Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2020

Subject Code:3150409 **Date:22/01/2021**

Subject Name:Biostatistics

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Notations used in this paper have conventional meaning and need no clarifications.**
5. **All necessary tables and values are given in this question paper itself**

MARKS

Q.1 **(a)** What is descriptive biostatistics? **03**

(b) Explain the terms: geometric mean and harmonic mean. **04**

(c) **07**

Find the mean from the following data:

Marks (x)	15	5	20	10	20	30	45	25
No. of student (f)	5	7	9	10	8	6	3	2

Q.2 **(a)** Calculate the mode for the data given: 100, 97, 110, 200, 75, 120, 150. **03**

(b) Calculate mode on the basis of simple frequency distribution of a variable: **04**

Variable(x) (Number of bacterial colonies)	1	2	3	4	5	6	7
Frequency(f) (Plates)	1	4	12	9	2	1	1

(c) The mean age of 80 students is 16 years and the mean age of another group of 20 students is 20 years. Find out the mean age of all the 100-student combined together. **07**

Q.3 **(a)** Give the difference between correlation and regression. **03**

(b) What is a relation between Mean, Median and Mode? **04**

(c) Calculate Mean Deviation: **07**

Class Interval	0-4	4-8	8-12	12-16	16-20
Frequency	8	6	4	2	5

Q.4 **(a)** Write down the assumption of ANOVA. **03**

(b) When to use standard deviation and mean deviation? **04**

(c) Calculate standard deviation of the following data: **07**

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of fields „f"	5	13	20	32	60	80	90	100

Q.5 **(a)** Explain Poisson's distribution. **03**

(b) A bag contains 4 balls two balls are drawn at random without replacement and found to be white. What is the probability that all balls are white? **04**

(c) Find the correlation between mid term score (x) and final score (y). **07**

x	82	81	80	68	70	92	76	80	86	62
y	94	92	85	75	73	95	69	86	90	69

Q.6 **(a)** Write the assumptions of t-test. **03**

(b) Suppose 5% 0f men and 0.25% of women have grey hair. A grey hair person is selected what is the probability that he is a male? Assume equal probabilityfor men and women. **04**

(c) Find the Rank of correlation between Price and Supply by karl-pearson method. **07**

Price	10	12	18	16	15	19	18	17
Supply	30	35	45	44	42	48	47	46

Q.7 **(a)** What is positive skewness and negative skewness? **03**

(b) A sample of 400 male students is found to have a mean height 67.47 inches. Can it be reasonably regarded as a sample from a large population with mean height 67.39 inches and standard deviation 1.30 inches? Test at 5% level significance. **04**

(c) In a certain sample of 2000 families 1400 families consume tea. Out of 1800 Hindu families 1236 families consume tea. Use chi square test to find the association between consumption of tea and family types. **07**

Q.8 Perform LSD for the following data. **14**

C 25	B 23	A 20	D 20
A 19	D 19	C 21	B 18
B 19	A 14	D 17	C 20
D 17	C 20	B 21	A 15

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Selected values of normal distributions

Level of significance	Z value- two tailed test	Z value- one tailed test
0.10	1.645	1.282
0.05	1.96	1.645
0.02	2.326	2.054
0.01	2.576	2.326
0.001	3.291	3.090

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 χ2 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