

Set A

Bachelor of Management Studies

Semester I

Statistics for Business Decisions

UPC: 61011104

Attempt any 4 questions. All questions carry equal marks.

(Max. Marks: 75)

Q1. Cherish foods is a chain of restaurants which has its presence in many parts of the world. The company also has its presence in the Indian market with outlets in Bengaluru and Hyderabad. After completing 2 years of successful operations in these cities, the company wants to analyse its performance. The following table comprises the data on sales revenue of ten stores of the company in the two cities:

Store	Sales Revenue (in ₹ '000)	
	Bengaluru	Hyderabad
1	22	20
2	27	30
3	30	25
4	32	38
5	28	42
6	30	38
7	61	44
8	20	46
9	30	35
10	40	42

Find the mean, median and mode for the sale revenue in the two cities. Which of these is the most appropriate measure of average? In which city are the sales more uniformly distributed? Calculate the moment measures of skewness and kurtosis for both distributions and interpret them. Draw a Box and Whisker plot for the distribution of sales revenue in the two cities and comment on its nature.

Q2. Ace Ltd. conducts annual training program and aptitude test for its employees. The scores of the test are documented and used for the purpose of appraisal. The following table comprises data on test score and monthly salary of ten managers of the company:

Manager	Score of the aptitude test	Monthly salary (in ₹ '000)
1	92	70
2	94	75
3	96	80
4	82	85
5	86	82
6	94	88
7	90	86
8	92	92
9	84	80
10	90	75

Use the above data to calculate (i) Karl Pearson's coefficient of correlation and comment on the degree, direction and significance of its value (ii) Spearman's rank correlation. Plot a scatterplot using the data. Describe the relationship between correlation and regression coefficients.

Q3. Given below is Delhi's daily minimum temperature From December 26 to December 31, 2020. Fit a linear, and a quadratic trend. Plot the two trend lines and predict the temperature for January 1, 2021 for both cases.

Date	Minimum Temperature (degrees Celsius)
December 26, 2020	7
December 27, 2020	8
December 28, 2020	13
December 29, 2020	5
December 30, 2020	6
December 31, 2020	5

Q4. For the average daily stock price and daily volume traded over 5 years for three companies, construct a stock price index using Fisher's method with year 2001 as base year.

	Company A		Company B		Company C	
Year	Price	Quantity	Price	Quantity	Price	Quantity
2001	200	500	12	100	2310	29
2002	220	649	15	120	2250	37
2003	209	127	14	110	2039	56
2004	231	840	25	150	3290	94
2005	245	126	21	130	3900	168

Find a linear regression relationship of how the Fisher's price index affects quantity traded for stock of Company A.

Q5. Highlight the differences between Type I and Type II error, giving their significance and utility in hypothesis testing.

Eleven sales executive trainees are assigned selling jobs right after their recruitment. After a fortnight they are withdrawn from their field duties and given a month's training for executive sales. Sales executed by them in thousands of rupees before and after the training, are listed below:

Sales before training	23	20	19	21	18	20	18	17	23	16	19
Sales after training	24	19	21	18	20	22	20	20	23	20	27

Considering the sales following normal distribution, do these data indicate that the training has contributed to improving their performance significantly at 5% level of significance?

Also determine the 90% two-sided confidence interval estimates of mean of sales before training.

For a larger sample of 100 trainees, it was found that their average sales after training were equal to Rs.25,000. Can we conclude that this larger sample comes from a population with a mean sales of Rs.23,000? The standard deviation of the large sample was found to be equal to Rs. 8,300. Test the hypothesis at a 1% level of significance.

Q6. Is there any relation between conditional probability and probability obtained from Bayes' theorem? How are the two different from each other?

A student is appearing for a short online competitive quiz. The quiz consists of 10 multiple-choice questions. Each question has five possible answers, only one of which is correct. In such a scenario-

What is the probability that the student gets no answers correct? What will be the performance (in percentage) if the student gets two answers correct?

Also, a student is considered to be failed if he scores less than 50% (Considering one mark for each correct answer). What is the probability that the student fails the quiz?

Further, assume that for a low probability event of accidents, there is an average of 1 accident per day that happens in a city. In the table below predict the number of days for which we will have 0, 1, 2, 3, 4 accidents in a day out of a total of 50 days.

Number of Accidents	0	1	2	3	4
Number of Days	?	?	?	?	?