



1ST SEMESTER 2011/2012

PAGE 1 OF 3

**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

**PROGRAM : BACHELOR OF SCIENCE IN FOOD
SCIENCE, NUTRITION AND TECHNOLOGY
YEAR III**

COURSE CODE : FSNT 302

TITLE OF PAPER : FOOD MACHINERY AND PLANT DESIGN

TIME ALLOWED : TWO HOURS

**INSTRUCTIONS : ANSWER QUESTION ONE (1) AND ANY
OTHER TWO (2) QUESTIONS. ILLUSTRATE
YOUR ANSWERS WITH DIAGRAMS
WHERE NEEDED**

**DO NOT OPEN THIS PAPER UNTILL PERMISSION HAS BEEN GRANTED
BY THE CHIEF INVIGILATOR**

QUESTION ONE [COMPULSORY]

- a. Explain why designing a food plant is supposed to be carried out by the team of experts. (6 Marks)
- b. Outline the main requirements in hygienically designing the floor, wall and ceilings of a food plant (10 Marks)
- c. List six factors to be taken into account while selecting a food plant site (6 marks)
- d. Discuss the principles for hygienic design of food processing equipment and auxiliary systems in contact with food. (10 Marks)
- e. What is a Clean-in-place (CIP) system? Give a brief explanation of different CIPs (8 Marks)

[TOTAL MARKS: 40]

QUESTION TWO

- a. Make a distinction between the mechanism of pressure and vacuum filters. (6 Marks)
- b. Discuss the principle of separation using centrifuges and list the different classes of centrifuges. (10 Marks)
- c. What do mechanical and operational requirements of a food-processing machine refer to? (6 Marks)
- d. A refrigeration system may be considered as a pump that conveys heat from a region of low temperature to another region of high temperature. What makes such un-natural heat transfer phenomena possible? (8 Marks)

[TOTAL MARKS: 30]

QUESTION THREE

- a. Mention the different sections of an extruder and explain the importance of the depth of screw flight in relation to the transportation and transformation of the material to be extruded (10 Marks)
- b. Explain how a fluidized bed drier works (8 Marks)
- c. Describe the different types of evaporators (6 Marks)

- d. How is it possible to maximize radial and longitudinal velocities in order to improve the mixing performance of liquid mixers (6 Marks)

[TOTAL MARKS: 30]

QUESTION FOUR

- a. Make a distinction between displacement and dynamic pumps. (8 Marks)
b. What is the difference between a hammer and a disc mill? (8 Marks)
c. Explain the working principle of a freeze drier (8 Marks)
d. What are the main components of a rounder (6 Marks)

[TOTAL MARKS: 30]