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**Date: 29-01-2021.**

**II.B.TECH- I-SEM (R22)-II MID Examinations-January-2024 Date: 27/01/2024**

**Subject: Computer Oriented & statistical Methods Time:01:30 TO 03:30 PM**

**Branch: IT, CSC&CSD Marks: 30 M**

***Answer all Questions in Part -A & Answer any FOUR Questions in Part -B***

**PART-A 5x2=10 M**

1. Define Null & Alternative hypothesis. (CO 3)

2. Explain briefly the χ2 (Chi-Square) test. (CO 4)

3. Explain t-distribution. (CO 4)

4. Define stochastic process & Markov chain. (CO 5)

5. If the transition probability matrix is . Find x, y an z ? (CO 5)

**PART-B 4x5 = 20 M**

6. An oceanographer wants to check whether the depth of the ocean in a certain region is 57.4

fathoms, as had previously been recorded. What can he conclude at the level of significance 𝛼 = 0.05,

if readings taken at 40 random locations in the given region yielded a mean of 59.1 fathoms with a

Standard deviation of 5.2 fathoms? (CO3)

7. A researcher wants to know the intelligence of students in a school. He selected two groups of

students. In the first group there are 150 students having mean IQ of 75 with a S.D of 15. In the

second group there are 250 students having mean IQ of 70 with S.D of 20. Is there a significant difference between the means of two groups? (CO3)

8. A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer

claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard? (CO4)

**9.** The heights of 10 males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66

inches. Is it reasonable to believe that the average height is greater than 64 inches? Test at 5%

significance level assuming that for 9 degrees of freedom (t=1.833 at α=0.05). (CO4)

10**.** Find the equilibrium vector or steady state vector for the transition matrix (CO5)

11. The transition probability matrix of a Markov chain , n= 1,2,3 ……. having 3 states

1, 2 and 3 is P= and the initial distribution is = .

Find (i) P(X2=3) (ii) P(X3=2, X2=3, X1=3, X0=2). (CO5)

SCHEME OF EVALUATION

PART-A

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| S NO | THEORY | MARKS | TOTAL |
| 1 | Define Null & Alternative hypothesis. | 2 | 2 |
| 2 | Explain briefly the χ2 (Chi-Square) test. | 2 | 2 |
| 3 | Explain t-distribution. | 2 | 2 |
| 4 | Define stochastic process & Markov chain. | 2 | 2 |
| 5 | If the transition probability matrix is . Find x, y an z ? | 2 | 2 |

PART-B

|  |  |  |  |
| --- | --- | --- | --- |
| S NO | THEORY | MARKS | TOTAL |
| 6 | An oceanographer wants to check whether the depth of the ocean in a certain region is 57.4 fathoms, as had previously been recorded. What can he conclude at the level of significance 𝛼 = 0.05, if readings taken at 40 random locations in the given region yielded a mean of 59.1 fathoms with a Standard deviation of 5.2 fathoms?    (or) | 5 | 5 |
| 7 | A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there are 150 students having mean IQ of 75 with a S.D of 15. In the second group there are 250 students having mean IQ of 70 with S.D of 20. Is there a significant difference between the means of two groups? | 5 | 5 |
| 8 | a) Define the mean and Standard deviation.  b) A sample of 26 bulbs gives a mean life of 990 hours with a S.D of 20 hours. The manufacturer claims that the mean life of bulbs is 1000 hours. Is the sample not up to the standard?  (or) | 1  4 | 5 |
| 9 | The heights of 10 males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. Is it reasonable to believe that the average height is greater than 64 inches? Test at 5% significance level assuming that for 9 degrees of freedom (t=1.833 at α=0.05). | 5 | 5 |
| 10 | Find the equilibrium vector or steady state vector for the transition matrix  (or) | 5 | 5 |

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| --- | --- | --- | --- |
| S NO | THEORY | MARKS | TOTAL |
| 11 | a) Define Markov chain.  b) The transition probability matrix of a Markov chain , n= 1,2,3 ……. having 3 states  1, 2 and 3 is P= and the initial distribution is = .  Find (i) P(X2=3) (ii) P(X3=2, X2=3, X1=3, X0=2). | 2  3 | 5 |