

**UNIVERSITY OF AGRICULTURE, ABEOKUTA**  
**COLLEGE OF ENVIRONMENTAL RESOURCES MANAGEMENT**  
**DEPARTMENT OF AQUACULTURE AND FISHERIES MANAGEMENT**  
**SECOND SEMESTER EXAMINATION 2009/2010 SESSION**

**FIS 504: Advances in Fish Nutrition**

**INSTRUCTION: Answer Three Questions in all, with at least one from each section**

**TIME: 2 Hours**

**SECTION A**

1a. Define and state the requirements for feed formulation.

b. Formulate a ration containing 40% crude protein (C.P). Use fish meal (65% C.P), Soyabean meal (43% C.P) and sunflower seed meal (37% C.P) in the ratio 2:2:1. Replace soyabean meal with pigeon pea meal (35% C.P) at 15% level. Use maize (10% C.P) and pineapple peel meal (6% C.P) and energy sources in the ratio 2:1. Fixed ingredients are: Oil = 5%, Vit Premix = 1%, DCP = 0.5%, Salt = 0.25%. Calculate weight and protein contributions of each ingredient.

2a. What are vitamins?

b. Write short notes on each of these vitamins:

- (i) Vitamin C
- (ii) Vitamin E

**SECTION B**

3a. Fish behave like diabetic humans. Briefly discuss.

b. Giving three examples each, discuss “macro” and “micro” nutrients required by finfish.

4a. What are the major issues to be considered in fish feed formulation and production.

b. Differentiate between supplementary and complete fish feeds.

5. Define the following indices for evaluating fish feed quality:

- I. Specific Growth Rate (SGR)
- II. Food Conversion Efficiency (FCE)
- III. Food Conversion Ratio (FCR)
- IV. Protein Efficiency Ratio (PER)