

CHUKA



UNIVERSITY

Knowledge is Wealth (*Sapientia divitia est*) Akili ni Mali

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BOTA 131: GENERAL MICROBIOLOGY: Y1S2, JAN-APRIL 2025.

SECTION A.

Answer all the Questions

1. a). Outline the **FOUR** Koch's Postulates for identifying the causative agent of infectious diseases 4mks
b). Define the term 'animalecule' 1mk
2. a) Differentiate *Staphylococcus* and *Streptobacillus* and draw their typical shapes 2mks
b) Using a diagram, differentiate between lophotrichous and monotrichous flagella 2mks
c) State the main function of bacterial plasmids 1mk
3. a) List **THREE** characteristics of fungi 3mks
b) Using a diagram, describe fungal mycelia 2mks
4. Describe **ONE** use of each of the following items in a microbiology laboratory
 - i) Autoclave 1mks
 - ii) Biosafety cabinet 1mks
 - iii) Incubator 1mks
 - iv) Wire loop 1mks
 - v) 70% ethanol 1mks
5. a) Draw and label the structure of a bacteriophage 3mks
b) Describe the structural differences between a helical capsid and an icosahedral capsid 2mks
6. a) State the temperature range and provide an example of a bacterium for each of the following
 - i. Psychrophiles 2mks
 - ii. Mesophiles 2mks
c) Differentiate between a mixed culture and a pure culture 1mks

SECTION B.
Answer two Questions

7. a). Describe the step-by-step procedure of Gram staining, starting from the preparation of the slide (16mks)
b) Explain the differences in the cell wall structure of Gram-positive and Gram-negative bacteria and how this affects their Gram stain results (4mks)
8. a) Discuss **FIVE** benefits of microorganisms in agriculture and provide examples for each benefit (10mks)
b) Discuss **FIVE** biotechnology products produced by microorganisms through industrial fermentation, with examples (10mks)
9. Discuss various methods of dry heat and moist heat sterilization techniques (20mks)
10. a) Describe batch culture and explain the events that occur during each growth phase (14mks)
b) Discuss **THREE** advantages of batch culture in microbial processes (6 mks)

