Reg. No.

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M.B.A - DEGREE EXAMINATIONS, APRIL/MAY 2023

First Semester

Master of Business Administration

20MBT104 – BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING

(Use of Statistical table permitted)

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level,CO
1.	Given that P(A) =3/8, P(B) = 5/8 and P (AUB) = 3/4. Find P(A/B).	*2,K2,CO1*
2.	Find the binomial distribution whose mean is 6 and variance 4.	*2,K2,CO1*
3.	State Central Limit Theorem.	*2,K1,CO2*
4.	Distinguish between Point estimate and Interval estimate.	*2,K2,CO2*
5.	Define Type-I and Type- II error.	*2,K1,CO3*
6.	What are the applications of F-test?	*2,K1,CO3*
7.	List any two non-parametric tests.	*2,K1,CO4*
8.	State the uses of chi-square test.	*2,K1,CO4*
9.	Define Index number.	*2,K1,CO5*
10.	Write the Karl Pearson's coefficient of correlation.	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)

11.	a)	In a bolt factory, Machines A, B and C manufacture respectively 25%, 35% and 40% of the total of their output 5, 4 and 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by (i) From machine B (ii) From machine C	*13,K3,CO1*
		OR	
	b)	In a test of 2000 electric bulbs, it was found that the life of a particular make was normally distributed with an average life of 2040 hours and standard deviation of 60 hours. Estimate the number of bulbs likely to burn for (i) More than 2150 hours (ii) Less than 1950 hours (iii) More than 1920 hours but less than 2160 hours	*13,K3,CO1*

12. a) An economist wishes to estimate the average family income in a certain population. The population standard deviation is known to be USD $ 4500 and the economist uses a random sample of size n = 225. Using central limit theorem find the probability that the sample mean will fall within and 800 of the population mean? *13,K3,CO2*

OR

b) A large drug store wants to estimate average weekly sales for a brand of soap. A random sample of 13 weeks gives the following numbers: 123, 110, 95, 120, 87, 89, 100, 105, 98, 88, 75, 125 and 101. Find 90% and 95% confidence interval for average weekly sales. *13,K3,CO2*

13. a) (i) Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers of tea. After the increase in duty, 800 people were tea drinkers in a sample of 1200 people. Find whether there is a significant decrease in the consumption of tea after the increase in excise duty. *6,K3,CO3*

(ii) A sample of 10 boys had the following IQ's: 70, 120, 110, 101, 88, 83, 95, 98, 100 and 107. Test whether the population IQ may be 100. *7,K3,CO3*

OR

b) (i) 20 people were attacked by a disease and only 18 were survived. The hypothesis is set in such a way that the survival rate is 85%, if attacked by this disease. Will you reject the hypothesis that it is more than 5% level of significance *6,K3,CO3*

(ii) The time taken by workers in performing a job by method I and method II is given below: *7,K3,CO3*

Method I	20	16	26	27	23	22	
Method II	27	33	42	35	32	34	38

Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly?

14. a) Two methods of instruction to apprentices is to be evaluated. A director assigns 15 randomly selected trainees to each of the two Methods. Due to drop outs, 14 complete in Batch 1 and 12 complete In Batch 2. An achievement test was given to these successful Candidates. Their scores are as follows. *13,K3,CO4*

Method I : 70, 90, 82, 64, 86, 77, 84, 79, 82, 89, 73, 81, 83, 66

Method II : 86, 78, 90, 82, 65, 87, 80, 88, 95, 85, 76, 94

Test whether the two methods have significant difference in effectiveness. Use Mann-Whitney test at 5% significance level.

OR

b) In an industrial production line items are inspected periodically for defectives. The following is a sequence of defectives items (D) and non- defective items (N) produced by these production line. *13,K3,CO4*

DD NNN D NN DD NNNNN DDD NN D NNNN D N D

Test whether the defectives are occurring at random or not at 5% level of significance.

15. a) Find the coefficient of correlation between x and y from the following data. *13,K3,CO5*

x	5	10	5	11	12	4	3	2	7	1
y	1	6	2	8	5	1	4	6	5	2

OR

b) The price of a certain commodity during 1980 to 1983 as follows: *13,K3,CO5*

Year/Months	Jan-Mar	Apr-June	July-Sep	Oct-Dec
1980	321	348	348	348
1981	327	351	354	348
1982	342	359	381	345
1983	364	390	401	385

Compute the seasonal indices by the method of simple average.

PART - C (1 × 15 = 15 Marks)

16. a) Test of the fidelity and selectivity of 190 radio receivers produced the results shown in the following table: *15,K3,CO4*

Use the 0.01 level of significance to test whether there is a relationship between selectivity and fidelity.

Selectivity	Fidelity		
	Low	Medium	High
Low	6	12	32
Medium	33	61	18
High	13	15	0