

Mid-West University
Examinations Management Office
Final Examinations-2079

Bachelor level/ B.Sc/ 3rd Semester

Full Marks: 60

Time: 3 hours

Pass Marks: 30

Subject: Probability Distribution (STAT435/335)

Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate full marks.

Group A

Long answer question (Attempt all) [4x6=24]

- 1) Write down the probability distribution function of truncated poisson distribution. also obtain the mean and variance of the distribution at $x=0$.
- 2) State and prove chebyshev's inequality.
- 3) Define gamma distribution. Discuss its application. The life time of electronic machine has a gamma distribution with parameter $\alpha=2$. determine the probability that the machine has the life (i) more than one year (ii) between 1 and 2 years.
- 4) Derive chi square distribution and mention its important properties.

OR

Define marginal density function of X and Y. Let (X,Y) be jointly distributed random variable with probability density function given

$$\text{by , } f(X, Y) = \begin{cases} 2, & \text{if } 0 < X < Y, 0 < Y < 10 \\ 0, & \text{Otherwise} \end{cases}$$

Find marginal probability density function of X and that of Y.

Group B

Short answer question (Attempt all) [6x4=24]

- 5) What do you mean by joint probability distribution function? Write down the properties of joint probability distribution function of (X, Y).

- 6) Define gamma distribution. Derive moment generating function of gamma distribution.
- 7) What is mode of convergence? Discuss about convergence in probability,
- 8) Let X has binomial distribution $B(5, \frac{1}{3})$ truncated at $X=0$ then find mean and variance of truncated random variable X.
- 9) If t has student's t-distribution with 10-degree freedom, then find mean variance and skewness of the distribution.

OR

An unbiased die is rolled twice. Let X denotes the number shown on the first roll and Y denotes the number shown on the second roll. Find (i) $E(X+Y)$ (ii) $E(XY)$.

- 10) Let X and Y denote the proportions of correct answers a student gets on two tests in science and management respectively and the joint density function of the random variable X and Y be;

$$f(X, Y) = \begin{cases} \frac{2}{5} (2x + 3y), & \text{if } 0 < X < 1, 0 < Y < 10 \\ 0, & \text{elsewhere} \end{cases}$$

Determine the probability density function of $U = \frac{X+Y}{2}$

Group C

Very Short answer question (Attempt all) [6x2=12]

- 11) Distinguish between truncated and non-truncated distribution.
- 12) What do you mean by jacobian of transformation?
- 13) What do you mean by degree of freedom?
- 14) Illustrate how conditional distributions are computed.
- 15) Define conditional variance of two random variables.
- 16) Write down important applications of F distribution.

THE END