



UNIVERSITY OF ESWATINI
Faculty of Health Sciences
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH AND FOOD
SCIENCE

FINAL EXAMINATION PAPER 2021

TITLE OF PAPER : FOOD PROCESSING

COURSE CODE : EHS 427

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS :

- : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
- : ANSWER **ANY FOUR** QUESTIONS.
- : EACH QUESTION **CARRIES 25** MARKS.
- : WRITE NEATLY & CLEARLY
- :
- : BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED
BY THE INVIGILATOR.**

QUESTION ONE

- (a) Define;
- (i) Surface activity [1 Mark]
 - (ii) Glass transition [1 Mark]
 - (iii) Shearing force [1 Mark]
 - (iv) Hydrostatic head [1 Mark]
 - (v) Atomisation [1 Mark]
- (b) Briefly outline how processing achieves the listed objectives.
- (i) Stop or slow deteriorative chemical or biochemical reactions. [8 marks]
 - (ii) Maintain and or improve nutritional properties of food. [6 Marks]
 - (iii) Make foods for special groups of people. [6 marks]
- Total [25 Marks]**

QUESTION TWO

- (a) Use Pearson Square approach to come up with the final composition of milk and cream, if you are given homogenized milk (3% fat) to be mixed with cream (20% fat) to produce a light cream containing 10% fat. [5 Marks]
 - (b) Briefly outline how you can prevent loss of nutrients during blanching. [5 Marks]
 - (c) What are the advantages of heat exchangers? [5 Marks]
 - (d) What are the factors that affect the heat resistance of microorganisms in food? [8 Marks]
 - (e) What are the main disadvantages of sterilization? [2 Marks]
- Total [25 Marks]**

QUESTION THREE

- (a) Briefly outline how food processing can lead to prevention of microbial growth or toxin production and also increase storage stability or life of food. [15 Marks]
- (b) Two fluids, sucrose solution (20%) and milk are flowing along pipes of same diameter (1 cm) at 20°C and at the same flow velocity of 120 m/minute. Determine whether the flow is streamline or turbulent in each fluid. (Physical properties of sucrose and milk are as shown in Table 1. [10 marks]

Table 1. Properties of Fluids

	Thermal conductivity (W m ⁻¹ °K ⁻¹)	Density (kg m ⁻³)	Dynamic viscosity (N s m ⁻²)	Temperature (°C)
Sucrose (60%)			6.02 x 10 ⁻²	20
Sucrose (20%)	0.54	1070	1.92 x 10 ⁻³	20
Whole milk	0.56	1030	2.12 x 10 ⁻³	20

Total [25 Marks]

QUESTION FOUR

- (a) Briefly discuss steady state versus unsteady state heat transfer. [15 Marks]
(b.) What are the factors that can lead to loss in pressure during fluid flow? [4 Marks]
(c.) Why larger heat exchangers are necessary when air is used to heat or cool compared to those needed for liquids? [1 Mark]
(c) Briefly illustrate the principles behind indirect heating. [5 Marks]
Total [25 marks]

QUESTION FIVE

- (a) Define;
(i) Thermal death time [1 Mark]
(ii) Z-value [1 Mark]
(iii) Phosphatase [1 Mark]
(b) What are the changes to food during extrusion? [7 Marks]
(c) What are factors that influence nature of extruded products? [9 Marks]
(d) What are the effects of extrusion on food? [6 Marks]
Total [25 Marks]