2071
M.Sc. (Bio-Informatics) Second Semester
MBIN-8007: Statistics and Probability

Time allowed: 3 Hours

Max. Marks: 60

NOTE: *Attempt* <u>*five*</u> *questions in all, including Question No. I which is compulsory and selecting atleast one question from each Unit. Use of simple calculator is allowed.*

x-x-x

I. Briefly explain the following terms:-

   a)   Ordinal and Interval scale, with examples

   b)   Attributes and variables, with examples

   c)   Steps to construct Ogive curves

   d)   Conditional probability with examples

   e)   Probability mass function of Poisson distribution

   f)   Null and Alternative hypothesis

   g)   Critical points of t- distribution

   h)   Type-I error   (8x1½)

UNIT - I

II. a) What is Central tendency? Define any two measures of central tendency along with their merits and demerits

   b) Define:-

   i) Coefficient of dispersion and its measures

   ii) Deciles and Percentiles

   iii) Skewness, and how it can be measured

   iv) Histogram   (4,8)

III. a) Define discrete and continuous random variables, with examples. How will you obtain the Expectation of a random variable?

   b) Find the Median and Mode of the following data

Age (in Years)	:	30-39	40-49	50-59	60-69	70-79	80-89
No. of Students	:	39	63	123	75	25	19

(6,6)

P.T.O.

UNIT - II

IV. a) State and prove Bayes' theorem.

b) Explain the following terms with examples

i) Sample space

ii) Independent events

iii) Probability density function (pdf)

iv) Cumulative distribution function (cdf) and its properties   (6,6)

V. a) What do you understand by the term 'Regression'? Define the regression equation of Y on X and its usefulness.

b) Define Spearman's Rank correlation coefficient and state its important properties.

(6,6)

UNIT - III

VI. a) Define Normal distribution and state its important properties

b) Define Binomial distribution. Find the expressions for its mean and variance. Under what conditions it can be approximated by a normal distribution. (6,6)

VII. a) Develop a test procedure for testing $H_0 : \mu_1 = \mu_2$ against $H_1: \mu_1 \neq \mu_2$, when the two normal populations are independent and their variances are unknown but equal.

b) Define ANOVA and state its assumptions. A test was given to five athletes at random from three different centers. The scores of the athletes out of 20 are given below:

Center I: 29   27   26   25   28

Center II: 27   24   25   24   25

Center III: 26   23   20   27   26

Carry out the analysis of variance and state your conclusions.
(Tabulated $F_{2,12} = 19.40$ for $\alpha = 0.05$)   (6,6)

x-x-x