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

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QUESTION 1 (COMPULSORY)

(a) Explain the main components of a food processing plant. **(12 Marks)**

(b) Five unit operations are involved in manufacturing a particular food. Translate the following closeness scenarios in a relationship chart using appropriate codes.

Operation 1 and 2 =.> especially important
Operation 1 and 3 => Absolutely necessary
Operation 3 and 4 => Important
Operation 1 and 5 => undesirable
Operation 2 and 5 => unimportant
Operation 3 and 5 => ordinary closeness

(12 Marks)

(c) In the production of juice, fruit is extracted followed by separation of seeds from the juice. The resulting juice is concentrated and packed. The packed juice is subjected to thermal treatment to make the product shelf stable under ambient condition. For this process, identify appropriate equipment and explain why you choose each equipment. **(16 Marks)**

[TOTAL MARKS = 40]

QUESTION 2

(a) Describe the operating characteristics of shallow flight with high speed and deep flighted with low speed screw extruders. **(10 Marks)**

(b) Identify and explain the purpose of the components of a refrigerator. **(12 Marks)**

(c) State **two (2)** principles of hygienic design of food processing equipments. **(8 Marks)**

[TOTAL MARKS = 30]

QUESTION 3

(a) Identify **five (5)** factors that influence the degree of mixing in solids. **(10 Marks)**

(b) Describe the phenomena in falling and rising film evaporators. **(10 Marks)**

(c) Identify the different classes of fans and give a brief description to any two. **(10 Marks)**

[TOTAL MARKS = 30]

QUESTION 4

(a) Identify the elements of a fluidized bed dryer and describe the important design considerations for each element. **(15 Marks)**

(b) With the help of a labeled sketch describe the production of milk powder using spray drier and a cyclone. **(15 Marks)**

[TOTAL MARKS = 30]