Reg. No.												

Question Paper Code	21327

M.B.A - DEGREE EXAMINATIONS, NOV/DEC 2022

First Semester

Master of Business Administration

20MBT104 - BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING

(Regulations 2020)

(Use of Statistical table may be permitted)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level,CO
1.	Name few descriptive measures of data.	*2,K1,CO1*
2.	The mean of Binomial distribution is 20 and standard deviation is 4. Find the parameters of the distribution.	*2,K5,CO1*
3.	Distinguish between parameter and statistic.	*2,K5,CO2*
4.	State the central limit theorem.	*2,K1,CO2*
5.	Write the properties of t-distribution.	*2,K1,CO3*
6.	Distinguish between one-way and two-way analysis of variance.	*2,K3,CO3*
7.	Define Rank-Sum test.	*2,K1,CO4*
8.	State any two applications of Chi-square test.	*2,K1,CO4*
9.	What is positive and negative correlation?	*2,K2,CO5*
10.	State the utility of regression in the field of economic analysis.	*2,K1,CO5*

PART - B (5 × 16 = 80 Marks)

Answer ALL Questions

11. a) (i) A random variable X has the following probability distribution: *8,K5,CO1*

X	0	1	2	3	4	5	6	7
P(X)	0	k	$2k$	$2k$	$3k$	k^2	$2k^2$	$7k^2+k$

Find (i) the value of k (ii) $P(X \geq 4)$.

(ii) If X is a normal variable with mean 30 and standard deviation of 5. *8,K3,CO1*
Find (i) $P[27 \leq X \leq 35]$ (ii) $P[X \geq 45]$ use normal distribution tables.

OR

b) Out of 2000 families with 4 children each , Find how many family would you expect to have (i) at least 1 boy (ii) 2 boys (iii) 1 or 2 girls (iv) no girls. *16,K5,CO1*

12. a) The age of employees in a company follows normal distribution with its mean and variance as 40 years and 121 years respectively. If a random sample of 36 employees is taken from a finite normal population of size 1000, what is the probability that the sample mean is (i) less than 45(ii) greater than 42 and(iii) between 40 and 42. *16,K2,CO2*

OR

b) A random sample of 700 units from a large consignment showed that 200 were damaged. Find (i) 95% (ii) 99% confidence limits for the proportion of damaged units in the consignment. *8,K2,CO2*

A random sample of size 9 is obtained from a Normal population with mean 25 and if the variance 100 find the probability that the sample mean exceeds 31.2. *8,K2,CO2*

13. a) A study compares the effect of four 1-month point-of-purchase promotions on sales. The unit sales for five stores using all four promotions in different months follow. *16,K3,CO*

Free Sample	78	87	81	89	58
One-pack gift	94	91	87	90	88
Cents off	73	73	78	69	83
76Refund by mail	79	83	78	69	81

(i) Estimate the population variance using the between column variance.
(ii) Estimate the population variance using the within-column variance computed from the variance within the samples.
(iii) Calculate the F ratio. At the 0.01 level of significance, do the promotions produce different effects on sales.

OR

b) The following are the final examination marks of three groups of students who were taught computer by three difference methods. *16,K4,CO3*

First method: 94 88 91 74 87 97
Second method: 85 82 79 84 61 72 80
Third method: 89 67 72 76 69
Prepare ANOVA table and write your comments.

14. a) (i) Mechanical engineers testing a new arc welding technique, classified welds both with respect to appearance and an X-ray inspection *8,K4,CO4*

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

Use ψ^2-test for independence using 0.05 level of significance.

(ii) The scores of a written examination of 24 students, who were trained by using three different methods, are given below. *8, K4,CO4*

Video cassette A	74	88	82	93	55	70	65		
Audio cassette B	78	80	65	57	89	85	78	70	
Class Room C	68	83	50	91	84	77	94	81	92

Use Krushkal-Wallis test at $\alpha = 5\%$ level of significance, whether the three methods of training yield the same results.

OR

b) The sales records of two branches of a department store over the last 12 months are shown below. (sales figures are in thousands of dollars). We want to use the Mann-Whitney-Wilcoxon test to determine if there is a significant difference in the sales of the two branches. *16,K2,CO4*

Month	Branch A	Branch B
1	257	210
2	280	230
3	200	250
4	250	260
5	284	275
6	295	300
7	297	320
8	265	290
9	330	310
10	350	325
11	340	329
12	372	335

(i) Compute the sum of the ranks for branch A

(ii) Compute the mean μT.

(iii)Compute σT.

Use $\alpha = 0.05$ and test for any significant difference in the age distribution of the two populations.

15. a) Promotional expenses and sales data for an equipment manufacturer are as follows. Calculate the correlation coefficient and comment. *16,K5,CO5*

Promotional expenses in Lakhs	7	10	9	4	11	5	3
Sales in units	12	14	13	5	15	7	4

OR

b) (i) Given below are the figures of production (in thousand quintals) of a sugar factory. *8,K3,CO5*

Year	1992	1993	1994	1995	1996	1997	1998
Production	75	80	95	85	95	100	105

Fit a straight line trend by the least squares method and tabulate the trend values.

(ii) The equations of two variables X and Y as follows $3X+2Y-26=0$, $6X+Y-31=0$ Find the mean values, and regression coefficients. *8,K5,CO5*