

UNIVERSITY OF RUHUNA

FACULTY OF FISHERIES AND MARINE SCIENCES & TECHNOLOGY

Academic Year 2023/ 2024

Bachelor of Science Honors in Fisheries and Marine Sciences Degree

Level III, Semester I Examination – October/ November 2024

FAQ 3132: Microbiology for Aquaculture and Fisheries

Time: 1 hour and 30 minutes

Answer any three (03) questions.

1.

- a) Summarize the main steps in the process of formation of a microbial biofilm. (10 marks)
- b) "Microbial biofilms in aquaculture can be beneficial if they are properly managed". Defend this statement. (40 marks)
- c) Summarize the following. (50 marks)
- I) Bacterial cell wall
 - II) pH and osmotic pressure as growth requirements of bacteria
 - III) Indirect methods to enumerate bacteria
 - IV) Trace elements and organic growth factors for bacterial growth
 - V) Obtaining pure bacteria cultures from a given water sample

2.

- a) Compare the following. (25 marks)
- I) Types of bacterial groups classified by their temperature tolerance
 - II) Selective media and differential media used to culture bacteria
 - III) Cellular respiration and fermentation of bacteria
 - IV) Two common methods used for long term preservation of bacteria
 - V) Two forms of bacterial glycocalyx
- b) Argue about the following statements.
- I) Bacterial plasma membrane has a selective permeability.
 - II) Some photoautotrophic bacteria are anoxygenic.
 - III) Iron, Copper, Zinc, Phosphorus and Sulfur are considered as trace elements required for bacterial growth.



- IV) Lipid and protein metabolism by bacteria has several benefits. (20 marks)
- c) Write a comparative report on direct methods used to measure microbial growth. (55 marks)
- 3.
- a) "Instead of eliminating all microorganisms, managing the microbial community is the preferred approach in aquaculture." Justify this statement. (10 marks)
- b) Compare the "Probiotics" and "Prebiotics". (10 marks)
- c) List the various methods used in aquaculture to deliver probiotics to the host. (10 marks)
- d) Summarize the different modes of action of probiotics to benefit their host. (70 marks)
- 4.
- a) "Biofloc technology not only reduces the need for water exchange but also provides an additional source of protein for fish." Justify this statement. (30 marks)
- b) Describe two methods for implementing biofloc technology in aquaculture with suitable illustrations. (10 marks)
- c) List the advantages and disadvantages of biofloc technology. (10 marks)
- d) K-selection is a strategy used for managing microbial communities in aquaculture. Describe two methods to achieve K-selection in aquaculture. (50 marks)
5. Write short notes on **any four (04)** of the following.
- a) Bacterial endospore
- b) Gut microbes of fish
- c) Oxygen requirements of bacteria
- d) Green water systems
- e) Methods to improve host resistance in aquaculture (100 marks)

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