

B.Sc. (Honours) Examination 2018
Semester-III
Computer Science
Course : BCSC-32 (Old)
(Statistical Methods)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any four** questions

10×4=40

1. Explain with an example as to how a histogram is plotted from a data-set. Also explain Absolute frequency and Relative frequency in this context. Hence specify how this probability is obtained from the histogram. 3+2+2+3=10
 2. Define random variable. What is its Support? What is the difference between a discrete random variable and a continuous random variable? Provide examples. Distinguish probability mass function and probability density function. How are these two related to probability distribution function? 2+2+2+2+2=10
 3. Define Expectation and Variance of a random variable. If $X \sim \text{Binomial}(n, p)$, then find $E(X)$. 2+2+6=10
 4. If $X \sim \text{Poisson}(\lambda), \lambda > 0$, then find $E(X)$ deduce (i) $E(X)$ and (ii) $V(X)$. 4+6=10
 5. Consider the linear regression model $y_i = \alpha + \beta x_i + \epsilon_i, 1 \leq i \leq n$, where x_i and y_i are the i^{th} instance of independent and dependent variable respectively, α and β being unknown parameters to be estimated in terms of $\{(x_i, y_i) | 1 \leq i \leq n\}$. $\{\epsilon_i | 1 \leq i \leq n\}$ indicate the associated error. Derive the least square estimate (*l.s.e*) for α and β . 10
 6. Write short notes on **any two** : 5×2=10
 - a) Maximum Likelihood Estimate
 - b) Independent and identically distributed random variable.
 - c) Normal distribution
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