



1<sup>ST</sup> SEM. 2014/15

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 (2) HOURS**

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

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

**QUESTION 1 (COMPULSORY)**

- (a) Explain process synthesis giving detailed steps, activities and associated results  
(15 Marks)
- (b) State the similarities and differences between filters and centrifugal clarifiers.  
(10 Marks)
- (c) In the production of milk powder, milk is concentrated followed by drying and separation of the powder from drying air (powder recovery). For this process, identify appropriate equipment and explain why you choose each equipment.  
(15 Marks)

**[TOTAL MARKS = 40]****QUESTION 2**

- (a) List the steps in CIP system and discuss any **two (2)** in detail. (14 Marks)
- (b) Write short notes on the following: (16 Marks)
- i. Auxiliary system
  - ii. Dynamic pumps
  - iii. Disc bowl centrifuges
  - iv. Gauge rolls

**[TOTAL MARKS = 30]****QUESTION 3**

- (a) Describe the phenomena of fluidization and state its application in food processing operations. (10 Marks)
- (b) Describe an extrusion machine and outline its functions in the extrusion process.  
(10 Marks)
- (c) Name the mixers used for mixing powders and briefly describe any **one (1)**.  
(10 Marks)

**[TOTAL MARKS = 30]**

**QUESTION 4**

- (a) State **three (3)** principles of hygienic design of food processing equipments. (12 Marks)
- (b) With the help of a sketch show the component velocities in liquid mixing and describe the ways to maximize the velocities to improve mixing efficiency. (12 Marks)
- (c) Name the different categories of mills and describe **one (1)** in detail. (6 Marks)

**[TOTAL MARKS = 30]**