

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***MBA DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2025***First Semester**Master of Business Administration***BA4101/PMBT2401-Statistics for Management****Statistical Table Can be Permitted****Regulations – 2021/2024****Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	State axioms of probability.	L1	1	2
2.	Suppose that X has a Poisson distribution with parameter $\lambda = 2$. Compute $P[X \geq 1]$.	L2	1	2
3.	Distinguish between parameter and statistic.	L1	2	2
4.	Define confidence limits for a parameter	L1	2	2
5.	What are the Type I and Type II errors?	L1	3	2
6.	Mention any four uses of Chi-square distribution in test of hypothesis.	L1	3	2
7.	Define Rank-Sum test.	L1	4	2
8.	Distinguish between Mann-Whitney U-test and Krushkal-Wallis test.	L1	4	2
9.	Define regression coefficient.	L1	5	2
10.	Find the mean values of regression lines are $2y-x=50$ and $3y-2x=10$.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a i If the random variable X takes values 1, 2, 3, 4 such that $2P(X = 1) = 3P(X = 2) = P(X = 3) = 5P(X = 4)$, find the probability distribution and cumulative distribution of X.	L2	1	8
	i A factory production line is manufacturing bolts using three machines, A, B and C. Of the total output, machine A is responsible for 25%, machine B for 35% and machine C for the rest. It is known from previous experience with the machines that 5% of the output from machine A is defective, 4% from machine B and 2% from machine C. A bolt is chosen at random from the production line and found to be defective. What is the probability that it came from (a) machine A (b) machine B (c) machine C?	L2	1	8
	Or			
	b i The number of monthly breakdown of a computer is a random variable having a Poisson distribution with mean equal to 1.8. find the probability that this computer will function for a month i) without a breakdown ii) with at least one breakdown.	L3	1	8
	i In a normal distribution, 31% of the items are under 45 and 8% are	L3	1	8

i over 64. Find the mean and variance of the distribution.

12. a i In a sample of 1000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters, Can we assume that both rice and wheat are equally popular in this State at 1% level of significance? L3 2 8

i Twenty people were attacked by a disease and only 18 survived, Will you reject the hypothesis that the survival rate, if attacked by this disease, is 85% in favour of the hypothesis that it is more, at 5% level. (Use large sample test). L3 2 8

Or

b i A firm wishes to estimate with an error of not more than 0.03 and a level of confidence of 98%, the proportion of consumers that prefer its brand of household detergent. Sales report indicate the about 0.20 of all consumers prefer the firm's brand. What is the requisite sample size? L3 2 8

i A random sample of 700 units from a large consignment should that 200 were damaged. Find (i) 95% (ii) 99% confidence limits for the proportion of damaged units in the consignment L3 2 8

13. a i The number of accidents per week in a city are as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9 and 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 weeks period? L3 3 8

i Given a sample mean of 83, a sample standard deviation of 12.5 and a sample size of 22, test the hypothesis that the value of the population mean is 70 against alternative that it is more than 70. Use the 0.025 significance level. L3 3 8

Or

b The following data relate to the number of units produced per week by three methods. L3 3 16

Method 1 : 170 192 190 120

Method 2 : 160 165 170 172

Method 3 : 182 190 170 178 185

Prepare ANOVA table and write your comments

14. a i Mechanical engineering testing a new arc-welding technique classified welds both with respect to appearance and an X-ray inspection. L3 4 8

	Appearance			
X - ray		Bad	Normal	Good
	Bad	20	7	3
	Normal	13	51	16
	Good	7	12	21

Using Chi-square test for independence using 0.05 level of significance.

- i The following is an arrangement of 25 men(M) and 15 women(W), L3 4 8
 i lined up to purchase tickets for a premier picture show:
 M WW MMM W MM W M W M WWW MMM W MM WWW
 MMMMMM WWW MMMMMM. Test the randomness at the 5%
 level.

Or

- b i Apply Mann-Whitney U test to determine if there is a significant L3 4 8
 difference in the age distribution of the two groups:
 Day College :26 18 25 27 19 30 34 21 33 31
 Evening College :32 24 23 30 40 41 42 39 45 35

- i An experiment designed to compare three preventive methods L3 4 8
 i against corrosion yielded the following maximum depths of pits (in
 thousands of an inch) in pieces of wire subjected to the respective
 treatments.

METHOD A	77	54	67	74	71	66	
METHOD B	60	41	59	65	62	64	52
METHOD C	49	52	69	47	56		

Use Kruskal-Wallis test at the 5% level of significance to test the null hypothesis that the three Samples come from identical populations.

15. a i The equations of two variables X and Y as follows $3X+2Y-26=0$, L2 5 8
 $6X+Y-31=0$ Find the means, regression coefficient & coefficient of
 correlation.

- i The following data pertains of X = Revenue (in '000 of rupees) L3 5 8
 i generated at a Corporate Hospital and Y = Number of Patients (in
 '00) arrived for the last ten years.

X 86 95 75 85 90 98 112 74 100 110
 Y 21 24 18 24 22 30 27 18 25 28

Find the Karl Pearson's coefficient of correlation and give your comment.

Or

- b i Obtain the rank correlation coefficient for the following data: L3 5 8

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

- i Fit a line $y=ax+b$ using the method of least squares for the data L3 5 8
 i below. Estimate the value of y when $x=10$.

x	0	1	2	3	4
y	2	3	5	4	6

