Unit-IV / FkeâeF-IV

8. Define t and χ^2 distributions and find its first two central moments.

t leLee χ^2 yeŠvee keâe heejYee<ee oeepeS leLee Fmekeâ ØeLece oe keâvõeÙe DeeleCee keâe ieCevee keâeepeS~

9. (a) If $x_i \sim N(\mu, \sigma^2)$; i = 1, 2, ... n. then find the distribution $\overline{x} = \frac{1}{n}\sum_{1}^{n} x_i$.

Ùeeo $x_i \sim N(\mu, \sigma^2)$; i = 1, 2, ... n lee $\overline{x} = \frac{1}{n}\sum_{1}^{n} x_i$ keâe yeŠve %eele keâeepeS~

(b) Define Gometric distribution and find its mean and variance.

ieCeelceekeâ yeŠve keâe heejYee<ee oeepeS leLee Fmekeâe ceeOÙe leLee Øeme j Ce %eele keâeepeS~

A (Printed Pages 8)

Roll No. ___________

S-693

B.A. (Part-I) Examination, 2015

STATISTICS

First Paper

(*Probability & Distribution*)

Time Allowed : Three Hours] ***[Maximum Marks : 33***

Note : Answer five questions in all. Question No. 1 is compulsory. Beside this, answer one question from each Unit.

keâue heeÛe ØeMvee keâ Gòej oeepeS~ ØeMve me.1 DeeveJeeÙe n~ Fmekeâ Deeleejòeâ ØelÙekeâ FkeâeF me Skeâ ØeMve keâe Gòej oeepeS~

1. Attempt all parts.

meYee Yeeie nue keâeepeS~

(a) Match the correct expression of probabilities on left.

(i) $P(\phi)$, where ϕ is null set	(a) $1 - P(A)$
(ii) $P(A/B)\ P(B)$	(b) $P(AB)$
(iii) $P(\overline{A})$	(c) $P(A)-P(AB)$
(iv) $P(\overline{A}\,\overline{B})$	(d) 0
(v) $P(A-B)$	(e) $1-P(A)-P(B)+P(AB)$

yeeÙee Deej oe nF ØeeeÙekeâleeDee keâe mene keâ pee[me eceueeFS~

(i) $P(\phi)$; pene ϕ MevÙe meceÛÛeÙe n	(a) $1 - P(A)$
(ii) $P(A/B)\ P(B)$	(b) $P(AB)$
(iii) $P(\overline{A})$	(c) $P(A)-P(AB)$
(iv) $P(\overline{AB})$	(d) 0
(v) $P(A-B)$	(e) $1-P(A)-P(B)+P(AB)$

hJeeÙemee yeŠve keâ keâvõeÙe DeeleCe evekeâeueve keâ eueS heve j eJeeòe mecyevOe evekeâeeueS leLee Fmeme ØeLece Ûeej DeeleCe %eele keâj yeŠve keâ ieCee keâe eueKee~

Unit-III / FkeâeF-III

6. Prove that in a Bevariate normal distribution, marginal and conditional distribution are univariate normal.

emeæ keâeepeS ekeâ eÉheo Øemeeceevle yeŠve ce meeceele Deej Øeeleyevoee yeŠve Skeâ Ûej Øemeeceevle nele n~

7. Write short notes on any two of the following :

(i) Central limit theorem

(ii) Law of large numbers

(iii) Conditional Expectation

evecveeueeKele ce ekeâvne oe hej mee#ehle eŠhheeCeÙee eueKee :

(i) keâvõeÙe meecee ØeceÙe

(ii) yenle meKÙee eveÙece

(iii) Øeeleyeeoele ØelÙeeMee

(f) If $f(x) = 6x(1-x)$; $0 \le x \le 1$ is a pdf then find b if $P[x<b] = P[x>b]$.

Ùeeo x keâe ØeeeÙekeâlee levelJe Heâueve

$f(x) = 6x(1-x)$; $0 \le x \le 1$ n lee b keâe ceeve evekeâeuee Ùeeo $P[x<b] = P[x>b]$.

(g) Prove that for any two events A and B,

$P(A \cup B) = P(A) + P(B) - P(AB)$

ekeâvne oe leŠveeDee A Deej B keâ eueS emeæ keâeepeS ekeâ

$P(A \cup B) = P(A) + P(B) - P(AB)$

(h) State the conditions under which Binomial distribution tends to Poisson distribution and Normal distribution.

Gve ØeeleyeOee keâe GuueKe keâeepeS epevece Binomial yeŠve, hJeeÙemee yeŠve Deej ØemeeceevÙe yeŠve keâe De«emeej le nelee n~

(i) The M.gf of a random variable x is Mx(t), then find the m.gf. of x about A.

ÙeeÂeÛÚkeâ Ûej x keâe DeeleCe peveekeâ Heâueve MevÙe keâ heejle: Mx(t) n lee A keâ heejle: DeeleCepevekeâ Heâueve %eele keâeepeS~

(j) State the necessary and sufficient condition for independence of n events A_1, A_2, .. A_n.

DeeJeMÙekeâ SJe heÙeehle ØeeleyeOe yeleeFS epememe n leŠveeS A_1, A_2, .. A_n mJele$e ne~

Unit-I / FkeâeF-I

2. (a) State and prove Baye's theorem.

yepe ØeceÙe keâe keâLeve keâjle nS emeæ keâeepeS~

(b) Define density function and distribution function of a random variable and state its properties.

ekeâmee ÙeeöeÛÚkeâ Ûej keâe ØeeeÙekeâlee levelJe Heâueve leLee yeŠve Heâueve keâe heejYee<ee oeepeS leLee Fvekeâ ieCee keâe eueKee~

3. If $f(x) = 6x(1-x)$; $0 \le x \le 1$

(i) Check that above is a p.d.f.

(ii) Obtain an expression for the distribution function of x

(iii) Compute $P\left[x \le \frac{1}{2} / \frac{1}{3} \le x \le \frac{2}{3}\right]$

Ùeeo $f(x) = 6x(1-x)$; $0 \le x \le 1$ n, lee

(i) yeleeFS ekeâ Ùen ØeeeÙekeâlee leveIJe Heâueve n~

(ii) x keâ yešve Heâueve %eele keâeepeS~

(iii) $P\left[x \le \frac{1}{2} / \frac{1}{3} \le x \le \frac{2}{3}\right]$ keâe ceeve yeleeFS

Unit-II / FkeâeF-II

4. State and prove Chebyshev's inequality. Does these exist a random variable x for which.

$P\ [\mu - 2\sigma \le x \le \mu + 2\sigma] = .6$?

Where μ and σ are mean and standard deviation of x.

MeyeeMeJe Demeecekeâe keâe keâLeve keâj emeæ keâeepeS Deej yeleeFS ekeâ keÙee keâeF ÙeeeÂeÛÚkeâ Ùej Smee n epemekeâ eueS

$P\ [\mu - 2\sigma \le x \le \mu + 2\sigma] = .6$ n?

5. Derive recurrence relation for finding central moments of Poisson distribution and hence find first four central moments and state the properties of the distribution.

(b) If $P(A \cap B) = \frac{1}{2}$; $P(\bar{A} \cap \bar{B}) = \frac{1}{2}$ and $2P(A) = P(B) = p$, find the value of p.

Ùeeo $P(A \cap B) = \frac{1}{2}$; $P(\bar{A} \cap \bar{B}) = \frac{1}{2}$ Deej

$2P(A) = P(B) = p$ n lee P keâe ceeve yeleeFS~

(c) Give classical definition of probability and point out its defects.

ØeeeÙekeâlee keâe eÛej Øeelee%ole heej Yee<ee oeepeS leLee Fmekeâ oe<e yeleeFS~

(d) If x is a Poisson variate and :

$P[x=2] = 9\,P[x=4] + 90\,P[x=6]$ find mean of x .

Ùeeo x hJeeÙemee Ùej n Deej :

$P[x=2] = 9\,P[x=4] + 90\,P[x=6]$ lee x keâe ceeOÙe %eele keâeepeS~

(e) Show that :

$E(cx) = c\ E(x)$

& $V(cx) = c^2\ V(x)$ whese c is a constt.

eoKeeFS ekeâ $E(cx) = c\ E(x)$ Deej

$V(cx) = c^2\ V(x)$ pene c Skeâ emLejekeâ n