10-1ST-AAS 102 -3

Uva Wellassa University
Faculty of Animal Science & Export Agriculture

Bachelor of Animal Science & B.Sc. in Export Agriculture Degree Programmes

End Semester Examination – August 2010
Year I Semester II

Fundamentals of Agricultural, Food & Biochemical Engineering (AAS 102 – 3)

PART II - Essay

Question 01

I. Write short notes on,

a) Heat Transfer (05 marks)

b) Internal Energy (05 marks)

c) Specific Heat Capacity (05 marks)

d) Laminar flow & Turbulent flow (05 marks)

e) Bernoulli's Theory (05 marks)

II. Milk is flowing into a pipe cooler having 1.4 m internal diameter at a rate of $4kgs^{-1}$.The initial temperature of milk is 60°C and it is wished to cool to 15°C by circulating 5°C water around the pipe. Calculate the **length** of pipe cooler.

(Assume an overall coefficient of heat transfer from the cooler pipe to the milk of 900 J m^{-2} s^{-1} $°C^{-1}$, and that the specific heat of milk is 3900 J kg^{-1} $°C^{-1}$)

(15marks)

Question 02

I. **"Aeration and agitation are implemented in most fermentation processes".** Comment on this statement. (10 marks)

II. How does the **Reynolds number (Re)** is applied to characterize the behaviour of flow **in agitation**? (10 marks)

III. Briefly discuss the factors considered in designing & operation of a bioreactor. (10 marks)

IV. Briefly explain the importance of dissolved oxygen (DO) level in a bioreactor. (10 marks)

Question 03

I. What are the **general assumptions** we make, when analyzing trusses? (05 marks)

II. What do you mean by a **Free Body Diagram**? (05 marks)

III. Given below is a roof truss which in equilibrium. Calculate,

a. The $\mathbf{R_1}$ & $\mathbf{R_2}$ reactions. (05 marks)

b. The **internal member forces**. (25 marks)