JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE IN ANIMAL SCIENCE

3RD YEAR 2ND SEMESTER 2019/2020 ACADEMIC YEAR

REGULAR

COURSE CODE: AAS 3323

COURSE TITLE: RATION FORMULATION

EXAM VENUE: **STREAM: (BSc. Animal Science)**

DATE: **EXAM SESSION:**

TIME: 2HOURS

Instructions

1. **Answer ALL questions in Section A (compulsory) and ANY TWO questions in Section B**
2. **Candidates are advised not to write on the question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A [30 MARKS]

Answer ALL questions in this section

1. Identify three main types of carbohydrates consumed by ruminants and give their sources. (3 marks)
2. Give advantages and disadvantages of adding oils to broiler rations. (3 marks)
3. State two main sources of phosphorus and one main source of calcium in animal feeds. (3 marks)
4. Give main advantages and disadvantages of incorporating molasses in ruminant feeds. (3marks)
5. Distinguish between dry milling and wet milling in maize processing. (3 marks)
6. Explain the trial and error method of ration formulation. (3 marks)
7. Using Double Pearson Square method, formulate a ration containing 18% crude protein and energy of 2.7 Mcal/kg of feed by using the following information:
   Maize: crude protein (8.0%); Energy (3.42 Mcal/kg)
   Maize bran: crude protein (10.6%); Energy (2.50 Mcal/kg)
   Fish meal: crude protein (52%); Energy (2.80 Mcal/kg) Show your working. (6 marks)
8. State the meaning of slack space in ration formulation. (3 marks)
9. Explain the concept of least cost ration formulation. (3 marks)

SECTION B [40 MARKS]

Answer ANY TWO questions from this section

10.
   a) Describe utilization of dried whey protein concentrate, fish meal and blood meal in animal nutrition. (10 marks)
   b) Formulate a High Yield Dairy Ration containing 18% Crude Protein using two feedstuffs: Maize bran (12% crude protein); Cotton seed cake (35% crude protein). Use both Pearson square method and simultaneous equations method. Show all your working. (10 marks)
11. A 100 kg layer ration is to be formulated according to Kenya Bureau of Standards specifications for laying hens: Crude protein (16-17%); Energy (2700-2800 Kcal/kg feed); Calcium (3.7-4.0 %); Fiber (12% maximum). Describe the constraints which a nutritionist has to contend with, when using linear programming to formulate the ration. Use the following ingredients: Maize, maize bran, pollard, fish meal, bone meal, salt, sunflower cake. (20 marks)
12.
   a) Evaluate the advantages of weighted goal programming over linear programming in ration formulation. (10 marks)
   b) Ranking/grouping of feedstuffs can be done according to their contents of a particular nutrient which they can supply. Rank the following feedstuffs according to their energy contents: Roughages; mineral supplements; oils; protein concentrates, fats, grains. (10 marks)

13. In the absence of a mixer at the farm level, feed mixing can be done manually using various techniques. Analyze these techniques. (20 marks)