



FACULTY OF SCIENCE

DEPARTMENT OF FOOD TECHNOLOGY (DFC)

MODULE: FTN1BF1
FOOD TECHNOLOGY I
(NATIONAL DIPLOMA FOOD TECHNOLOGY)

NOVEMBER EXAMINATION

DATE: 6 December 2016

SESSION: 16:30 – 18:30

EXAMINER

Dr S de Kock

MODERATOR

Ms Moyo

DURATION 2 HOURS

MARKS 120

NUMBER OF PAGES: 5 PAGES, INCLUDING 1 ANNEXURE

INSTRUCTIONS: ANSWER ALL QUESTIONS
QUESTIONS MAY BE ANSWERED IN ANY ORDER, BUT SUB-
SECTIONS OF QUESTIONS MUST BE ANSWERED TOGETHER
CALCULATORS ARE PERMITTED (ONLY ONE PER STUDENT)

REQUIREMENTS: 2 ANSWER SCRIPTS PER STUDENT

QUESTION 1

Give one word (or term) for the following:

- 1.1 The method used to select and train panellists
- 1.2 Emulsifier found in egg yolk
- 1.3 The vitamin that prevents night blindness
- 1.4 The scale that measures the amount of glucose in a syrup
- 1.5 The syrup which is formed when sucrose gets broken down into glucose and fructose
- 1.6 The branched component in starch
- 1.7 Two sugar units which are linked together
- 1.8 A red pigment in foods
- 1.9 The minimum amount of energy needed to keep the body going on a daily basis
- 1.10 Measurement of absorbed nitrogen that is retained in the body for maintenance and growth

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QUESTION 2

The following information is given on the labels of ProNutro and low fat milk:

PRONUTRO:

Ingredients: wheat flour, wheat bran, sugar, minerals and vitamins.

Nutritional information:

Nutrient	Per 100g
Protein	15.5g
Carbohydrate	60.7g
Fat	5.7g

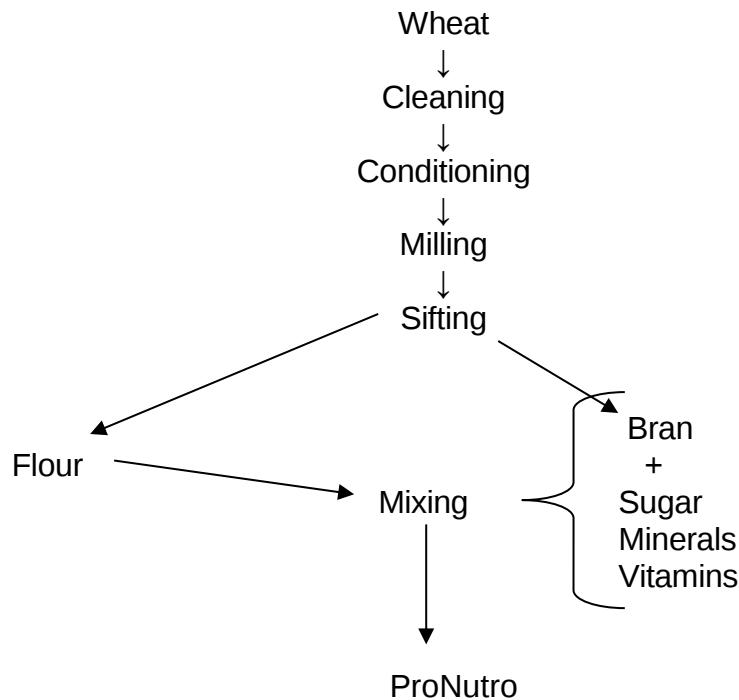
Directions for use: 50g ProNutro + 200 ml Milk

LOW FAT MILK:**Nutritional information:**

Nutrient	Per 100g
Protein	3.3g
Carbohydrate	5g
Fat	2.1g

- 2.1 Which component is present in wheat flour which is not present in any other cereal? (1)
- 2.2 What is the main component of bran? (1)
- 2.3 What is the milk carbohydrate (sugar) called? (1)

- 2.4 Give one function and one deficiency symptom of each of the following minerals and vitamins present in ProNutro:
 a) Vit B₁
 b) Magnesium (4)
- 2.5 How many kJ would a serving of 50g ProNutro + 200 ml low fat milk provide? (10)
- 2.6 The simplified manufacturing procedure for ProNutro is set out in the following flow diagram:



- 2.6.1 List 5 types of cleaning equipment normally used to clean wheat. (5)
- 2.6.2 Describe the design and operation of a Sortex Air Separator as one of the machines used to clean wheat. Make use of a diagram to aid your answer. (7)
- 2.6.3 Draw a diagram to illustrate the working of crushing rolls that are used to mill the wheat. (4)
- 2.6.4 Crushing rolls use compressive forces to achieve size reduction. Name 2 other forces that are used to reduce the size of products, and give examples of a machine that uses each type of force. (4)
- 2.6.5 During sifting, there is a risk of dust explosions. What can be done to make sure that this does not happen? (3)
- 2.6.6 Taking into account that ProNutro is a dry product, suggest a type of mixer that can be used to mix all the ingredients together and explain the mixer's operation. (5)
- 2.6.7 What properties of the dry materials are going to influence how they mix? (4)
- 2.6.8 Explain why milk has to be homogenised. (2)
- 2.6.9 Discuss the design and working of a homogeniser. (5)

2.7 You want to test the acceptability of your ProNutro with 2 existing cereals that are already on the market. You asked panellists to rank the products (1 = liked most; 3 = liked least). The results are as follows:

Panelist	Product		
	ProNutro	Existing cereal A	Existing cereal B
1	1	2	3
2	2	1	3
3	1	3	2
4	1	2	3
5	1	2	3

2.7.1 What conclusion can you draw from this? (6)

2.7.2 How would you conduct this panel with regards to environment and instructions to the panel? (4)
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QUESTION 3

In the beer brewing industry, many pieces of equipment are used to separate unwanted solids from the beer and the initial water.

3.1 After fermentation, the yeast has to be removed. One of the ways to do this, is to add a compound which binds to the yeast and create a mass of solids (more than 25%). This can then be removed by a nozzle discharge centrifuge. Explain its working and give a diagrammatical illustration of it. (11)

3.2 Filtration is used to take out any precipitates which can cause haziness

3.2.1 Define and describe the following:

- a) Filter medium (2)
- b) Filtrate (2)
- c) Filter aid (3)

3.2.2 Give a diagrammatic illustration of **either** a horizontal **or** vertical plate pressure filter that could be used for this application. Show the flow of feed and product. (5)

3.3 Reverse osmosis is used to clean the water before brewing. Explain what reverse osmosis is and make use of a diagram to illustrate your answer. (7)
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QUESTION 4 (on next page)

QUESTION 4

- 4.1 Give examples of where extraction is used as a unit operation in the food industry. (5)
- 4.2 Give a diagrammatic illustration of a Hildebrandt extractor that can be used and give an example of where it can be used. (6)
- 4.3 List 3 pieces of equipment that can be used to express oils from oilseeds. (3)
- [14]**
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TABLE 91
RANK TOTALS REQUIRED FOR SIGNIFICANCE AT THE 5 PER CENT LEVEL (P < 0,05)

The four-figure blocks represent: Lowest insignificant rank sum, any treatment - Highest insignificant rank sum any treatment. lowest insignificant rank sum, predetermined treatment - Highest insignificant rank sum, predetermined treatment.

Number of Reps.	Number of Treatments, or Samples Ranked										
	3	3	4	5	6	7	8	9	10	11	12
2				... 3-9	... 3-11	... 3-13	... 4-14	... 4-16	... 4-18	... 5-19	5-21
3		... 4-8	... 4-11	4-14 5-13	4-17 6-15	4-20 6-18	4-23 7-20	5-25 8-22	5-28 8-25	5-31 9-27	5-34 10-29
4		5-11 5-11	5-15 6-14	6-18 7-17	6-22 8-20	7-25 9-23	7-29 10-26	8-32 11-29	8-36 13-31	8-39 14-34	9-43 15-37
5	... 6-9	6-14 7-13	7-18 8-17	8-22 10-20	9-26 11-24	9-31 13-27	10-35 14-31	11-39 15-35	12-43 17-38	12-48 18-42	13-52 20-45
6	7-11 7-11	8-16 9-15	9-21 11-19	10-26 12-24	11-31 14-28	12-36 16-32	13-41 18-36	14-46 20-40	15-51 21-45	17-55 23-49	18-60 25-53
7	8-13 8-13	10-18 10-18	11-24 13-22	12-30 15-27	14-35 17-32	15-41 19-37	17-46 22-41	18-52 24-41	19-58 26-51	21-63 28-56	22-69 30-61
8	9-15 10-14	11-21 12-20	13-27 15-25	15-33 17-31	17-39 20-36	18-46 23-41	20-52 25-47	22-58 28-52	24-64 31-57	25-71 33-63	27-77 36-68
9	11-16 11-16	13-23 14-22	15-30 17-28	17-37 20-34	19-44 23-40	22-50 26-46	24-57 29-52	26-64 32-58	28-71 35-64	30-78 38-70	32-86 41-76
10	12-18 12-18	15-25 16-24	17-33 19-31	20-40 23-37	22-48 26-44	25-25 30-50	27-63 34-56	30-70 37-63	32-78 40-70	35-85 44-76	37-93 47-83
11	13-20 14-19	16-28 18-26	19-36 21-34	22-44 25-41	25-52 29-48	28-60 33-55	31-68 37-62	34-76 41-69	36-85 45-76	39-93 49-83	42-101 53-90
12	15-21 15-21	18-30 19-29	21-39 24-36	25-47 28-44	28-56 32-52	31-65 37-59	34-74 41-67	38-82 45-75	41-91 50-82	44-100 54-90	47-109 58-98
13	16-23 17-22	20-32 21-31	24-41 26-39	27-51 31-47	31-60 35-66	35-69 40-64	38-79 45-72	42-88 50-80	45-98 54-89	49-107 59-97	52-117 64-105
14	17-25 18-24	22-34 23-35	26-44 28-42	30-54 33-51	34-64 38-60	38-74 44-68	42-84 49-77	46-94 54-86	50-104 59-95	54-114 65-103	57-125 70-112