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University Examinations 2024/2025

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN FOOD SCIENCE AND TECHNOLOGY

AFT 3203: PRINCIPLES OF MICROBIOLOGY

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS:

- Answer Question one and any other two

QUESTION ONE (30 MARKS)

- Define the following terms:
 - Sterilization (1 mark)
 - Antiseptic (1 mark)
 - Sanitizer (1 mark)
- Describe the general characteristics of viruses (3marks)
- Assume you discovered a new organism: it is multicellular, is nucleated, is heterotrophic, and has cell walls. To what kingdom does it belong? (1mark)
- Differentiate between gram positive and gram negative bacteria (6marks)
- Define a pathogen, and differentiate between the two classes of pathogens (5marks)
- Differentiate between a mixed culture and a pure culture (2marks)
- What are aseptic techniques? (2marks)
- You have been given the responsibility of controlling microbial contamination in administration offices in Mount Kilimanjaro crisps factory. Highlight five criteria you would use to select antiseptics that will be used routinely (5marks)
- Highlight the economic importance of fungi (3marks)

QUESTION TWO (20 MARKS)

a) Microorganism can be identified/classified using different criteria. Explain the following criteria in detail giving the microbial classification under each criterion

i. Gas requirements (4marks)

ii. Nutrition and metabolism (6marks)

b) Study the following two tables. Which of the following organisms are most closely related? Are any two the same species? On what did you base your answer? (5 marks)

Table 1

Characteristics	A	B	C	D
Morphology	Rod	Coccus	Rod	Rod
Gram reaction	+	-	-	+
Glucose utilization	Fermentative	Oxidative	Fermentative	Fermentative
Production of acids	Present	Present	Absent	Absent
% of Guanine and Cytosine	48-52	23-40	50-54	49-53

Table 2

Organism	%DNA hybridisation
A and B	5-15%
A and C	5-15%
A and D	70-90%
B and C	10-20%
B and D	2-5

c) Compare archaea and bacteria; bacteria and eukarya; and archaea and eukarya. (5marks)

QUESTION THREE (20 MARKS)

a) List five organelles found in a bacteria cell and describe their function (10 marks)

b) Describe five intrinsic parameters that influence the growth of microorganisms (10 marks)

QUESTION FOUR (20 MARKS)

a) You are tasked with growing microorganisms in the lab, in order perform this task, highlight and explain five microbial requirements that you would need to consider. (10 marks)

b) Discuss the physical agents that may be used in the control of microorganisms (10 marks)