Reg. | | | | | | | | | No.

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - APRIL 2025.
(For those admitted in June 2024 and later)

PROGRAMME AND BRANCH: B.Sc., STATISTICS

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
II	PART-III	CORE-4	U24ST204	DISTRIBUTION THEORY

Date & Session: 30.04.2025/FN **Time: 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer ALL Questions.
CO1	K1	1.	If a coin is tossed 10 times, what is the probability of getting exactly 6 heads? (p = 0.5 for heads) a) 0.2051 b) 0.2461 c) 0.1172 d) 0.3027
CO1	K2	2.	The variance of a Poisson distribution is equal to: a) λ b) λ(1−λ) c) λ^2 d) $\sqrt{\lambda}$
CO2	K1	3.	In a geometric distribution, the trials are: a) Dependent b) Independent c) Continuous d) Limited
CO2	K2	4.	In a multinomial distribution, the sum of probabilities of all categories must equal: a) 0 b) 1 c) n d) Depends on the experiment
CO3	K1	5.	In a normal distribution, what percentage of data falls within ±1 standard deviation of the mean? a) 50% b) 68.27% c) 95.45% d) 99.73%
CO3	K2	6.	Which of the following defines a rectangular (uniform) distribution? a) All outcomes are equally likely. b) Outcomes follow a bell-shaped curve. c) Outcomes occur at regular intervals. d) The probability decreases over time.
CO4	K1	7.	What is the mean of an exponential distribution with parameter λ? a) $1/\lambda$ b) λ c) λ^2 d) 2λ
CO4	K2	8.	The gamma distribution generalizes which other distribution? a) Normal distribution. b) Binomial distribution. c) Exponential distribution. d) Uniform distribution.
CO5	K1	9.	Which of the following is true for the t-distribution? a) It is used for small sample sizes. b) It is symmetric and bell-shaped. c) It approaches the normal distribution as sample size increases. d) All of the above.
CO5	K2	10.	The chi-square distribution is: a) Symmetric. b) Skewed to the right. c) Skewed to the left. d) Uniform

<table>
<tr><th>Course Outcome</th><th>Bloom's K-level</th><th>Q. No.</th><th><u>SECTION – B</u> (5 X 5 = 25 Marks)
Answer <u>ALL</u> Questions choosing either (a) or (b)</th></tr>
<tr><td>CO1</td><td>K3</td><td>11a.</td><td>List down the properties of Binomial distribution
(OR)</td></tr>
<tr><td>CO1</td><td>K3</td><td>11b.</td><td>Fit a Poisson distribution for the following data
<table>
<tr><td>Number of mistakes per page</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Number of pages</td><td>211</td><td>90</td><td>19</td><td>5</td><td>0</td></tr>
</table></td></tr>
<tr><td>CO2</td><td>K3</td><td>12a.</td><td>Explain Multinomial distribution
(OR)</td></tr>
<tr><td>CO2</td><td>K3</td><td>12b.</td><td>Explain the concept of lack of memory</td></tr>
<tr><td>CO3</td><td>K4</td><td>13a.</td><td>Explain Normal distribution and derive it mean.
(OR)</td></tr>
<tr><td>CO3</td><td>K4</td><td>13b.</td><td>Derive the mean of Rectangular distribution</td></tr>
<tr><td>CO4</td><td>K4</td><td>14a.</td><td>Define gamma distribution and write the mean and variance
(OR)</td></tr>
<tr><td>CO4</td><td>K4</td><td>14b.</td><td>Discuss the Beta distribution in Second kind with its constants.</td></tr>
<tr><td>CO5</td><td>K5</td><td>15a.</td><td>Derive chi Square distribution
(OR)</td></tr>
<tr><td>CO5</td><td>K5</td><td>15b.</td><td>Write the properties of t-distribution</td></tr>
</table>

Course Outcome	Bloom's K-level	Q. No.	<u>SECTION – C</u> (5 X 8 = 40 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)
CO1	K3	16a.	Derive Mean and Variance of the Binomial distribution **(OR)**
CO1	K3	16b.	Discuss negative binomial distribution and derive its MGF
CO2	K4	17a.	Derive Mean and Variance of Geometric distribution **(OR)**
CO2	K4	17b.	Discuss hyper geometric distribution and derive its approximation to binomial.
CO3	K4	18a.	Explain the characteristics of Normal distribution **(OR)**
CO3	K4	18b.	Discuss a Rectangular distribution and its properties
CO4	K5	19a.	Derive the mean and variance of Exponential distribution **(OR)**
CO4	K5	19b.	When does a variable follow gamma distribution and its properties?
CO5	K5	20a.	Derive the relationship between t and F distribution **(OR)**
CO5	K5	20b.	Explain the applications of Chi-square distribution and give its properties