UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – 2019

Roll No. in Fig. ....

Roll No. in Words. ....

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Paper: Probability Distributions (Theory)
Course Code: STAT-316 Part – I (Compulsory) Time: 15 Min. Marks: 10

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Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.
Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the correct option. **(10x1=10)**

i) In normal distribution, z-score and z-statistic are classified as names of

a) standardized normal random variable
b) Poisson random variable
c) normal geometric variable
d) weighted average variable

ii) Bivariate normal distribution has ________ number of parameters.

a) 9
b) 3
c) 6
d) 5

iii) In any continuous probability distribution, what is the probability that x equals the mean $P(x=\mu)$?

a) 0.0
b) 0.5
c) μ
d) 1.0

iv) What is the mean of the uniform distribution from 15 to 65?

a) 40
b) 20
c) 11.5
d) 6.32

v) If the probability density of X is given by
$f(x) = 2(1-x)$ for $0<x<1$
To evaluate $E[(2X+1)^2]$

a) 2
b) 1
c) 4
d) 3

P.T.O.

vi) The square of t-distribution is

a) F distribution

b) Gamma distribution

c) Lognormal distribution

d) Laplace distribution

vii) The range of Beta distribution is

a) 0 to 1

b) -1 t0 +1

c) 0 to α

d) $-\alpha$ to $+\alpha$

viii) If χ^2- distribution has "n" degree of freedom then the mean of the χ^2 distribution is

a) n

b) n-1

c) 2n

d) n-2

ix) If μ is equal to 8 then standard deviation of exponential probability distribution is

a) 0.425

b) 0.125

c) 0.225

d) 0.325

x) If the value of the parameter of Beta distribution let α=5 and λ= 25 then the mean of beta distribution of first kind is

a) 0.1875

b) 0.1785

c) 0.16667

d) 0.2

UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – 2019

Roll No. ....

Paper: Probability Distributions (Theory)
Course Code: STAT-316 Part – II
Time: 2 Hrs. 45 Min. Marks: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q2 i) Show that the square of t- variate with n degree of freedom is distributed as F with 1 and n degree of freedom. **(20)**

ii) Let $Y_1 < Y_2 < Y_3 < Y_4$ denotes the order statistic of a random sample of size 4 from distribution having p.d.f.

$$f(x) = \begin{cases} 2x & 0 < x < 1 \\ 0 & otherwise \end{cases}$$

Find the distribution of Y_3.

iii) Let X and Y are independent random variables with joint p.d.f.

$$\begin{aligned} f(x, y) &= x + y \qquad 0 < x < 1,\ 0 < y < 1 \\ &= 0 \qquad \text{elsewhere} \end{aligned}$$

Find E(XY) and E(X + Y).

iv) If the random variable X has normal distribution with mean 'm' and variance 'σ^2'. Obtain the distribution of Y=aX+b.

v) Find mean and variance of Pareto Distribution.

Q3. Define lognormal distribution and obtain its rth moment about origin. **(8)**
If $\log_e x$ is normally disturbed with $\mu=1, \sigma^2=4$. Find $P(\frac{1}{2} < X < 2)$.

Q4. Let X_1 and X_2 be two independent standard normal variables. Let $Y_1 = X_1 + X_2$ and $Y_2 = \frac{X_1}{X_2}$. Find the marginal p.d.f. of Y_2. **(7)**

Q5. Derive F-distribution. **(8)**

Q6. Derive characteristic function of Cauchy distribution. **(7)**