Seat No.: _____ Enrolment No.:_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BPLAN- SEMESTER– 2 EXAMINATION – SUMMER 2016

Subject Code: 1025504 Date: 03/06/2016

Subject Name: Statistical and Quantitative Methods in Planning-II

Time: 10.30AM-12.30PM Total Marks: 50

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Fill in the blanks **05**

1) Full form of ANOVA_____.
2) For _____ condition the value of Zc and Zt is indicate the hypothesis is accepted.
3) In regression analysis if one variable is considered is called_____.
4) If sample size is <30 then it follows _____ distribution.
5) The χ^2 test is also known as _____.

(b) Short questions **05**

6) What is Regression?
7) What is hypothesis?
8) What is linear programming?
9) What is theoretical value of Z at 90% confidence level?
10) For which value of "R" the hypothesis is accepted and rejected?

Q.2 **(a)** A transport company owns four trucks. Develop the regression model to estimate annual maintenance expenditure from the following data. **05**

Age of Trucks (Years)	10	6	6	2
Annual Maintenance (Rs.)	14	14	12	8

Calculate the coefficient of correlation and determination. Estimate the annual maintenance expenditure for 8 years.

(b) Following information is available on sales of TV's **05**

$\overline{X}$ (lakhs)	20	180
6 (lakhs)	6	24

Assume R=0.8. Find the likely sale if 40 lakhs is spent on advertisement. What would

OR

(b) The cost of travel by two wheeler for various trip length is shown below. **05**

Trip Length (km)	8	6	3	8	5	6	6	6	5
Travel Cost (Rs.)	7	5	4	8	6	8	8	7	4

Develop the regression model to estimate travel expenditure.

Q.3 **(a)** The mean weight of 400 workers is 67.47kg. The population mean and standard deviation are 67.39kg and 1.30kg respectively. Apply hypothesis to check that can you consider the sample whether it is in population or not. Take C.L.=95% **05**

(b) An administrator of stimulus given a data of 12 patients which indicate increased in blood pressure level. The doctor claim is that there is a increased in B.P. level check whether the doctor claim is right or not? Take C.L.=95% **05**

5	2	8	-1	3	0	6	-2	1	5	0	4

OR

Q.3 **(a)** What is Type I and Type II error in hypothesis? **05**

(b) It is assumed that 20% of travel in train is in 1st class, but when a sample of 400 passengers was taken, it was found that 70 passengers travel in 1st class. Prove whether the 20%travrl in 1st class is acceptable. Take C.L.= 95%. **05**

Q.4 **(a)** The attendance of the student of class I for the week is given below. **05**

Day of week	Attendance
Monday	66
Tuesday	57
Wednesday	54
Thursday	48
Friday	75

Whether it follows the uniform distribution or not apply chi square test. Take C.L.=95%.

(b) Three variety of wheat are used on 4 plots and yield per hectare is obtained as under. Is there any influence of variety on yield values apply ANOVA. **05**

A(Ha)	B(Ha)	C(Ha)
6	5	5
7	5	4
3	3	3
8	7	4

OR

Q.4 **(a)** Write short note on ANOVA and explain One way and Two way ANOVA. **05**

(b) University result have shown for 500 students as under **05**

University result	1st class	2nd class	3rd class	Failure
Students	40	110	170	180

Check whether university claim is correct or not. Whether the samples follow the distribution claimed by university. Take the proportion of students (10%,20%,30%,40%) apply chi square test. Take C.L.=95%.

Q.5 **(a)** Formulate the linear programming by simplex method for Maximization of **10**
$Z= 12X_1+3X_2+X_3$ subjected to
$10X_1+2X_2+X_3 \leq 100$
$7X_1+3X_2+2X_3 \leq 77$
$2X_1+4X_2+X_3 \leq 80$

OR

Q.5 **(a)** Explain decision making under condition of uncertainty. **05**

(b) Discuss the application of statistic in urban planning. **05**

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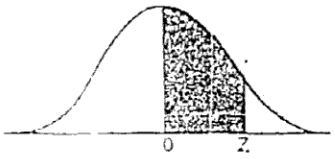
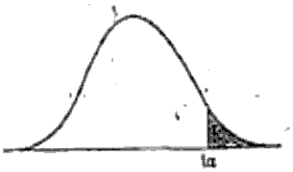
VII. AREA UNDER STANDARD NORMAL CURVE



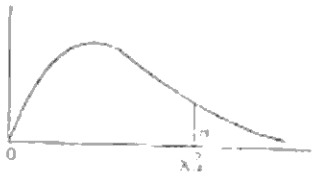
z → / ↓	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1519	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

IX. VALUES OF t



d.f.	t.100	t.050	t.025	t.010	t.005
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.325	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
inf.	1.282	1.645	1.960	2.326	2.576

VIII. VALUES OF CHI-SQUARE



df \ α	.100	.050	.025	.010	.005	.001
1	2.71	3.84	5.02	6.63	7.88	[illegible]
2	4.61	5.99	7.38	9.21	10.6	[illegible]
3	6.25	7.81	9.35	11.3	12.9	[illegible]
4	7.78	9.49	11.1	13.3	14.9	[illegible]
5	9.24	11.1	12.8	15.1	16.7	[illegible]
6	10.6	12.6	14.4	16.8	18.5	[illegible]
7	12.0	14.1	16	18.5	20.3	[illegible]
8	13.4	15.5	17.5	20.1	22.0	[illegible]
9	14.7	16.9	19.0	21.7	23.6	[illegible]
10	16.0	18.3	[illegible]	23.2	25.2	[illegible]
11	17.3	19.7	[illegible]	24.7	26.8	[illegible]
12	18.5	21.0	[illegible]	26.2	28.3	[illegible]
13	19.8	22.4	[illegible]	27.7	29.8	[illegible]
14	21.1	23.7	[illegible]	29.1	31.3	[illegible]
15	22.3	25.0	27.5	30.6	32.8	[illegible]
16	23.5	26.3	28.8	32.0	34.3	[illegible]
17	24.8	27.6	[illegible]	33.4	35.7	[illegible]
18	26.0	28.9	[illegible]	34.8	37.2	[illegible]
19	27.2	30.1	[illegible]	36.2	38.6	[illegible]
20	28.4	31.4	34.2	37.6	40.0	45.3
21	29.6	32.7	35.5	38.9	41.4	46.8
22	30.8	33.9	36.8	40.3	42.8	48.3
23	32.0	35.2	38.1	41.6	44.2	49.7
24	33.2	36.4	39.4	43.0	45.6	51.2
25	34.4	37.7	40.6	44.3	[illegible]	[illegible]
26	35.6	38.9	41.9	45.6	48.3	54.1
27	36.7	40.1	43.2	47.0	49.6	55.5
28	37.9	41.3	44.5	48.3	51.0	56.9
29	39.1	42.6	45.7	49.6	52.3	58.3
30	40.3	43.8	47.0	50.9	53.7	59.7
35	46.1	49.8	53.2	57.3	60.3	66.6
40	51.8	55.8	59.3	63.7	66.8	73.4
45	57.5	61.7	65.4	70.0	73.2	80.1
50	63.2	67.5	71.4	76.2	79.5	86.7
55	68.8	73.3	77.4	82.3	85.7	93.2
60	74.4	79.1	83.3	88.4	92.0	99.6
65	80.0	84.8	89.2	94.4	98.1	106.0
70	85.5	90.5	95.0	100.4	104.0	112.3
75	91.1	96.2	100.8	106.4	110.3	118.6
80	96.6	101.9	106.6	112.3	116.3	124.8
85	102.1	107.5	112.4	118.2	122.3	131.0
90	107.6	113.1	118.1	124.1	128.3	137.2
95	113.0	118.8	123.9	130.0	134.2	143.3
100	118.5	124.3	129.6	135.8	140.2	149.4