



**2<sup>ND</sup> SEM. 2017/18**

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**UNIVERSITY OF SWAZILAND  
SUPPLEMENTARY EXAMINATION PAPER**

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

**COURSE CODE : FNS202**

**TITLE OF PAPER : FOOD MACHINERY AND PLANT DESIGN**

**TIME ALLOWED : TWO (2) HOURS**

**INSTRUCTIONS : ANSWER QUESTION ONE (1) AND ANY  
OTHER TWO (2) QUESTIONS**

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

**QUESTION 1 (COMPULSORY)**

- (a) Describe how a screw conveying system works with the aid of a sketch. **(15 Marks)**
- (b) Discuss the elements in functional area design of food processing plant. **(15 Marks)**
- (c) Compare and contrast twin and single screw extruders. **(10 Marks)**

**[TOTAL MARKS = 40]**

**QUESTION 2**

- (a) Discuss how the tubular and disc bowl centrifuges work. **(15 Marks)**
- (b) Describe the operation of drum dryer and fluidized bed dryer. **(15 Marks)**

**[TOTAL MARKS = 30]**

**QUESTION 3**

- (a) Describe the following:
- i. Process synthesis
  - ii. Pre-sheeters film evaporator
  - iii. Auxiliary system
  - iv. Hygienic design of processing equipment
- (4 x 5 = 20 Marks)**
- (b) Describe two (2) types of freezers used in the food processing industry. **(2x5 = 10 Marks)**

**[TOTAL MARKS = 30]**

**QUESTION 4**

- (a) Outline the steps in Clean-in-Place (CIP) system. **(14 Marks)**
- (b) With the help of a sketch, describe concurrent and counter current spray driers. **(16 Marks)**

**[TOTAL MARKS = 30]**