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GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER VIII • EXAMINATION – SUMMER 2015

Subject Code: 180403 **Date: 13/05/2015**

Subject Name: Biostatistics

Time:10.30AM-01.00PM **Total Marks: 70**

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Standard necessary charts are provided in this question paper.
5. Take table value for 5% level of significance as 1.96 for normal distribution.

Q.1 **(a)** Discuss the limitations of Biostatistics in modern research. **07**

(b) Give the definitions: Inferential biostatistics, Mean, Variance, Standard deviations, Geometric Mean, Frequency curve, Histogram. **07**

Q.2 **(a)** Find out the Mean Deviation of the following data. **07**

Class Interval	2-4	4-6	6-8	8-10
f	3	4	2	1
X	3	5	7	9

(b) Find the standard deviation of the following data. **07**

Sr No.	1	2	3	4	5	6	7	8	9	10
X	240.12	240.13	240.15	240.12	240.17	240.15	240.17	240.16	240.22	240.21

OR

(b) Differentiate between mean, median and mode. **07**

Q.3 Perform an analysis of variants for the data given as under. **14**

Lypophilizers						
	P	**Q**	**R**	**S**	**T**	**U**
Kishan	6	5	6	7	4	3
Bhavik	9	7	8	3	2	8
Sandeep	3	5	4	6	2	1
Raju	5	9	8	3	4	2
Mahindra	1	2	4	7	6	5

The data is given for five different lyophilizes for the same kind of samples by performing individual experiments. The figure corresponds to number of samples without contamination. Comment on productivity.

OR

Q.3 An agricultural experiment on the Latin square plant gave the following results for the yield of wheat per acre. Letters A, B, C, D, E co-responds to different variants of wheat. **14**

A	16	B	10	C	11	D	9	E	9
E	10	C	9	A	14	B	12	D	11
B	15	D	8	E	8	C	10	A	18
D	12	E	6	B	13	A	13	C	12
C	13	A	11	D	10	E	7	B	14

Q.4 (a) Using method of least squares, fit a relation of the form $y=ab^x$ to the following data: **07**

X	2	3	4	5	6
Y	144	172.8	207.4	248.8	298.5

(b) The weight of 10 guinea pigs (in grams) when brought in the laboratory and after one month were recorded in the following table. Calculate and conclude whether the gain in weight is statistically significant or not. **07**

Guinea Pig	**Weight (in g)**									
In the beginning	49	41	37	41	42	37	39	38	41	35
After one month	52	43	46	52	46	38	42	41	42	38

OR

Q.4 (a) In a sample survey of public opinion, two questions were asked: **07**

1: Do you drink?

2: Are you in favor of local option on sale of liquor.

The answers are given in the following table:

	Yes	**No**	**Row Total**
Yes	56	31	87
No	18	6	24
Column Total	74	37	111

07

(b) If P is the pull required to lift q load W by means of a pulley block, find a linear law of the form P=mW+c connecting P and W, using the following data

P	12	15	21	25
W	50	70	100	120

Where P and W are taken in kg'-wt. Compute P when W = 150kg.

Q.5 (a) Find out co- efficient of co-relation X and Y from the given data. **07**

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

(b) Write a note on testing a hypothesis. **07**

OR

Q.5 (a) Find out co- efficient of co-relation from the given data (by Spearman's rank co-relation). **07**

X	80	70	61	56	45
Y	31	36	21	28	19

(b) Discuss the applications of biostatistics in medical field. **07**

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Table : Values of F at the 5% Significance Level									
DoF- denominator	**DoF- numerator**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	161	200	216	225	230	234	237	239	241
2	18.50	19.00	19.20	19.20	19.30	19.30	19.40	19.40	19.40
3	10.10	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.40	6.59	6.39	6.26	6.16	6.09	6.04	6.00
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80.
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
30	4.17	.3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04

Table: Values of F at The 1% Significance Level									
DoF-denominator	**DoF- numerator**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	4052	5000	5403	5625	5764	5859	5928	5982	6022
2	98.50	99.90	99.20	99.20	99.30	99.30	99.40	99.40	99.40
3	34.10	30.80	29.50	28.70	28.20	27.09	27.70	27.50	27.30
4	21.20	18.00	16.70	16.00	15.50	15.20	15.00	14.80	14.70
6	13.70	10.90	9.78	9.15	8.75	8.47	8.26	8.10	7.98
8	11.30	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91
10	10.00	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
14	8.86	6.51	5.56	5.04	4.70	4.46	4.28	4.14	4.03
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72

Table value of “t” at different degrees of freedom on P=0.05 and 0.01 level		
V	**P**	
	0.05	**0.01**
1	6.314	31.821
2	2.920	6.965
3	2.353	4.541
4	2.132	3.747
5	2.015	3.365
6	1.943	3.143
7	1.895	2.998
8	1.860	2.896
9	1.833	2.821
10	1.812	2.764
11	1.796	2.718
12	1.782	2.681
13	1.771	2.650
14	1.761	2.624
15	1.753	2.602
16	1.746	2.583
17	1.740	2.567
18	1.734	2.552
19	1.729	2.541
20	1.725	2.528
21	1.721	2.518
22	1.717	2.508
23	1.714	2.500
24	1.711	2.492
25	1.708	.2.485
26	1.706	2.479
27	1.703	2.463
28	1.701	2.467
29	1.699	2.462
30	1.697	2.457
40	1.684	2.423
60	1.671	2.390
120	1.658	2.338

Table: Distribution of $\chi 2$ corresponding to different levels of significance			
Degree of freedom(df)	Probability (P)		
	0.05	0.01	0.001
1	3.84	6.64	10.83
2	5.99	9.21	13.82
3	7.82	11.35	16.27
4	9.49	13.29	18.47
5	11.07	15.09	20.52
6	12.59	16.81	22.46
7	14.07	18.48	24.32
8	15.51	20.09	26.13
9	16.92	21.67	27.88
10	18.31	23.21	29.59
11	19.68	24.73	31.26
12	21.03	26.22	32.91
13	22.36	27.69	34.53
14	23.69	29.14	36.12
15	25.00	30.58	37.70
16	26.30	32.00	39.25
17	27.59	33.41	40.79
18	28.87	34.81	42.31
19	30.14	36.19	43.82
20	31.41	37.57	45.32
21	32.67	38.93	46.80
22	33.92	40.29	48.27
23	35.17	41.64	49.73
24	36.42	42.98	51.18
25	37.65	44.31	52.62
26	38.89	45.64	54.05
27	40.11	46.96	55.48
28	41.34	48.28	56.89
29	42.56	49.59	58.30
30	43.77	50.89	59.70