PRESIDENCY UNIVERSITY
BENGALURU

SET - A

SCHOOL OF ENGINEERING
END TERM EXAMINATION - FEB 2023

Semester : Semester I - 2022
Course Code : MAT1003
Course Name : Sem I - MAT1003 - Applied Statistics
Program : B.Tech - (All Programs)

Date : 23-FEB-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   **(10 X 2 = 20M)**

1. Find the mean of first 10 odd integers.

    (CO1) [Knowledge]

2. Find the lower quartile Q_1 of the following data set: 4, 8, 15, 21, 13, 17, 25.

    (CO1) [Knowledge]

3. Two data sets A and B have variances of 25 and 45 units respectively. Which set is more consistent?

    (CO1) [Knowledge]

4. What is the range of moderate positive and moderate negative correlation?

    (CO1) [Knowledge]

5. Write the Regression equation of x on y?

    (CO1) [Knowledge]

6. If 'S' be the sample space, then the probability of occurrence of an event 'E' is given by?

    (CO2) [Knowledge]

7. Find the probability of getting a head in the experiment of tossing a coin?.

    (CO2) [Knowledge]

8. Write down the formula for the calculation of the conditional probability $P(B|A)$ when A and B are not independent events.

    (CO2) [Knowledge]

9. Find the value of P(X=3), if the random variable X follows the Poisson distribution with λ=5.

    (CO3) [Knowledge]

10. For a Binomial distribution the number of trials is 50 and the probability of failure is 0.3. What is the mean of the distribution?

    (CO3) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(5 X 10 = 50M)**

11. Following are the marks obtained by a student in 10 tests of 50 marks each

Test	1	2	3	4	5	6	7	8	9	10
Marks	44	30	28	10	2	48	21	15	50	20

Determine the standard deviation of marks. (CO1) [Comprehension]

12. A university bought 45%, 25% and 30% of computers from HCL, Wipro and IBM respectively. Suppose that 2% of the computers from HCL, 3% of the computers from Wipro and 1% of the computers from IBM are found to be defective. Given a randomly chosen computer is defective, what is the probability that it is made by (i) HCL (ii) Wipro? (CO2) [Comprehension]

13. Compute Karl Pearson's coefficient of correlation between advertisement cost and sales as per the data given below:

Advertisment cost (in Lakhs)	39	65	62	90	82	75	25	98	36	78
Sales (in lakhs)	47	53	58	86	62	68	60	91	51	84

Also determine the nature of correlation of the given observations. (CO1) [Comprehension]

14. While proof reading a book, 5 misprints are found in every 3 pages. What is the probability that any given 3 pages would have
(a) at least 2 misprints
(b) at most 2 misprints
(c) exactly 5 misprints? (CO3) [Comprehension]

15. The average lifetime of an electric motor is 5 years. If lifetime of electric motors is normally distributed with a variance of 2 years, what is the probability that an electric motor survives for
(a) at most 3 years
(b) at least 3 years
(c) between 3 to 7 years.
(Given that $P(Z \leq 0.71) = 0.76115$, $P(Z \leq 1.41) = 0.92703$). (CO3) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **(2 X 15 = 30M)**

16. Consider the following data set:

Marks in Mid Exam	18	17	23	22	21	20	19	19	20	21
Marks in End term Exam	16	12	20	15	22	15	11	14	19	16

Construct suitable mathematical models to estimate:

a. Marks in Mid Exam when marks in End term Exam is known

b. Marks in End term Exam when marks in Mid Exam is known (CO1) [Application]

17. It has been observed that, a person reaches his office on time only 3 out of 5 days during the rainy season,.
a. Construct a suitable mathematical model, which represents the number of days out of *n* days, in which the person reaches his office on time during rainy days.
b. If it rains consecutively for 3 days, what is the probability that the person reaches his office on time exactly for all the days?
c. If it rains consecutively for 5 days, what is the probability that the person reaches his office on time at most for 2 days?
d. If it rains consecutively for 15 days, what is the mean number of days on which he reaches his office exactly on time?

***** (CO3) [Application]