Total No. of Questions :4]

SEAT No. :

P1388

[Total No. of Pages :3

[5623]-1008
F.Y.B.Sc. (Computer Science)
STATISTICS
CSST 112 : Mathematical Statistics
(2019 Pattern) (Semester - I)

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) Attempt each of the following:

A) Fill in the blanks: (1 Mark each)

a) Suppose A and B are two independent events defined on sample space Ω with $P(A)=0.2$ and then $P(B)=0.4$ $P(A' \cap B')$=_____.

b) The mean of geometric distribution with parameter 'p' is _____.

B) Choose the most appropriate alternative for each of the following: (1 mark each)

a) If X is a continuous random variable then E(aX+b) =_____.

i) aE(X) ii) E(X)+b

iii) aE(X)+b iv) $a^2E(X)$

b) If A and B are two events defined on sample space Ω such that $P(A)=\frac{1}{4}$, $P(B)=\frac{1}{2}$, and $P(A \cap B)=\frac{1}{8}$ then $P(A \cup B)$' is_____.

i) $\frac{3}{8}$ ii) $\frac{5}{8}$

iii) $\frac{1}{2}$ iv) $\frac{1}{4}$

c) If X and Y are independent binomial variables such that $X \sim B(5,0.3)$ and $Y \sim B(8,0.3)$ then the distribution of X+Y is.

i) B(3,0.3) ii) B(13,0.3)

iii) B(13,0.6) iv) B(3,0.6)

P.T.O.

Q2) Attempt any TWO of the following. (5 marks each)

a) Explain the following terms:

i) Non-deterministic experiments.

ii) Principles of counting.

b) i) State the Axioms of probability.

ii) State the Bayes theorem.

c) Out of 10 collections of diamonds, 4 are precious. Three diamonds are stolen. Find the Probability that

i) None of the precious diamonds are stolen.

ii) At most one precious diamonds is stolen.

Q3) Attempt any TWO of the following. (5 Marks each)

a) 40% of the students in a certain college are girls. 5% of the students in this college are members of culture club. 3% of the students are girls in the culture club. If a student is selected at random, find the probability that:

i) The student is a member of the culture club given that the student is a girl.

ii) the student is a girl given that she is a member of culture club.

iii) The student is a boy given that he is a member of culture club.

b) Define the following.

i) Conditional probability

ii) Sensitivity

iii) Continuous random variable

iv) Median of a discrete random variable

v) Variance of a discrete random variable

c) State the probability mass function of geometric distribution. State its variance. Also state any two real life situations where this distribution is used.

Q4) Attempt any ONE of the following.

A) a) The number of yearly breakdowns of a computer is a random variable having Poisson distribution with parameter m=1.8. Find the probability that this computer will function for a year:

i) without breakdown.

ii) with at most one breakdown. **[5]**

b) Define distribution function of a continuous random variable X and state its important properties. **[5]**

B) a) Let X be a continuous random variable having probability density function.

$$f(x)=\begin{cases}\frac{3}{4}x(2-x), & 0\le X\le 2\\ 0 & \text{, Otherwise}\end{cases}$$

Find (1) Mean of X (2) Variance of X. **[5]**

b) Describe binomial experiment. Also state any two real life situations where binomial distribution is used. **[5]**

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