UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMME	:	**BACHELOR OF SCIENCE IN FOOD SCIENCE, NUTRITION AND TECHNOLOGY YEAR III**
COURSE CODE	:	**FSNT 304**
TITLE OF PAPER	:	**SENSORY EVALUATION**
REQUIREMENTS	:	**STATISTICAL TABLES, SCIENTIFIC CALCULATORS**
TIME ALLOWED	:	**TWO (2) HOURS**
INSTRUCTIONS	:	**ANSWER QUESTION ONE (1) AND ANY OTHER (2) QUESTIONS**

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Question 1

a) An assessor ranked ten different samples twice in the following way:

Sample	A	B	C	D	E	F	G	H	I	J
1^{st} ranking	2	4	1	8	6	3	5	9	10	7
2^{nd} ranking	1	4	2	7	8	3	5	6	10	9

Using the calculated Spearman's correlation coefficient, what can you conclude about the ability of the assessor to rank the samples at $\alpha = 0.05$? [10 marks]

b) A test beer 'B' is brewed using a new lot of malt, and the sensory analyst wishes to know if it can be distinguished from the control beer 'A' taken from current production. A 5 % risk of error is accepted and 12 trained assessors are available; 18 glasses of 'A' and 18 glasses of 'B' are prepared to make 12 sets which are distributed at random among the subjects, using two each of the combinations ABB, BAA, BBA, ABA, and BAB.

Eight subjects correctly identify the odd sample. Are the two beers different at the 5 % level of significance?

Using appropriate Statistical Tables, comment and draw-up a conclusion. [10 marks]

c) It was thought that viewing certain meats under red light might enhance sensory assessors' preference for meat. Some cuts of meat were viewed by assessors under red and white light. The samples of meat were rated on a complex preference scale which gave scores that were assumed to come from a population of scores that were normally distributed. The results are as shown in Table 1.

Table1. Preference scores

Subject	Preference scores	
	Under white light	**Under red light**
1	20	22
2	18	19
3	19	17
4	22	18
5	17	21
6	20	23
7	19	19
8	16	20
9	21	22
10	19	20

Using the appropriate statistic, find out if there is any significant difference between preference scores under red light and those under white light at $\alpha = 0.05$. [20 marks]

[Total Marks = 40]

Question 2

Describe the general design features of an ideal sensory evaluation room. [30 marks]

[Total Marks = 30]

Question 3

a) Write notes on the following sensory techniques.

i.	Triangle test (simple)	[5 marks]
ii.	Paired Comparison tests	[15 marks]
iii.	Duo-trio tests	[10 marks]

[Total Marks = 30]

Question 4

a) In an attempt to modernise a condiment plant, a manufacturer must replace an old cooker used to process barbecue sauce. The plant manager would like to know if the sauce produced in the new cooker tastes the same as the one made in the old cooker.

The project objective is therefore to determine if the new cooker can be put into service in the plant in place of the old cooker.

The test objective is to determine if the two barbecue sauce products, produced in different cookers, can be distinguished by taste.

You are required to indicate the appropriate sensory test that may be used, supporting your answer with a brief note. [5 marks]

b) Write notes on the 'hedonic test'. [10 marks]

c) Explain the following factors which may affect sensory evaluation:

i.	Logical effect	[5 marks]
ii.	Positional bias (order effect)	[5 marks]
iii.	Central tendency error	[5 marks]

[Total Marks = 30]

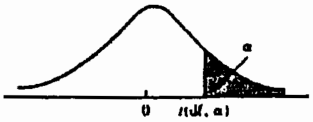
END OF QUESTION PAPER

Table 10.II.11 – Significance in triangle tests ($p = 1/3$)
(Source: Roessler *et al.*, 1978)

Number of test subjects or judgements	Minimum correct judgements to establish significant differentiation for a level of error of:			Number of test subjects or judgements	Minimum correct judgements to establish significant differentiation for a level of error of:		
	$\alpha = 0.05$ (*)	$\alpha = 0.01$ (**)	$\alpha = 0.001$ (***)		$\alpha = 0.05$ (*)	$\alpha = 0.01$ (**)	$\alpha = 0.001$ (***)
5	4	5	–	53	24	27	29
6	5	6	–	54	25	27	30
7	5	6	7	55	25	27	30
8	6	7	8	56	25	28	31
9	6	7	8	57	26	28	31
10	7	8	9	58	26	29	31
11	7	8	9	59	27	29	32
12	8	9	10	60	27	29	32
13	8	9	11	61	27	30	33
14	9	10	11	62	28	30	33
15	9	10	12	63	28	31	34
16	9	11	12	64	29	31	34
17	10	11	13	65	29	32	34
18	10	12	13	66	29	32	35
19	11	12	14	67	30	32	35
20	11	13	14	68	30	33	36
21	12	13	15	69	30	33	36
22	12	13	15	70	31	34	37
23	12	14	16	71	31	34	37
24	13	14	16	72	32	34	37
25	13	15	17	73	32	35	38
26	14	15	17	74	32	35	38
27	14	16	18	75	33	35	39
28	14	16	18	76	33	36	39
29	15	17	19	77	33	36	39
30	15	17	19	78	34	37	40
31	16	17	19	79	34	37	40
32	16	18	20	80	35	37	41
33	16	18	20	81	35	38	41
34	17	19	21	82	35	38	42
35	17	19	21	83	36	39	42
36	18	20	22	84	36	39	42
37	18	20	22	85	36	39	43
38	18	20	23	86	37	40	43
39	19	21	23	87	37	40	44
40	19	21	24	88	38	41	44
41	20	22	24	89	38	41	44
42	20	22	24	90	38	41	45
43	20	23	25	91	39	42	45
44	21	23	25	92	39	42	46
45	21	23	26	93	39	43	46
46	22	24	26	94	40	43	46
47	22	24	27	95	40	43	47
48	22	25	27	96	41	44	47
49	23	25	28	97	41	44	48
50	23	25	28	98	41	45	48
51	24	26	28	99	42	45	48
52	24	26	29	100	42	45	49

Table 2 The entries in this table are the critical values for Student's t for an area of α in the right-hand tail. Critical values for the left-hand tail are found by symmetry

Critical values of Student's t distribution



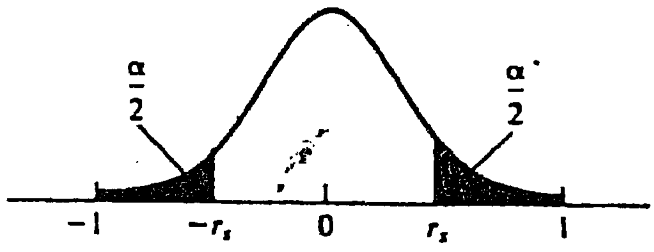
df	Amount of α in One-tail 0.25	0.10	0.05	0.025	0.01	0.005
1	1.000	3.08	6.31	12.7	31.8	63.7
2	0.816	1.89	2.92	4.30	6.97	9.92
3	0.765	1.64	2.35	3.18	4.54	5.84
4	0.741	1.53	2.13	2.78	3.75	4.60
5	0.727	1.48	2.02	2.57	3.37	4.03
6	0.718	1.44	1.94	2.45	3.14	3.71
7	0.711	1.42	1.89	2.36	3.00	3.50
8	0.706	1.40	1.86	2.31	2.90	3.36
9	0.703	1.38	1.83	2.26	2.82	3.25
10	0.700	1.37	1.81	2.23	2.76	3.17
11	0.697	1.36	1.80	2.20	2.72	3.11
12	0.695	1.36	1.78	2.18	2.68	3.05
13	0.694	1.35	1.77	2.16	2.65	3.01
14	0.692	1.35	1.76	2.14	2.62	2.98
15	0.691	1.34	1.75	2.13	2.60	2.95
16	0.690	1.34	1.75	2.12	2.58	2.92
17	0.689	1.33	1.74	2.11	2.57	2.90
18	0.688	1.33	1.73	2.10	2.55	2.88
19	0.688	1.33	1.73	2.09	2.54	2.86
20	0.687	1.33	1.72	2.09	2.53	2.85
21	0.686	1.32	1.72	2.08	2.52	2.83
22	0.686	1.32	1.72	2.07	2.51	2.82
23	0.685	1.32	1.71	2.07	2.50	2.81
24	0.685	1.32	1.71	2.06	2.49	2.80
25	0.684	1.32	1.71	2.06	2.49	2.79
26	0.684	1.32	1.71	2.06	2.48	2.78
27	0.684	1.31	1.70	2.05	2.47	2.77
28	0.683	1.31	1.70	2.05	2.47	2.76
29	0.683	1.31	1.70	2.05	2.46	2.76
z	0.674	1.28	1.65	1.96	2.33	2.58

NOTE: For df $\geq$ 30, the critical value $t(\text{df}, \alpha)$ is approximated by $z(\alpha)$, given in the bottom row of table.

Table 14

Critical Values of Spearman's Rank Correlation Coefficient

The entries in this table are the critical values of r_s for a two-tailed test at α. For a one-tailed test, the value of α shown at the top of the table is double the value of α being used in the hypothesis test.



n	$\alpha = 0.10$	$\alpha = 0.05$	$\alpha = 0.02$	$\alpha = 0.01$
5	0.900	—	—	—
6	0.829	0.886	0.943	—
7	0.714	0.786	0.893	—
8	0.643	0.738	0.833	0.881
9	0.600	0.683	0.783	0.833
10	0.564	0.648	0.745	0.794
11	0.523	0.623	0.736	0.818
12	0.497	0.591	0.703	0.780
13	0.475	0.566	0.673	0.745
14	0.457	0.545	0.646	0.716
15	0.441	0.525	0.623	0.689
16	0.425	0.507	0.601	0.666
17	0.412	0.490	0.582	0.645
18	0.399	0.476	0.564	0.625
19	0.388	0.462	0.549	0.608
20	0.377	0.450	0.534	0.591
21	0.368	0.438	0.521	0.576
22	0.359	0.428	0.508	0.562
23	0.351	0.418	0.496	0.549
24	0.343	0.409	0.485	0.537
25	0.336	0.400	0.475	0.526
26	0.329	0.392	0.465	0.515
27	0.323	0.385	0.456	0.505
28	0.317	0.377	0.448	0.496
29	0.311	0.370	0.440	0.487
30	0.305	0.364	0.432	0.478