Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BPHARM – SEMESTER II (OLD Syllabus) • EXAMINATION – SUMMER • 2015

Subject code: 220001 Date: 28-05-2015

Subject Name: Applied Mathematics (Biostatistics)

Time: 10:30 am - 01:30 pm Total Marks: 80

Instructions:

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

Q.1 (a) Explain types of correlation. **06**

(b) Find the coefficient of correlation between x and y for the following data. **05**

X	78	89	97	69	59	79	68	61
Y	125	137	156	112	107	138	123	110

(c) For 10 observations on price (X) and supply (Y), the following data were obtained. **05**

$\sum X = 130$, $\sum Y=220$, $\sum X^2=2288$, $\sum Y^2=5506$, $\sum XY=3467$

Obtain the equation of line of regression Y on X and Estimate the supply when the price is 16 units.

Q.2 (a) Explain (i) Stratified random sampling (ii) systematic sampling (iii) Cluster sampling **06**

(b) Suppose a population consists of four farms serially numbered 1, 2, 3 and 4. Suppose 3, 2, 6 and 4 quintals of rice respectively are produced in these fields. Draw all possible samples of size 2 and find the mean weight of rice for every sample. **05**

(c) What is sampling method? What are the advantages of sampling? **05**

Q.3 (a) Explain Scatter Diagram. **06**

(b) The following data show the blood pressure reduction (in mm Hg) caused in 10 animals by a new antihypertensive compound. **05**

20,18,15,12,8,16,18,17,14,21

Test the hypothesis that the blood pressure reduction for the population is 15 mm Hg.($t_{9,0.05}$=2.262)

(c) To test the effectiveness of a new diet pill, nine randomly selected subjects were weighed before they went on the pill for six months. Their weights in kg before and after the program were recorded as under: **05**

Subject	1	2	3	4	5	6	7	8	9
Initial weight	80	82	75	90	98	87	100	107	103
Final Weight	79	83	75	81	95	86	101	105	100

Apply sign test to test the hypothesis that the diet pill is ineffective.(Table value= 8)

Q.4 (a) Explain (i) Two-tailed and one tailed tests (ii) Degree of freedom **06**

(b) The nicotine content of two samples of tobacco was found to be as follows. **05**

Sample A: 24,27,26,21,25

Sample B : 27,30,28,31,22,36

Can it be said that the two samples came from the same normal population?($F_{5,4,0.05}$ =6.26)

(c) Explain paired test. **05**

Q.5 (a) Explain Nonparametric tests. **06**

(b) In an experiment on immunization of cattle from tuberculosis , the following results were obtained: **05**

	Affected	Unaffected
Inoculated	12	28
Not inoculated	13	7

Examine the effect of the variance in controlling the incidence of disease.(Table value=3.84)

(c) The following table shows the yields per acre of four different plant crops grown on lots treated with three different types of fertilizer. Determine at 5 % level of significant whether there is significant difference in yield per acre (i) due to the fertilizers (ii) due to the type of crops.(F_{T1}=5.14,F_{T2}=4.76) **05**

	Crop I	Crop II	Crop III	Crop IV
Fertilizers A	5.5	7.4	8.2	7.7
Fertilizers B	9.8	8.8	10.6	8.0
Fertilizers C	6.9	7.8	6.7	6.2

Q. 6 (a) Explain Analysis of variance for one way classification. **06**

(b) In order to compare the effectiveness of two sunburn lotions, a random sample of seven subjects is selected. Lotion A is applied to the left side of their faces and Lotion B to the right side. After the subjects have sat in the sun watching a three-hour tennis match, the degree of sunburn is measured on a scale. **05**

Subject	1	2	3	4	5	6	7
Lotion A	48	62	42	69	74	35	84
Lotion B	46	49	48	63	43	32	53

Apply Wilcoxon signed rank test, determine whether the data support the claim that the two lotions are equally effective.(Table value=2)

(c) An I.Q test was administered to 5 medical representatives before and after they were obtained. The result are given below. **05**

Candidate No.	1	2	3	4	5
I.Q Before training	110	120	123	132	125
I.Q After training	120	118	125	136	127

Test whether there is any change in I.Q after the training Programmed. ($t_{4,0.05}$ = 2.776)

Q.7	(a)	Explain: Wash out period and carry over effect.	**06**
	(b)	Differentiate between cross over and parallel design. What do you mean by carry over effect in a bioequivalence study?	**05**
	(c)	Discuss about application of chi-square and restriction of chi-square test.	**05**

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