1ST SEM. 2015/16

UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME	:	**FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR II**
COURSE CODE	:	**FSNT 202**
TITLE OF PAPER	:	**SENSORY EVALUATION**
TIME ALLOWED	:	**TWO (2) HOURS**
INSTRUCTIONS	:	**ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS. STATISTICAL TABLES AND FORMULA ARE PROVIDED AT THE END OF THE QUESTION PAPER**

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QUESTION 1 (COMPULSORY)

(a) What are the **four (4)** basic kinds of taste and in which part of the tongue are they perceived? Use a diagram to illustrate your answer. **(12 Marks)**

(b) Two apple juice drinks marked "A" and "B" were offered to a panel of 24 assessors. The question asked was "Which sample is sweeter", 23 responded that "B" was sweeter and 1 responded that "A" was sweeter. Was there a significant difference ($p < 0.05$) between sample "A" and "B"? Justify your answer. **(8 Marks)**

(c) Three apple juice drinks "A", "B" and "C" were presented to 24 assessors who were asked to rank the samples in-order of sweetness intensity. The rank sums are shown in the table below:-

	Apple Juice Drinks		
	A	B	B
Rank sums	25	64	69

i. Are there any significant differences ($p < 0.05$) in the sweetness intensity of the three samples? Justify your answer. **(8 Marks)**

ii. Calculate LSDR and do a multiple comparison of the rank sums indicating whether there are significant differences or not between each pair of samples.

(12 Marks)

[TOTAL MARKS = 40]

QUESTION 2

(a) What is Umami?

(3 Marks)

(b) Why is the sense of taste sensitive in children than in adults? **(5 Marks)**

(c) A duo-trio test was used to determine if methional could be detected when added to cheddar cheese in amounts of 0.125 ppm and 0.250 ppm and the following results were obtained:

Cheddar cheese with 0.125 ppm = 10 out of 16 correct judgments
Cheddar cheese with 0.250 ppm = 14 out of 16 correct judgments

i. What is the minimum number of correct judgements do you require to establish significance at 0.05 probability levels for 16 judges?

(5Marks)

ii. Which sample can you say you are 95% confident that methional can be detected in cheddar cheese? **(5 Marks)**

(d) How would you design a sensory evaluation booth? **(12 Marks)**

[TOTAL MARKS = 30]

QUESTION 3

(a) What is an expert panel and list two products that employ expert panels. **(4 Marks)**

(b) The following results are an analysis of variance (ANOVA) output on the sweetness rating of three samples of apple flavoured imitation juice by 24 FSNT 2 student assessors.

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
789	24	17	0.708	0.215
354	24	49	2.041	0.041
746	24	83	3.458	0.346

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*
Between Groups	90.77778	2	45.38888889	225.717
Within Groups	13.875	69	0.201086957	
Total	104.6528	71		

i. Find the critical $F_{0.05, 2, 69}$ value **(5 Marks)**

ii. Are the means significantly different at 0.05 probability level? Justify your answer. **(5 Marks)**

(c) You are to conduct a quantitative descriptive analysis (QDA) for a new potato chips snack.

i. What is quantitative descriptive analysis used for? **(2 Marks)**

ii. How many panelists would you need? **(2 Marks)**

iii. How will you go about training and developing vocabulary? **(6 Marks)**

iv. What type of scale will you develop? **(2 Marks)**

v. How will you analyze the data after evaluation? **(4 Marks)**

[TOTAL MARKS = 30]

QUESTION 4

(a) Explain **two (2)** environmental factors and **two (2)** defects that could affect each of the following senses during sensory evaluation.

i) Sense of sight **(4 Marks)**

ii) Sense of smell **(4 Marks)**

(b) Explain the following discrimination methods. Also explain how samples should be presented to the panel:-

i. Paired comparison test **(6 Marks)**

ii. Ranking test **(6 Marks)**

iii. Triangle test **(6 Marks)**

(c) Explain how the sense of smell works.

(4 Marks)

[TOTAL MARKS = 30]

Table 1. Minimum number for correct judgements to establish significance at various probability levels for paired comparison and Duo-trio tests (one-tailed, p = ½)

No of trials (N)	Probability levels						
	0.05	0.04	0.03	0.02	0.01	0.005	0.001
7	7	7	7	7	7		
8	7	7	8	8	8	8	
9	8	8	8	8	9	9	
10	9	9	9	9	10	10	10
11	9	9	10	10	10	11	11
12	10	10	10	10	11	11	12
13	10	11	11	11	12	12	13
14	11	11	11	12	12	13	13
15	12	12	12	12	13	13	14
16	12	12	13	13	14	14	15
17	13	13	13	14	14	15	16
18	13	14	14	14	15	15	16
19	14	14	15	15	15	16	17
20	15	15	15	15	16	17	18
21	15	15	16	16	17	17	18
22	16	16	16	17	17	18	19
23	16	17	17	17	18	19	20
24	17	17	18	18	19	19	20
25	18	18	18	19	19	20	21
26	18	18	19	19	20	20	22
27	19	19	19	20	20	21	22
28	19	20	20	20	21	22	23
29	20	20	21	21	22	22	24
30	20	21	21	22	22	23	24
31	21	21	22	22	23	24	25
32	22	22	22	23	24	24	26
33	22	23	23	23	24	25	26
34	23	23	23	24	25	25	27
35	23	24	24	25	25	26	27
36	24	24	25	25	26	27	28
37	24	25	25	26	26	27	29
38	25	25	26	26	27	28	29
39	26	26	26	27	28	28	30
40	26	27	27	27	28	29	30
41	27	27	27	28	29	30	31
42	27	28	28	29	29	30	32
43	28	28	29	29	30	31	32
44	28	29	29	30	31	31	33
45	29	29	30	30	31	32	34
46	30	30	30	31	32	33	34
47	30	30	31	31	32	33	35
48	31	31	31	32	33	34	35
49	31	32	32	33	34	34	36
50	32	32	33	33	34	35	37
60	37	38	38	39	40	41	43
70	43	43	44	45	46	47	49
80	48	49	49	50	51	52	55
90	54	54	55	56	57	58	61
100	59	60	60	62	63	64	66

Source : E.B. Roessler et al., Journal of Food Science, 1978, 43, 940-947

Table 2. Minimum numbers of agreeing judgements necessary to establish significance at various probability levels for the paired comparison and paired preference tests (two tailed, p = ½)

No. of trials (n)	Probability Levels						
	0.05	0.04	0.03	0.02	0.01	0.005	0.001
7	7	7	7	7			
8	8	8	8	8	8		
9	8	8	9	9	9	9	
10	9	9	9	10	10	10	
11	10	10	10	10	11	11	11
12	10	10	11	11	11	12	12
13	11	11	11	12	12	12	13
14	12	12	12	12	13	13	14
15	12	12	13	13	13	14	14
16	13	13	13	14	14	14	15
17	13	14	14	14	15	15	16
18	14	14	15	15	15	16	17
19	15	15	15	15	16	16	17
20	15	16	16	16	17	17	18
21	16	16	16	17	17	18	19
22	17	17	17	17	18	18	19
23	17	17	18	18	19	19	20
24	18	18	18	19	19	20	21
25	18	19	19	19	20	20	21
26	19	19	19	20	20	21	22
27	20	20	20	20	21	22	23
28	20	20	21	21	22	22	23
29	21	21	21	22	22	23	24
30	21	22	22	22	23	24	25
31	22	22	22	23	24	24	25
32	23	23	23	23	24	25	26
33	23	23	24	24	25	25	27
34	24	24	24	25	25	26	27
35	24	25	25	25	26	27	28
36	25	25	25	26	27	27	29
37	25	26	26	26	27	28	29
38	26	26	27	27	28	29	30
39	27	27	27	28	28	29	31
40	27	27	28	28	29	30	31
41	28	28	28	29	30	30	32
42	28	29	29	29	30	31	32
43	29	29	30	30	31	32	33
44	29	30	30	30	31	32	34
45	30	30	31	31	32	33	34
46	31	31	31	32	33	33	35
47	31	31	32	32	33	34	36
48	32	32	32	33	34	35	36
49	32	33	33	34	34	35	37
50	33	33	34	34	35	36	37
60	39	39	39	40	41	42	44
70	44	45	45	46	47	48	50
80	50	50	51	51	52	53	56
90	55	56	56	57	58	59	61
100	61	61	62	63	64	65	67

Source : .E.B .Roessler et al.. Journal of Food Science, 1978, 43, 940-947

Table 3. Minimum numbers of correct judgements to establish significance at various probability levels for the triangle tests (one tailed p = ½)

No. of trials (n)	Probability Level:						
	0.05	0.04	0.03	0.02	0.01	0.005	0.001
5	4	5	5	5	5	5	
6	5	5	5	5	6	6	
7	5	6	6	6	6	7	7
8	6	6	6	6	7	7	8
9	6	7	7	7	7	8	8
10	7	7	7	7	8	8	9
11	7	7	8	8	8	9	10
12	8	8	8	8	9	9	10
13	8	8	9	9	9	10	11
14	9	9	9	9	10	10	11
15	9	9	10	10	10	11	12
16	9	10	10	10	11	11	12
17	10	10	10	11	11	12	13
18	10	11	11	11	12	12	13
19	11	11	11	12	12	13	14
20	11	11	12	12	13	13	14
21	12	12	12	13	13	14	15
22	12	12	13	13	14	14	15
23	12	13	13	13	14	15	16
24	13	13	13	14	15	15	16
25	13	14	14	14	15	16	17
26	14	14	14	15	15	16	17
27	14	14	15	15	16	17	18
28	15	15	15	16	16	17	18
29	15	15	16	16	17	17	19
30	15	16	16	16	17	18	19
31	16	16	16	17	18	18	20
32	16	16	17	17	18	19	20
33	17	17	17	18	18	19	21
34	17	17	18	18	19	20	21
35	17	18	18	19	19	20	22
36	18	18	18	19	20	20	22
37	18	18	19	19	20	21	22
38	19	19	19	20	21	21	23
39	19	19	20	20	21	22	23
40	19	20	20	21	21	22	24
41	20	20	20	21	22	23	24
42	20	20	21	21	22	23	25
43	20	21	21	22	23	24	25
44	21	21	22	22	23	24	26
45	21	22	22	23	24	24	26
46	22	22	22	23	24	25	27
47	22	22	23	23	24	25	27
48	22	23	23	24	25	26	27
49	23	23	24	24	25	26	28
50	23	24	24	25	26	26	28
60	27	27	28	29	30	31	33
70	31	31	32	33	34	35	37
80	35	35	36	36	38	39	41
90	38	39	40	40	42	43	45

Source : .E.B .Roessler et al.. Journal of Food Science, 1978, 43, 940-947