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FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
SCHOOL	VETERINARY MEDICINE		
DEPARTMENT	PARACLINICAL STUDIES		
PROGRAMME	VETERINARY MEDICINE		
MODULE	VETERINARY MICROBIOLOGY II		
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DURATION	**3 HOURS**	**MARKS**	150

FIRST OPPORTUNITY EXAMINATION

Examiners: Prof. C Ntahonshikira, Prof. S Khaiseb and Dr L Mwense
Internal Moderator: Dr F Chitate
External Moderator: Prof. F Giovanni

This Paper consists of SIX (6) pages including the front page

Instructions

Students should answer all questions
and
Hand in this question paper together with the answer booklet

SECTION A: MULTIPLE CHOICE QUESTIONS. **[15 MARKS]**

Choose the correct answer **[15 marks, 1 mark each]**

1. Scrapie is a chronic disease of which of the following animals?
    a. Sheep
    b. Mouse
    c. Mink
    d. Cow
2. Which concentration of ethanol is most effective for disinfection?
    a. 30%
    b. 50%
    c. 70%
    d. 100%
3. What is the correct order of staining reagents in Gram-Staining?
    a. Crystal violet, alcohol, iodine solution, safranin
    b. Crystal violet, iodine solution, alcohol, safranin
    c. Crystal violet, safranin, alcohol, iodine solution
    d. Iodine solution, crystal violet, alcohol, safranin
4. Which of the following is the example of Gram-negative bacteria?
    a. *Streptococcus equi*
    b. *Eschericia coli*
    c. *Staphylococcus aureus*
    d. *Bacillus anthracis*
5. In the classification of bacteria according to shape, which among the following refers to cuboidal arrangement of bacterial cells?
    a. Tetrads
    b. Staphylococci
    c. Sarcinae
    d. Streptococci
6. The organisms which can use reduced inorganic compounds as electron donors are known as:
    a. chemotrophs
    b. organotrophs
    c. lithotrophs
    d. phototrophs
7. According to Bergey's Manual of Systematic Bacteriology, prokaryotes that lack a cell wall belong to the group?
    a. Gracilicutes
    b. Firmicutes
    c. Tenericutes
    d. Mendosicute

8. Which of the following best describes pathogenicity?
    a. The ability of a pathogen to invade a host
    b. The degree of damage a pathogen causes
    c. The ability of a microorganism to cause disease
    d. The ability of a pathogen to replicate
9. Which of the following bacterial components is most associated with inducing septic shock?
    a. Peptidoglycan
    b. Lipopolysaccharide (LPS)
    c. Plasmids
    d. Flagella
10. Which of the following contributes to the development of antibiotic resistance in bacteria?
    a. Overuse of antibiotics
    b. Bacterial quorum sensing
    c. Loss of pathogenicity
    d. Increased host immunity
11. What is the agar of choice when performing culture and sensitivity tests?
    a. Sabouraud dextrose agar
    b. Mueller-Hinton agar
    c. Blood agar
    d. MacConkey agar
12. What is the type of hemolysis that creates a narrow bank of greenish discoloration around the colony when grown on a blood agar plate?
    a. Alpha hemolysis
    b. Gamma hemolysis
    c. Beta hemolysis
    d. Delta hemolysis
13. Stain useful in the evaluation of fungal organisms
    a. Lactophenol cotton blue
    b. Methylene blue
    c. Crystal violet
    d. Giemsa stain
14. An appearance indicating a positive or motile result in motility media:
    a. Concentrated growth at the bottom of the tube
    b. Diffuse growth throughout the media
    c. Concentrated growth on top of the media
    d. Growth only along the needle stab in the media
15. 18 to 24 hours following inoculation of a sample likely to contain pathogenic bacteria is:
    a. The ideal time to increase temperature of the agar plate Gram positive bacteria
    b. Optimal time to examine agar plate
    c. Best time to discard the agar plate
    d. Recommended time to add more bacteria to the agar plate

SECTION B: TRUE/FALSE QUESTIONS AND COMPLETE SENTENCES **[30 MARKS]**

QUESTION 1. Indicate whether the statement is TRUE or FALSE. **[15 marks, 1 mark each]**

1. Listeria monocytogenes can survive and replicate within macrophages and epithelial cells, making it a facultative intracellular pathogen.
2. Virulence factors of bacteria include toxins, adhesion molecules, and immune evasion mechanisms that contribute to disease severity.
3. Hydrogen sulfide (H_2S) production is a universal characteristic of all bacterial pathogens.
4. Exotoxins are heat-stable toxins that remain active even after exposure to high temperatures.
5. Boiling water is commonly used in the laboratory as a method of sterilization.
6. *Cryptococcus* is a genus of bacteria
7. *Clostridium* species are anaerobic, spore forming, spindle shaped bacteria
8. All coagulase negative staphylococci are non-pathogenic as coagulase enzyme is an indicator of pathogenicity in this genus.
9. Both Bacillus and Clostridium species cause soil infections.
10. Aspergillosis is a very common avian disease.

QUESTION 2. FILL /COMPLETE THE FOLLOWING SENTENCES **[15 MARKS, 1 marks each]**

1. In binomial nomenclature, an organism's scientific name includes its ..... and.....
2. A ..... is a disease-causing microorganism.
3. Mannitol salt agar is both ..... and .....
4. Movement of a bacterium towards a nutrient source is called .....
5. For demonstration of Streptococci haemolysis ..... agar is commonly used.
6. Rebecca Lancefield identified 19 groups of Streptococci and named it as .....
7. Based on pathogenesis clostridia classified into ....., ... and .....
8. Woman's curling hair type of growth is characteristic of .....
9. The test which is commonly used to demonstrate leptospires is.....
10. Fungal toxins are referred to as ..... and the disease they produced is termed as .....

SECTION C: SHORT ANSWER QUESTIONS. **[30 MARKS]**

QUESTION 1. Name the three antigenic components of *Bacillus anthracis* complex toxin. [3]

QUESTION 3. Give the common and differential characteristics of *Bacillus* and *Clostridium* species. [4]

QUESTION 4. Define immunity in detail and mention its two major classifications [3]

QUESTION 5. What's the difference between Endocytosis and phagocytosis? [2]

QUESTION 6. Name two physical methods of microbial control. [2]

QUESTION 7. Briefly discuss the habitat of leptospira. [3]

QUESTION 8. Name three (3) typical zygomycetes. [3]

QUESTION 9. Which group of fungi is called "lid lifters" and why? [3]

QUESTION 10. Define the term "virus". [2]

QUESTION 11. Describe the factors influencing the duration of viremia. [3]

QUESTION 12. Define "pasteurization" [2]

SECTION D: STRUCTURED QUESTIONS **[75 MARKS]**

QUESTION 1. **[10]**

a. Explain how MacConkey agar is both selective and differential [2]

b. Discuss what happens in each of the bacterial growth curve phase. [8]

QUESTION 2 **[10]**

a. Give five (5) key points of the genus *Staphylococcus*. [5]

b. Give five (5) general characteristics of spirochaetes. [5]

QUESTION 3. **[10]**

a. Define disinfection and sterilization. [4]

b. What are the key differences between disinfection and sterilization in terms of effectiveness and purpose? Provide two examples of methods used to achieve each process? [6]

QUESTION 4. **[10]**

a. Briefly discuss the habitat of leptospira. [5]

b. Discuss the key differences between endotoxins and exotoxins, including their mechanisms of action and impact on the host. [5]

QUESTION 5. What are the key stages in viral infection and pathogenesis? **[10]**

QUESTION 6. **[10]**

a. What types of samples are commonly collected for viral diagnosis? [6]

b. What are the key considerations when collecting samples for viral diagnosis? [4]

QUESTION 7. **[15]**

Listeria monocytogenes is a facultative intracellular pathogen that can infect both macrophages and epithelial cells. It possesses three key virulence factors that enable it to invade host cells, survive intracellularly, and spread to neighbouring cells.

a. Name these three virulence factors. [3]

b. Explain the role of each virulence factor in the infection process, including how they facilitate bacterial invasion, survival inside host cells, and cell-to-cell spread. [12]

END OF PAPER