Name. _____	**Printed Pages:01**
Student Admn. No.: _____	

School of Basic Science
Summer Term Examination – July - August 2024
[Programme: M.Sc.] [Semester: II) [Batch:]

Course Title: Mathematical Statistics	**Max Marks: 100**
Course Code: MSCM103	**Time: 3 Hrs.**

Instructions:
1. *All questions are compulsory.*
2. *Assume missing data suitably, if any.*

		K Level	COs	Marks
	SECTION-A (15 Marks)	**5 Marks each**		
1.	Define Poisson distribution & F-test.	KL 1	CO 1	5
2.	Define mean and variance of binomial distribution	KL 1	CO 1	5
3.	Find the correlation coefficient by Karl Pearson method (6, 9), (2, 11), (10,7) (4, 8), (8, 7).	KL 1	CO 2	5
	SECTION-B (40 Marks)	**10 Marks each**		
4.	In a normal distribution, 31% of the items are under 45 and 8% are over 64. Solve for mean and standard deviation of the distribution.	KL 2	CO 2	10
5.	In a binomial distribution for n=55 if $P(x=1)=0.4096$ & $P(x=2)=0.2048$. Solve for p.	KL 3	CO 2	10
6.	A random sample of size 16 has 53 as mean. The sum of squares of the deviation from mean is 135. Evaluate 95% and 99% confidence limits of the mean of the population.	KL 3	CO 3	10
7.	If X has a chi-square distribution with n degree of freedom, solve for moment generating function.	KL 3	CO 2	10
	SECTION-C (45 Marks)	**15 Marks each**		
8.	Let $X_1, X_2, X_3 \ldots\ldots\ldots\ldots X_n$ be a random sample from a normal distribution with unknown mean μ and variance σ^2. Discuss the maximum likelihood estimators of mean μ and variance σ^2.	KL 4	CO 3	15
9.	Prove that $r=\frac{\sigma_x^2+\sigma_y^2-\sigma_{x-y}^2}{2\sigma_x\sigma_y}$, where r is the coefficient of correlation between x and y σ_x, σ_y and σ_z are concerned standard deviations.	KL 5	CO 3	15
10	Design the observed and expected frequencies of 2x2 contingency table 12 | 15 6 | 2	KL 6	CO 3	15

Course outcomes:	Students will be able to	
COs	K level	
CO1		
CO2		
CO3		
CO4		

Note: 1. Q1to Q4from K1/K2.

2. Q5to Q8from K3/K4.

3. Q9to Q10from highest knowledge level.