will give a positive reaction for ELEK'S test

- a) *Bacillus anthracis*
- b) *Brucella abortus*
- c) *Corynebacterium diphtheria*
- d) *Proteus morganii*

19. The most common cause of enteric fever in Kenya is

- a) *Salmonella typhi*
- b) *Salmonella paratyphi*
- c) *Salmonella typhimurium*
- d) *Salmonella enteritidis*

20. The most common site of infection with coliforms bacilli is

- a) Upper respiratory tract
- b) Lower respiratory tract
- c) urinary tract
- d) Gall bladder

SECTION B: SHORT ANSWER QUESTIONS (40 MARKS)

1. Outline the resistance mechanisms of *Staphylococcus aureus* to methicillin. (5 Marks)
2. Write short notes on bacterial endospores. (5 Marks)
3. Write short notes on pathogenesis of botulism. (5 Marks)
4. Outline the laboratory diagnosis of *Streptococcus agalactiae*. (5 Marks)
5. Describe the clinical manifestations of *Bacillus anthracis* infections. (5 Marks)
6. Justify the source and mode of action of the shigatoxin. (5 Marks)
7. Write short notes on mycetoma of bacterial origin. (5 Marks)
8. Outline the significance of Genexpert in diagnosis of tuberculosis. (5 Marks)

SECTION C: LONG ANSWER QUESTIONS (20 MARKS)

SECTION C: LONG ANSWER QUESTION (20 MARKS)

QUESTION ONE (20 MARKS)

- a) Describe mechanisms of pathogenicity of *V. cholerae*. (4 marks)
- b) Give details of *V. cholerae* diagnosis in the laboratory. (12 marks)
- c) Outline pathogenicity of *E. coli*. (6 marks)

QUESTION TWO (20 MARKS)

- a) Discuss isolation of *S. pneumoniae* from various samples in the laboratory (CSF, blood, throat swab). (10 marks)
- b) Discuss strategies used by bacteria to evade the hosts' immune system. (10 marks)