Uva Wellassa University
B.Sc. in Export Agriculture / Bachelor of Animal Science

End Semester Examination June/July 2009
Year I Semester II

Fundamentals of Agricultural, Food and Biochemical Engineering AAS 102-3

Instructions

Answer **five (5)** questions. Each question is allocated equal marks (20 x 5 marks).
No. of questions : Six (06)
No. of pages : Two (02)
Total marks allocated : 100%
Time : Three (03) hours

1. Write short notes on the following;
   a. Concept of an air parcel (04 marks)
   b. Dry and saturated adiabatic lapse rate (04 marks)
   c. Unstable atmosphere (04 marks)
   d. Condensation nuclei (04 marks)
   e. Ice crystal theory of rain formation (04 marks)

2. (i) Discuss the following;
   a. Flow regimes (04 marks)
   b. Critical Reynold's number (04 marks)
   c. Continuity of flow (04 marks)

   (ii) Derive the Bernoulli's equation stating all the assumptions. (08 marks)

3. a. What is meant by "Commercial Sterilization of Food"? (03 marks)
   b. Discuss the characteristics to be considered in selecting a container for In-Container Processing. (05 marks)
   c. Compare and contrast the Quick Freezing and Slow Freezing. (06 marks)
   d. Briefly outline the factors to be maintained in a refrigeration system to have a better quality product. (06 marks)

4. a. Explain why is the pasteurized product cannot be stored in room temperature for a long period of time. (04 marks)

   b. In order to convert 50 kg of water at 30^0 C to a steam of 250^0 C, how much of heat to be provided? (Specific heat of water = 1.0 cal / g, Latent heat of vaporization = 540 cal / g at 100^0 C, Specific heat of water vapor = 0.48 cal / g). (08 marks)

   c. A sausage mixture is made by blending pork and lard.
   - Pork contains 15% fat, 63% water and 20% protein
   - Lard contains 80% Fat, 15% water and 3% protein
   How much of Pork and lard to be blended to obtain a sausage mixture of 100kg with 25 % fat content. (08 marks)

5. Write short notes on **two (2)** of the following topics;

   a. Production of citric acid (10 marks)
   b. Single cell protein (10 marks)
   c. Immobilization of microbial cells (10 marks)
   d. Membrane separation processes (10 marks)

6. a. "Creating correct shear condition in a bio reactor is a must". Comment on this. (02 marks)

   b. Name four (4) types of bioreactors and briefly explain the features of one (1) such reactor. (05 marks)

   c. Define respiration quotient. Briefly explain its importance. (04 marks)

   d. Illustrate the microbial cell growth in a batch culture using a graph. (04 marks)

   e. List two (2) upstream processes and two (2) downstream processes. (02 marks)

   f. Using a flow chart explain the major steps in commercial penicillin production. (03 marks)