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Calculate the Spearman's rank correlation coefficient to determine if there is a correlation between the performance of stocks in Sector A and Sector B. (8)

(200)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7828

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Unique Paper Code : 6202462302

Name of the Paper : Business Statistics and
Financial Mathematics

Name of the Course : Banking, Financial Services
and Insurance

Semester : III

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The paper has total 6 questions. Attempt any four questions.
3. Each question is of 15 marks.
4. Use simple calculator.

P.T.O.

1. (a) The following data relates to the ages of library card holders in a particular library scheme.

Age	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of Card Holders	12	17	28	36	40	32	19	6

Calculate the quartile deviation. (7)

- (b) The age distribution of 130 sales executives employed in a business enterprise is given below:

Age	20-25	25-30	30-35	35-40	40-45	45-50
Number of executives	2	14	29	43	33	9

Calculate the Mode of age from the given distribution. (8)

2. (a) A savings account offers an interest rate of 8% compounded monthly. Find the nominal interest rate if the effective annual interest rate is 8.3%.

6. (a) You invest \$5,000 at an interest rate of 6% per year compounded quarterly. You plan to withdraw \$400 at the end of each quarter for the next 5 years. What is the future value of the annuity?

(7)

- (b) Consider two sets of data representing the performance of 10 stocks in two different sectors over a period:

Sector A Performance Rank	Sector B Performance Rank
1	10
2	9
3	8
4	7
5	6
6	5
7	4
8	3
9	2
10	1

5. (a) A company fits a simple linear regression model to predict its monthly sales based on advertising expenditure. The observed sales (in thousands of units) for 5 months and the predicted sales from the model are given below:

Month	Observed Sales (Y)	Predicted Sales (Y)
1	45	46
2	50	52
3	55	54
4	60	59
5	65	62

Calculate the Mean Squared Error (MSE) for the regression model. (8)

- (b) Difference Between Parametric and non-parametric tests. (7)

You plan to invest \$10,000 in a deferred annuity. The interest rate is 5% per year, compounded annually. You will make annual payments of \$1,500 starting in 5 years, and the payments will continue for a total of 10 years. What is the present value of this annuity? (5)

- (b) A loan officer is studying the relationship between interest rates and the loan amount applicants qualify for. The data from five recent loan applicants is shown below:

Applicant	Interest Rate (%) (X)	Loan Amount (\$1000s) (Y)
1	5.0	200
2	5.5	190
3	6.0	185
4	6.5	175
5	7.0	160

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(i) Determine the linear regression equation to predict the loan amount based on the interest rate.

(ii) Predict the loan amount for an applicant with a 6.25% interest rate. (10)

3. (a) What is Poisson's distribution? Write a formula for probability function of Poisson's distributions. Also find the mean and variance. (7)

(b) A company launched a marketing campaign to increase product sales. Among the 500 customers, 200 were exposed to the marketing campaign (event E) and 300 were not. Out of the 200 customers who were exposed, 100 made a purchase (event M), and 100 did not. Out of the 300 customers who were not exposed, 50 made a purchase and 250 did not.

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(i) Find the probability that a customer made a purchase, given that they were exposed to the marketing campaign.

(ii) Find the probability that a customer was exposed to the campaign, given that they made a purchase. (8)

4. (a) What is hypothesis? Mention the types of hypotheses testing and steps of the hypothesis procedure? (7)

(b) A manufacturer claims that the average lifetime of a lightbulb is 800 hours. A sample of 25 lightbulbs is selected, and the sample mean lifetime is 780 hours with a sample standard deviation of 40 hours. At $\alpha=0.01$, test whether the sample provides sufficient evidence to reject the manufacturer's claim. (8)

P.T.O.