

GUJARAT TECHNOLOGICAL UNIVERSITY
B.Ph. - SEMESTER- II • EXAMINATION – WINTER-2017

Subject Code: 220001**Date: 28/12/2017****Subject Name: Applied Mathematics (Biostatistics)****Time: 02:30PM TO 05:30PM****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)** A Beer's law plot is constructed by plotting ultraviolet absorbance vs. concentration, with following result: **06**

Concentration (x)	1	2	3	4	5	6	7
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?

- (b)** Define regression coefficients and state their properties. **05**
- (c)** A population consists of 6 units with values 3, 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)** Explain sampling methods. **05**

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

- 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 two-way analysis of variance. **05**

- (c)** It is suspected that four methods 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 methods of analysis. F at 5 % level = 4.07

- Q.4 (a)** Explain F-test for equality of two variances. **06**

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

- (c)** Enumerate the various methods of sampling and discuss in detail about any two methods with suitable examples. **05**

- Q.5** (a) Write in detail factors for designing clinical studies. **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
- (c) What is a crossover design? Discuss merits and demerits of crossover design. **05**
- Q. 6** (a) Enumerate the experimental designs in clinical trials? Discuss in detail about any one experimental design. **06**
- (b) DesignWrite 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.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) What is the advantages and disadvantages of nonparametric tests **05**
