2913/204
FOOD PROCESSING AND
PRESERVATION I
June/July 2020
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN FOOD SCIENCE AND PROCESSING TECHNOLOGY

MODULE II

FOOD PROCESSING AND PRESERVATION I

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
answer booklet;
non-programmable scientific calculator.
This paper consists of TWO sections; A and B.
Answer ALL the questions in section A and any TWO questions from section B in the answer booklet provided.
Each question in section A carries 15 marks while each question in section B carries 20 marks.
Maximum marks for each part of a question are as shown.
Candidates should answer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (60 marks)

Answer ALL questions in this section.

1. (a) Differentiate between food processing and food preservation. (4 marks)

(b) State **three** benefits of food preservation. (3 marks)

(c) Explain **four** factors which cause fluctuation in low temperature storage. (8 marks)

2. (a) State **five** preservative effects of smoking. (5 marks)

(b) With the aid of a labelled diagram, explain the principles of counter - current drying. (10 marks)

3. (a) State **five** extrinsic factors which influence food spoilage. (5 marks)

(b) Outline the experimental determination of water activity in a food sample. (10 marks)

4. (a) Define each of the following:

(i) commercial sterilization; (2 marks)

(ii) dehydration; (2 marks)

(iii) cryogen; (2 marks)

(iv) Fo-value. (2 marks)

(b) With the aid of labelled diagram, describe indirect freezing of liquids. (7 marks)

SECTION B (40 marks)

*Answer any **TWO** questions from this section.*

5. (a) State **four** benefits of food fermentation. (4 marks)

(b) With the aid of chemical equations, describe the production of vinegar. (12 marks)

(c) Outline the procedure for freshing of pickled products for use after storage. (4 marks)

6. (a) State **four** objectives for dehydrating food. (4 marks)

1. Reduce water activity in foods
2. Reduce bulk in foods
3. Preservation
4. Ease transport of foods.

(b) Explain how each of the following factors affect the rate of drying in a dehydration process:

(i) constituent orientation; – (4 marks)

(ii) solute concentration. – (4 marks)

(c) Figure 1 shows a typical dehydration curve.

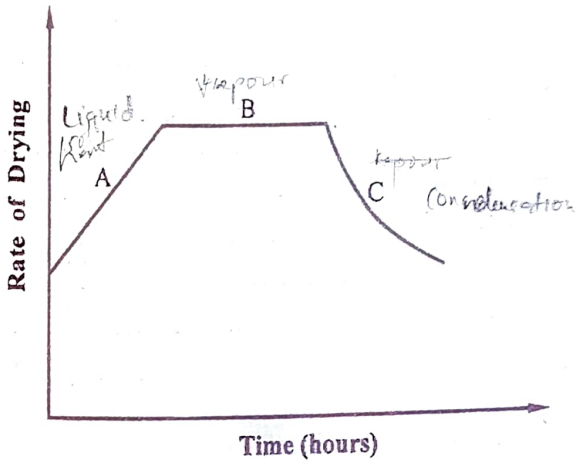


Fig. 1

Name the sections **A, B** and **C** on the graph and explain the events taking place in each of the sections. (8 marks)

A – High temps are required in order to achieve latent heat. This helps separate the solid portion from liquid phase thru heating.

B – Here it becomes to a constant where amount of vapour is equal to heat produced.

C – Vapour levels drop leaving behind solutes thus rate decreases.

7. (a) The following data was recorded when freezing two similar products P_1 and P_2.

Time in hours	Freezing temperatures (°C)	
	P_1	P_2
0	20	20
0.5	0	13
1.0	3	9
1.5	-7	5
2.0	-20	0
2.5	-20	-2
3.5	-20	-3
4.0		-3
4.5		-4
5.5		-9
6.0		-14
6.5		-20

(i) Plot the freezing curves for both products on the same graph. (5 marks)

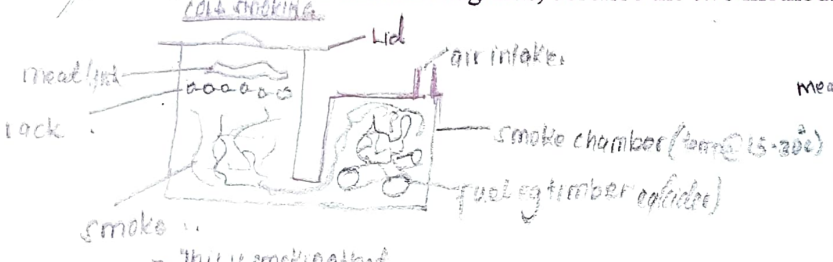
(ii) Identify the fast and slow freezing curve. (1 mark)

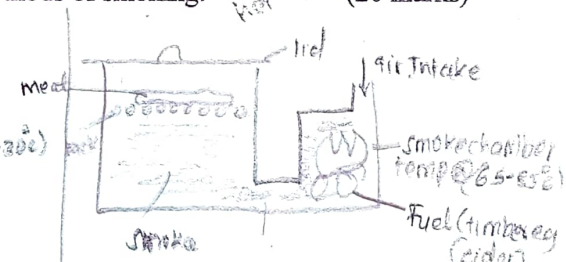
(b) Explain 'refrigeration load' and 'freezer burn' as used in freezing. (4 marks)

(c) (i) Explain the phenomenon of super cooling observed in freezing curve. (3 marks)

(ii) Explain the negative effects of slow freezing. (7 marks)

8. With the aid of labelled diagrams, describe the two methods of smoking. (20 marks)





- This is smoking that is done under low temp btwn 15-30°c. It doesn't actually cook the meat but smokes it well. Use of pressure chamber gives a good smoking aroma that is desirable during smoking. Smoked for 2-4hrs.

- Hot smoking done @ temp around 65-85°c to kill microorganisms. At this temp, cooking is achieved ensuring both aroma, flavour in the meat. Smoked for 2-4hrs.

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