



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2016/2017

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR
THE DEGREE OF BACHELOR OF SCIENCE IN FISHERIES AND
AQUACULTURE AND BACHELOR OF SCIENCE IN AQUATIC
RESOURCE CONSERVATION & DEVELOPMENT
WITH INFORMATION TECHNOLOGY**

MAIN CAMPUS

AFN 206: AQUACULTURE ENGINEERING

Date: 12th June, 2017

Time: 12.00 - 3.00pm

INSTRUCTIONS:

- Answer ALL Questions in section A and any other THREE in section B.



SECTION A: Answer ALL questions in this section (40 marks)

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1. a). Define the term Aquaculture engineering (2 marks)
b). Outline the factors considered in selecting fish species for culture (2 marks)
 2. a) Explain briefly the significance of the fish pond site selection in an aquaculture enterprise (2 marks)
b). Identify the problems that may arise if earthen fish pond is not properly designed and constructed (2 marks)
 3. Describe the constituents of cost of production in aquaculture enterprise (4 marks)
 4. Explain briefly the main components of land-based fish production farm (4 marks)
 5. a). Outline the qualities of a good pond dyke. (2 marks)
b). List the construction and design activities aimed at limiting seepage in earthen fish ponds (2 marks)
 6. Explain the purpose of the following in a fish pond
 - a) Freeboard (1 mark)
 - b) Dyke (2 marks)
 - c) Core trench (1 mark)
 7. Distinguish between intensive aquaculture system and extensive aquaculture system in-terms of;
 - a) Productivity (1 mark)
 - b) Labor intensity (1 mark)
 - c) Cost of production (1 mark)
 - d) Incidence of disease outbreaks (1 mark)
 8. Calculate the amount of feed (in grams) utilized per day by tilapia in a 1000m³ litre pond given an average weight of the fish as 30g (take stocking density at 3 fish per cubic metre. (4 marks)
 9. Explain the problems associated with low pH in fish culture unit (4 marks)
 10. Describe the following methods used to remove particles at the water intake in fish farming.
 - a) Mechanical filters and micro screens (2 marks)
 - b) Depth filtration – granular medium filters (2 marks)

SECTION B: Answer any THREE questions from this section (30 marks)

11. A newly constructed earthen fish pond measuring 60 metres by 30 metres is to be filled from a stand pipe discharging 80 litres in one minute. Provide the following estimates to the farmer to aid his planning.
- a) The amount of water required (in litres) to fill the pond given depth of 1.15 m and 0.85 m for deep-end and shallow-end respectively (Assume no Freeboard and Water loss = 0). (4marks)
 - b) If this pond would lose 300litres per day due to seepage and evapotranspiration, and leaving a freeboard of 15cm, how long (in-terms of hours) will it take to fill it (3 marks)
 - c) Taking into account the water losses, calculate how much will be spent in filling this pond (take cost of water to be Ksh 35 per cubic metre) (1 marks)
 - d) Estimate the number of tilapia fingerlings to be stocked in this pond (take stocking density to be 3 fish per cubic metre. (1marks)
 - e) Estimate the amount of feed (in grams) utilized per day by tilapia in this pond given an average weight of the fish as 75g and a feeding rate of 3.2% (1 marks)
12. Discuss aquaculture systems under the following headings
- a) Intensive system (5 marks)
 - b) Extensive system (5 marks)
13. a). Distinguish between cage and pen fish culture units. (4 marks)
- b). Explain factors considered in the choice, design and siting of fish cages (4 marks)
 - c). Highlight the challenges of practicing aquaculture in the sea (2 marks)
14. a). Explain the term feed formulation as used in aquaculture (2 marks)
- b). Define the term food conversion ratio (FCR) as used in aquaculture and highlight its importance to the farmer (2 marks)
 - c). Using Pearson Square method, calculate quantities of rice bran, corn, cotton seedcake and shrimp meal you will require to formulate 2000kg feed of 38% Crude Protein. The crude protein levels for the ingredients are given as follows; (5 marks)

	Ingredient	% CP	Cost per Kg (Ksh)
1	Rice bran	13.96	12.00
2	Corn	10.2	30.50
3	Cotton seed cake	38.8	30.50
4	Shrimp meal	52.7	51.50

- d).Estimate the cost of formulating the feed in part c) above (1 marks)