



2<sup>ND</sup> SEM. 2019/20

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**UNIVERSITY OF ESWATINI**

**FINAL EXAMINATION PAPER**

**PROGRAMME : BACHELOR OF SCIENCE IN FOOD SCIENCE  
NUTRITION AND TECHNOLOGY LEVEL IV /  
YEAR IV**

**COURSE CODE : FNS408 / FSNT 408**

**TITLE OF PAPER : FOOD PACKAGING & TRANSPORTATION**

**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) Define packaging and explain five (5) functions of food packaging. (12 Marks)
- (b) A manufacturer has produced 4800 units of 450 g canned peach slices in syrup. According to the sampling plan 6 units ( $n=6$ ) must be sampled and the acceptance number is 1. The net weight results were as follows: 450, 440, 418, 460, 470, and 465 grams.

Table 1. Tolerable negative error

Nominal quantity in grams and millilitres	Tolerable negative error	
	As a %age of nominal quantity	g or ml
5 to 50	9	-
from 50 to 100	-	4.5
from 100 to 200	4.5	-
from 200 to 300	-	9
from 300 to 500	3	-
from 500 to 1,000	-	15
from 1,000 to 10,000	1.5	-
from 10,000 to 15,000	-	150
above 15,000	1	-

State each of the **three (3) packer's rules** and using the table above and by calculation demonstrate if each of the rules is satisfied or not. (15 Marks)

- (c) Explain **one** major strength and **two** weaknesses of the following single films:-
- Low density polyethylene (LDPE) (3 Marks)
  - Polyimide (nylon) (3 Marks)
  - Ethylene vinyl alcohol (EVOH) (3 Marks)
- (d) Differentiate between modified atmosphere packaging (MAP) and controlled atmosphere packaging (CAP) giving **one (1)** application example in each case.

(4 Marks)

[TOTAL MARKS = 40]

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**QUESTION 2**

- (a) What is active packaging? Explain and give an example of its application under gas, moisture and microbial control in food. (13 Marks)
- (b) Explain the process for manufacturing the following glass packaging:
- i. Glass bottle for beer. (4 Marks)
  - ii. Glass jar for marmalade jam. (6 Marks)
- (c) Explain how laminated films are manufactured. (7 Marks)

[TOTAL MARKS = 30]

**QUESTION 3**

- (a) Explain the following manufacturing processes for rigid and semi-rigid plastic containers:-
- i. Thermoforming (3 Marks)
  - ii. Injection moulding (3 Marks)
  - iii. Stretch blow moulding (3 Marks)
- (b) Describe the following types of shipping containers and also give a food product example that could be shipped in each type of container:-
- i. Dry container (3 Marks)
  - ii. Insulated container (3 Marks)
  - iii. Reefer container (3 Marks)
- (c) Explain **three (3)** functions of an in-transit refrigeration unit. (6 Marks)
- (d) Explain the function of the additives, pigments and resin in paper manufacturing (6 Marks)

[TOTAL MARKS = 30]

**QUESTION 4**

- (a) Name and explain the following processes for manufacturing the following 2 piece cans:-
- i. Carbonated soft drink cans (7 Marks)
  - ii. Jam cans (7 Marks)
- (b) Discuss a process for manufacturing paper from cellulose fibre derived from wood chips. (8 Marks)
- (c) Explain how the following product characteristics affect logistic costs:-
- i. Volume to weight ratio
  - ii. Value to weight ratio
- (8 Marks)

**[TOTAL MARKS = 30]**

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