Seat No.: _____   Enrolment No. _____

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

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

(c) Enumerated 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   **05**
trials.

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   **05**
design.

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

(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   **06**
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)

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

(c) What is the advantages and disadvantages of nonparametric tests   **05**

＊＊＊＊＊＊＊＊＊＊＊＊＊＊＊