Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SET B

SCHOOL OF INFORMATION SCIENCE
END TERM EXAMINATION - JAN 2024

Semester : Semester I - 2023
Course Code : MAT3002
Course Name : Applied Statistics
Program : MCA

Date : 16-JAN-2024
Time : 1:00 PM - 4:00 PM
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 and standard distribution table are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **4X5M=20M**

1. The length of a conversation between two people follows an exponential variate with a mean of 5 min. Find the probability that the conversation ends less than 5 min

(CO1) [Knowledge]

2. A population consists of the five numbers 2,3,6,8 and 11. Consider all possible samples of size 2 that can be drawn replacements from this population. Find (a) the mean of the sampling distribution of the means (b) the standard deviation of the sampling distribution of the means

(CO3) [Knowledge]

3. Define Sampling Error, Level of Significance and Critical region

(CO3) [Knowledge]

4. Differentiate between z-test , t-test and F-test

(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **5X10M=50M**

5. An electrical firm manufactures light bulbs that have a length of life that is normally distributed with mean equal to 800 hours and standard deviation of 40 hours. Find the probability that a bulb burns between 778 and 834 hours.

(CO1) [Comprehension]

6. The following data gives the age of husband (x) and the age of wife (y) in years. Form the two regression lines and calculate the age of husband corresponding to 16 years age of wife.

x	36	23	27	28	28	29	30	31	33	35
y	29	18	20	22	27	21	29	27	29	28

(CO2) [Comprehension]

7. Psychological tests of intelligence and of engineering ability were applied to 10 students. The following data shows that the intelligent ratio and engineering ratio. Calculate the coefficient of correlation.

Student	A	B	C	D	E	F	G	H	I	J
IR	105	104	102	101	100	99	98	96	93	92
ER	101	103	100	98	95	96	104	92	97	94

(CO2) [Comprehension]

8. A toy manufacturer wants to get batteries for toys. A team collected 41 samples from supplier A and the variance was 110 hours. The team also collected 21 samples from supplier B with a variance of 65 hours. At a 0.05 alpha level determine if there is a difference in the variances. (Ftable value(0.025,40,20)=2.287

(CO4) [Comprehension]

9. A random sample of 40 geysers produced by company A has a mean life time of 647 hrs. of continuous use with a standard deviation of 27 hrs., while a sample of 40 produced by another company B has a mean life time of 638 hrs. of continuous use with a standard deviation of 31 hrs. Does this substantiate the claim of company A that their geysers are superior to those produced by company B at (a) 0.05 (b) 0.01 L.O.S
(Z table value for right tailed test=1.645 for 5% L.O.S and Z table value for right tailed test =2.33 for 1% L.O.S)

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **2X15M=30M**

10. a. A die is thrown 265 times and the number appearing on the face (x) follows the following frequency distribution

x	1	2	3	4	5	6
f	40	32	29	58	54	60

Calculate the value of χ^2

b. Test the significance of coefficient of correlation using α = 0.06 and r= 0.982.

x	5	6	8	3	2	5
y	6	5	9	4	2	5

11. a. The length of life X of certain computers is approximately normally distributed with mean μ and standard deviation σ = 40 hours. If a random sample of 30 computers has an average life of 788 hours, test the null hypothesis that μ = 800 hours against the alternative hypothesis at (a) 1% (b) 5% and (c) 10 % level of significance.
For two tailed test, at 1% level of significance, $ztable$= 2.58.
For two tailed test, at 5% level of significance, $ztable$= 1.96.
For two tailed test, at 10% level of significance, $ztable$= 1.645.
b. Calculate the t-test for the following data of the number of times people prefer coffee ot tea in five time intervals

coffee	4	5	7	6	9
Tea	3	8	6	4	7

(CO4) [Application]