

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN  
MICROBIOLOGY AND BIOTECHNOLOGY**

**BOTA 338: LABORATORY TECHNIQUES IN BACTERIOLOGY**

**STREAMS:**

**TIME:2HOURS**

**DAY/DATE: THURSDAY 13/04/2023**

**2.30 P.M. –4.30 P.M.**

**INSTRUCTIONS**

**Section A (30 marks). Answer all the questions**

1. a). State the function of each of the following parts of a light microscope (2 marks)
  - i) Condenser
  - ii) Diaphragm lever
- b). Explain the principle applied in the use of the following microscopes to visualize specimens
  - i) Fluorescence microscope
  - ii) Scanning electron Microscope (2 marks)
- c) Explain the term resolution as used in microscopy (1 mark)
2. a). Illustrate the following bacterial cell morphology (2 marks)
  - i) Staphylococcus
  - ii) Streptococcus
- b.) Explain the importance of fixation before bacterial cell staining (1 mark)
- c). Explain the principle of negative staining of bacterial cells (2 marks)
3. a). State the role of the following during carbohydrate fermentation test (4 marks)
  - i) Phenol red indicator
  - ii) Duhram tube
- b). Identify the enzyme involved in starch hydrolysis (1 mark)
4. Explain the principle of  $\beta$ -galactosidase activity test in identification of bacteria (5 marks)

5. Explain the application of urease activity test to identify *Proteus* from the other members of Enterobacterales (5 marks)
6. a) Explain why mycobacteria are categorized as acid fast (1 mark)
- b) Explain how the motility medium is used to differentiate motile and non-motile bacteria (4 marks)

**Section B. Answer two questions**

7. Describe the Gram reaction under the following;
- i) Gram stain procedure ii) The principle of its differential staining (20 marks)
8. Discuss the use of Indole, Methyl red, Voges-Proskauer, Citrate tests (IMViC) in the identification of enteric bacteria (20 marks)
9. Describe the principle and the procedure of endospore and capsule staining (20 marks)
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