



UNIVERSITY OF GHANA
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B.Sc. ENGINEERING, SECOND SEMESTER 2014-2015 EXAMINATIONS

FPEN 402. ENGINEERING DESIGN OF FOOD PROCESSES IV. ANIMAL FOODS (3 credits)

INSTRUCTIONS: TOTAL TIME THREE HOURS. ANSWER FIVE QUESTIONS

1.
 - a. Ice cream is an important product derived from milk. Draw and comment on the flow diagram of the complete ice cream manufacturing process.
 - b. "Overrun" is important in ice cream manufacture. Calculate the plant overrun in the ice cream mix described below.
 - i. 80 L mix plus 10 L chocolate syrup yielding 170 L chocolate ice cream
 - ii. 600 L mix yielding 1,110 L ice cream
 - iii. Calculate the ice cream plant overrun by volume, with particulates for a 50 L mix plus 32 L pecans giving 145 L butter pecan ice cream,
2. Animal foods play important role in the attainment of food security.
 - a. List the main sources of animal foods in Ghana. Considering how they are handled and marketed, what recommendations will you make to improve efficiency and quality?
 - b. If you were to propose the setting up of an animal processing plant, what will you consider as
 - i. requirements and
 - ii. issues of critical concern to the Food Process Engineer.?
3. Pre-slaughter operations can influence the quality of products derived from a beef processing plant. What are these operations? What will you consider in designing the pre-slaughter operations of such a plant. Give reasons for your considerations.
4.
 - a. Salting is one of the simple processes which can be applied in handling animal food products. Using fish as an example delineate the salting options available. Discuss the merits and demerits of each method.

- b. The conversion of fresh fish to smoked fish requires the application of heat and smoke. Discuss artisanal fish processing and propose what you will do to improve efficiency in fish smoking in Ghana.
5. Poultry processing plants can be automated to improve efficiency Explain briefly the following operations in poultry processing:
 - i. Automatic loading system for live birds
 - ii. Scalding of birds
 - iii. Plucking of feathers.
 - iv. Automatic carcass opening machine
6.
 - a. Following the slaughter of animals, cutting and packaging are important operations for preparing the meat for the market. Discuss the method you will apply in cutting beef carcass
 - b. What will you put in place in a meat plant for storage and selection of meat ingredients
7.
 - a. Fish canning operations are applied to stabilize the supply of fish to consumers. Discuss the processes applied for this type of food preservation.
 - b. Draw and label a can seam to show its component parts.
 - c. The equation below is important in assessing the percentage overlap of a can seam. Discuss how it is applied.

$$\frac{(x + y + 1.1t_e - L)}{L - (2.2t_e + 1.1t_b)} * 100$$