Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Subject Code: 2713107 **Date: 31/12/2015**

Subject Name: Statistics for Biomedical Engineers

Time:2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

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

Q.1 **(a)** What do you mean by presentation of data? Describe available methods of presenting data collected by investigators? **07**

(b) Explain the role of Biostatistics in public health. **07**

Q.2 **(a)** Explain the importance of scientific method and also describe the elements of scientific method. **07**

(b) Write notes on: - **07**

1) Frequency Polygon
2) Kurtosis

OR

(b) 15 dengue patients who were treated with highly active antiretroviral therapy for at least 12 months. The CD4 T cell counts (× 106/L) at baseline for the 15 subjects are listed below. **07**

225	165	125	211	256
145	123	60	157	182
155	255	121	175	153

Treat the above data set as a sample and compute the following;
a) mean, b) median, c) The mode, d) range, e) variance, f) standard deviation, g) coefficient of variation, h) Interquartile range.

Q.3 **(a)** A medical research team wished to evaluate proposed screening test for Ebola virus diseases. The test was given to a random sample of 400 patients with Ebola diseases and independent random sample of 450 patients without symptoms of the diseases. The two sample were drawn from population of subjects who were 60 years of age or older. Solve this case study with Bayes's rule where P(D) = 0.125 **07**

Test Results	Yes(D)	No (~D)	Total
Positive(T)	350	15	365
Negative (~T)	50	435	485
Total	400	450	850

(b) Discuss the prior and posterior probability analysis using appropriate case study. **07**

OR

Q.3 **(a)** Explain the conditional probability with appropriate case study. How does it differ from unconditional probability? **07**

(b) Explain the concept of confidence interval in biomedical statistical analysis and state the impact of 95% of confidence interval as gold standard for various analysis. **07**

Q.4 **(a)** A research team is interested in the difference between serum uric acid levels in patient with and without down's syndrome. In large hospital for the treatment of the mentally retarded, a sample of 13 individuals with down's syndrome yielded a mean of 3.5 mg/100ml. in general hospital a sample of 16 normal individuals of the same age and sex were found to have a mean value of 2.4. if it is reasonable to assume that the two population of values are normally distributed with variances equal to 1 and 1.5, find 95 percent confidence interval of $\mu 1-\mu 2$. **07**

(b) Elaborate the various tools for statistical estimation, support your answer with respective case study. **07**

OR

Q.4 **(a)** Punctuality of patients in keeping appointments is of interest to a research team. In a study of patient flow through the offices of general practitioners, it was found that a sample of 30 patients were 16.2 minutes late for appointments, on the average. Previous research had shown the standard deviation to be about 9 minutes. The population distribution was felt to be non-normal. What is the 90 percent confidence interval for the true mean amount of time late for μ appointments? **07**

(b) Draw a flow chart for various statistical method in regards to the one sample problem and the variable analysis. Enlist the various possible methods. **07**

Q.5 **(a)** Write notes on **07**

1) Normal distribution
2) Standard Normal distribution

(b) Draw box-whisker and stem and leaf plot for below given data. **07**

Let's consider a random sample of 15 concentrations of Sodium chloride (Nacl) in milligrams per liter.

13.8	19.9	11.5	11.2	19.5
13.7	11.5	17.8	13.7	12.2
13.8	11.7	13.9	19.8	11.4

OR

Q.5 **(a)** Explain the impact of p value and p/2 value in statistical interpretation. **07**

(b) Write notes on **07**

1) Partial correlation and multiple correlation
2) Rank correlation

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