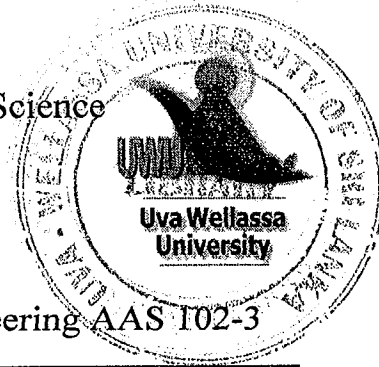


Uva Wellassa University  
B.Sc. in Export Agriculture / Bachelor of Animal Science

End Semester Examination June/July 2009  
Year I Semester II



Fundamentals of Agricultural, Food and Biochemical Engineering AAS T02-3

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**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

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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  $30^{\circ}\text{C}$  to a steam of  $250^{\circ}\text{C}$ , how much of heat to be provided? (Specific heat of water =  $1.0\text{ cal/g}$ , Latent heat of vaporization =  $540\text{ cal/g}$  at  $100^{\circ}\text{C}$ , Specific heat of water vapor =  $0.48\text{ cal/g}$ ). (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)