Seat No.: _____ Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm - SEMESTER– II • EXAMINATION – SUMMER 2017

Subject Code: 220001 **Date: 02/06/2017**
Subject Name: Applied Mathematics (Biostatistics)
Time: 10:30 AM to 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)** Enumerated the various methods of sampling and discuss in detail about any two methods with suitable examples. **06**

(b) Distinguish between Cluster sampling and Stratified sampling. **05**

(c) A population consists of 5 units with values 2, 1, 4, 6, 5. Write down all possible samples of size 2 with and without replacement and find sample mean for each sample. **05**

Q.2 **(a)** What is correlation? Distinguish between positive, negative and zero correlation. **06**

(b) Define regression coefficients and state their properties. **05**

(c) A Beer's law plot is constructed by plotting ultraviolet absorbance vs. concentration, with following result: **05**

Concentration (x)	1	5	10	15	20	25	30
Absorbance (y)	0.125	0.24	0.368	0.547	0.697	0.785	0.854

i) Calculate slop and intercept

ii) An unknown has an absorbance of 6.65. What is the concentration?

Q.3 **(a)** Explain following terms. **06**

Hypothesis, Statistical hypothesis, Null hypothesis, Alternative hypothesis, Test of a hypothesis, Critical region, Types of errors in testing of a hypothesis, Level of significance

(b) Explain F-test for equality of two variances. **05**

(c) Explain Chi-square test. **05**

Q.4 **(a)** Explain two-way analysis of variance. **06**

(b) Explain ANOVA and state some application of analysis of variance. **05**

(c) It is suspected that four method of analysis in laboratory are not accurate. A known sample is analyzed using each method and replicate assays performed each with following results: **05**

Method A	Method B	Method C	Method D
10	9	8	9
11	10	8	9
10	11	8	9

By applying one way ANOVA, test whether the mean assay is same for the four different method of analysis. F at 5 % level = 4.07

Q.5 **(a)** What arte the advantages and disadvantages of nonparametric tests **06**

(b) Write note on followings **05**

i) Wilcoxon signed rank test ii) Kruskal wallis test

iii) Wilcoxon rank sum test.

(c) Explain in detail Rank test. **05**

Q. 6 **(a)** Enumerate the experimental designs in clinical trials? Discuss in detail about any one experimental design. **06**

(b) Explain following terms with reference to experimental designs in clinical trials. **05**

i) Wash out period ii) Carry over effect

iii) Replicate design iv) Crossover Design

(c) What is a crossover design? Discuss merits and demerits of crossover design. **05**

Q.7 **(a)** A random sample of 20 tablets from a batch gives a mean ingredient content 42 mg and standard deviation of 6 mg. test the hypothesis that the population mean is 44 mg (t_{tab} at 5 % level of significance = 2.093) **06**

(b) What do you mean by biostatistics? Explain its importance in Pharmacy. **05**

(c) Write in detail factors for designing clinical studies. **05**

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