

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 slope 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 are the advantages and disadvantages of nonparametric tests | 06 |
| | (b) | Write note on followings
i) Wilcoxon signed rank test ii) Kruskal wallis test
iii) Wilcoxon rank sum test. | 05 |
| | (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.
<div style="display: flex; justify-content: space-between;"><div>i) Wash out period</div><div>ii) Carry over effect</div></div> <div style="display: flex; justify-content: space-between;"><div>iii) Replicate design</div><div>iv) Crossover Design</div></div> | 05 |
| | (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 |
