SEAT No. :

[5902]-18

F.Y. B.Sc. (Computer Science)
STATISTICS
CSST-112 : Mathematical Statistics
(2019 Pattern) (Semester-I) (Paper-II)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Use of calculator and statistical tables is allowed.*
4) *Symbols and abbreviations have their usual meaning.*

Q1) Choose the most appropriate alternative for each of the following. **[1Each]**

a) If $P(A) = 0.4$, $P(B) = 0.3$ $P(A \cap B) = 0.2$, then $P(A \cup B) =$

   i) 0.9   ii) 0.5

   iii) 0.12   iv) 0.1

b) If two events A and B are independent events defined on sample space Ω such that $P(A') = 0.3$ and $P(B') = 0.6$. Then $P(A' \cap B') =$

   i) 0.28   ii) 0.9

   iii) 0.18   iv) 0.1

c) The number of ways in which the letters of the word 'STRING' can be arranged are.

   i) 6   ii) 720

   iii) 1   iv) 270

d) The parameter of binomial distrubution is/are

   i) n   ii) θ

   iii) n,p   iv) λ

Q2) Attempt any FIVE of the following. **[5×2=10]**

a) How many two-digit numbers can be formed from the digits 1,2,3,4,5?

b) Define the terms 'Sample space' and 'Event'.

c) State the formula of conditional probability of an event

   i) A given B

   ii) B given A

P.T.O.

d) Explain the term sensitivity of the test.

e) State any two properties of distribution function of a discrete random variable.

f) Define probability mass function.

g) State axioms of probability.

h) What is Bernoulli trial? Explain with an illustration.

Q3) Attempt any Two of the following: **[2×4=8]**

a) A student has to answer 8 out of 10 questions in an examination.
   i) How many choices has he?
   ii) How many choices has he if he must answer the first 3 questions?

b) State the classical definition of probability. State its limitations.

c) Define the following terms with an illustration.
   i) Discrete random variable
   ii) Continuous random variable

Q4) Attempt any Two of the following. **[2×4=8]**

a) Define uniform distribution of a random variable taking values 1,2,3,...n. State its mean and variance.

b) Define the terms
   i) Independent events
   ii) Partition of sample space.
   Also state the Bayes' theorem.

c) Define geometric distribution. State its mean and variance.

Q5) Attempt any one of the following: **[1×5=5]**

a) A discrete random variable X has following probability distribution:

X	0	1	2	3	4	5
P[X = x]	p	3p	5p	7p	11p	13p

Find
   i) the value of p
   ii) E(X)
   iii) P(X <= 2)

b) State probability mass function of Poisson distribution. State its additive property. Also state the conditions under which binomial distribution can be approximated to Poisson distribution.