

IMT- 24

QUANTITATIVE TECHNIQUE

Notes:

- Write answers in your own words as far as possible and refrain from copying from the text books/handouts.
- Answers of Ist Set (Part-A), IInd Set (Part-B), IIIrd Set (Part – C) and Set-IVth (Case Study) must be sent together.
- Submit the assignments in IMT CDL H.O. along with the assignments Question Papers for evaluation .
- Only hand written assignments shall be accepted.

<u>A. First Set of Assignments</u>	5 Questions, each question carries 1.5 marks.
<u>B. Second Set of Assignments</u>	5 Questions, each question carries 1.5 marks.
<u>C. Third Set of Assignments</u>	5 Questions, each question carries 1.5 marks. Confine your answers to 150 to 200 Words.
<u>D. Forth Set of Assignments</u>	Two Case Studies : 7.5 Marks. Each case study carries 3.75 marks.

SECTION - A

- What are the component of a time series?
- Assume that the factory has two machines. Past records show that Machine 1 produces 30 per cent of the output. 5 percent of the items produced by the Machine 1 were defective and only 1 per cent produced by Machine 2 were defective .If an item selected at random is found to be defective, what is the probability that it was produced by Machine 2.
- Gati India Ltd. Maintains Kilometer records on all of its rolling equipment . Here are weekly kilometer records of its trucks.

810	450	756	789	210	657	589	488	876	689
1450	560	469	890	987	559	788	943	447	775

- Calculate the median kilometer a truck travelled.
 - Calculate the mean for 20 truck.
 - Compare part (a) and part (b) and explain which one is better measure of central tendency of the data.
- Calculate correlation coefficient from the following results:
 $n=10$; $\sum X=140$; $\sum Y=150$
 $\sum (X-10)^2=180$; $\sum (Y-10)^2=215$
 $\sum (X-10)(Y-10)=60$

5. ABC Builders is engaged in the construction of a multistory building. It has recently conducted a cost audit. The manger (cost accounting) has collected the figures of the total cost and its major constituents. The information collected as percentage of expenditure is shown below. Represent the Data with the help of a suitable diagram.

Item	Expenditure%
Wages	25
Bricks	15
Cement	20
Steel	15
Wood	10
Supervision and music	15

SECTION - B

1. . a) Prove: $P(A/B) > P(A)$,
Then $P(B/A) > P(B)$
2. What is the probability of obtaining two heads in two throws of a single coin.
3. The two regression coefficients b_{yx} and b_{xy} are either both be positive or both be negative. Do you agree with this statement. If so why ?
4. The equations of two regression lines obtained in a correlation analysis are given below.
 $3x + 12y = 19$; $3y + 9x = 46$
 obtain (i) the mean values
 (ii) the value of correlation coefficient
 and (iii) the ratio s_x / s_y
5. Differentiate between primary data and secondary data. Under what circumstances would secondary data be more useful than primary data .

SECTION - C

1. Find arithmetic mean, median and mode from the following:
Marks below 10 20 30 40 50 60 70 80

No. of students 15 35 60 84 96 127 198 250
2. A box contains 4 bad and 6 good transistors. Two are drawn out together. One of them is tested and found to be good. What is the probability that the other one is also good?

 On a midterm exam, the scores were distributed normally with mean of 72 and standard deviation of 10. Student Wright scored in the top 10 percent of the class on the midterm.
3. Wirght's midterm score was at least how much?

4. The final exam also had a normal distribution, but with mean of 150 and standard deviation of 15. At least what score should Wright get in order to keep the same ranking (i.e , top 10 percent).
5. What do you mean by trend analysis? Differentiate between secular trend and cyclic fluctuation.

CASE STUDY - 1

A restaurant manager has recorded the daily number of customers for the last four weeks. He wants to improve customer service and change employee scheduling as far as necessary, based on the expected number of daily customers in the future. The following data represent the daily number of customers as recorded by the manager for the last four weeks.

weeks	mon	Tues	wed	thurs	fri	sat	sun
1	440	400	480	510	650	800	710
2	510	430	500	520	740	850	800
3	490	580	410	630	720	810	690
4	500	500	470	540	780	900	850

Determine the daily seasonal indices using the seven day moving average.

CASE STUDY - 2

A batch of 5000 electric lamps have a mean life of 1000 hours and standard deviation of 75 hours. Assume a normal distribution.

- How many lamps will fail before 900 hours?
- How many lamps will fail between 950 and 1000 hours?
- What proportion of lamps will fail before 925 hours?
- Given the same mean life , what would the standard deviation have to be ensure that no more than 20% of lamps fail before 916 hours?