

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MBA
BRANCH: MBA

SEMESTER : I
SESSION : MO/2024

SUBJECT: MT421 DATA ANALYSIS AND DECISION TOOLS

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

- Q.1(a) The transport department of an organization hires taxis from 3 different suppliers, T1, T2 and T3 for the long-distance travels of its executives. It has received complaints of Taxi breakdowns from the executives and upon investigating the department has found that 60% of the taxis are supplied by T1, 30% by T2 and 10% by T3. If 9% of the Taxis from T1, 20% of T2 and 6% of T3 suffer a breakdown what is the probability that a Taxi hired by the firm will face a breakdown? If an Executive reported that his Taxi is into a Breakdown, what is the probability that the Taxi was supplied by T2? [4] CO 4 BL 4

- Q.1(b) There are 8 socks in a box, 5 brown and 3 green. From the box, 2 socks are selected at random without replacement. If X is a random variable which represents the count of brown socks selected, what is the probability distribution of X? Write a function to describe the probability distribution of X. [6] 4 5

- Q.2(a) In an examination of 675 candidates the examiner supplied the following information: [4] 1 3

Marks Obtained	No. of Candidates	Marks Obtained	No. of Candidates
Less Than 10%	7	Less Than 50%	381
Less Than 20%	39	Less Than 60%	545
Less Than 30%	95	Less Than 70%	631
Less Than 40%	201	Less Than 80%	675

Calculate the mode and median of the percentage marks obtained.

- Q.2(b) Particulars regarding the income of two villages are given below: [6] 1 3

	Village X	Village Y
Number of employees	600	500
Average income (Rs.)	17,500	18,600
S.D. of income (Rs.)	1,000	810

(i) In which village is the variation in income greater?

(ii) What is the combined standard deviation of the village X and village Y put together?

- Q.3(a) Explain the following [4] 3 3
 (i) Time Series Analysis
 (ii) Correlation and Regression

- Q.3(b) In the following table are recorded data showing the test scores made by salesmen on an intelligence test and their weekly sales: [6] 3 4

Salesmen	1	2	3	4	5	6	7	8	9	10	
Test Scores	45	75	50	60	80	90	85	40	80	55	
Sales ('000)	2.0	6.5	3.5	5.0	4.5	6.0	6.5	2.5	5.5	4.5	

Calculate the regression line of sales on test score and estimate the most probable weekly sales volume if a salesman makes a score of 70.

- Q.4(a) Unite notes on the following [4] 2 3
 (i) Central Limit Theorem
 (ii) Estimation of Parameters
- Q.4(b) Two electric tube lights of manufacturer *A* have mean lifetime of 1400 hours with a standard deviation of 200 hours, while those of manufacturer *B* have a mean lifetime of 1200 hours with a standard deviation of 100 hours. If random sample of 125 tubes of each manufacturer are tested, what is the probability that the manufacturer *A* tubes will have a mean lifetime which is at least (i) 160 hours more than the, manufacturer *B* tubes and (ii) 250 hours more than the manufacturer *B* tubes? [6] 2 4
- Q.5(a) Four machines *A*, *B*, *C* and *D* are used to manufacture certain machine parts which are classified as first grade, second grade and third grade. The quality control engineer wants to test whether the quality of the product from the four machines is same. Data collected is as follows: (Use chi square test) [4] 5 4

	<i>Machines</i>				
<i>Grade</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>Total</i>
First	620	750	400	530	2300
Second	130	200	140	130	600
Third	50	50	60	40	200
Total	800	1000	600	700	3100

- Q.5(b) Four machines *A*, *B*, *C* and *D* are used to produce a certain kind of cotton fabrics. Samples of size 4 with each unit as 100 square metres are selected from the outputs of the machines at random, and the number of flaws in each 100 square metres are counted, with the following result. (Use Anova Test) [6] 5 5

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
8	6	14	20
9	8	12	22
11	10	18	25
12	4	9	23

Do you think that there is a significant difference in the performance of the four machines?

:::::28/11/2024 E:::::