Code No: 183AK **R22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, February - 2024
COMPUTER ORIENTED STATISTICAL METHODS
(Common to CSE, IT, CSIT, CE(SE), CSE(CS), CSE(DS), CSD)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.
- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

1.a)	State addition theorem of probability.	[1]
b)	State Baye's rule.	[1]
c)	Show that E(aX+b)= a E(X) +b, where X is a random variable.	[1]
d)	Define a Poison distribution and give its mean and variance.	[1]
e)	Define a uniform distribution.	[1]
f)	Discuss the area property of normal distribution.	[1]
g)	Define the maximum error of estimation.	[1]
h)	Define t-distribution and give any two of its properties.	[1]
i)	Discuss the transition probability in brief.	[1]
j)	Describe a first order Markov process.	[1]

PART - B

(50 Marks)

2. Two cards are drawn at random from an ordinary deck of 52 cards. What is the probability of getting two aces if
a) the first card is replaced before the second card is drawn;
b) the first card is not replaced before the second card is drawn? [5+5]

OR

3.a) The chances that Dr. Rao will diagnose cancer disease correctly is 60%. The chance that a patient will die by his treatment after correct diagnosis is 40% and the chance of death by wrong diagnosis is 70%. A patient of Dr. Rao, who had cancer disease died. What is the probability his disease was correctly diagnosed?

b) If a die is rolled twice and X is defined as X = min (a,b), then find the probability distribution of X. [6+4]

4. If a coin is tossed 12 times, find the probability of getting
a) at least two heads,
b) at most 3 heads,
c) number of heads that lie between 5 and 8.
d) all heads and e) No head. [10]

OR

5. Fit a Poisson distribution to the following data. [10]

No. appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52

6.a) Given a random variable having the normal distribution with mean 16.2 and variance 1.5625, find the probabilities that it will take on a value
i) greater than 16.8, (ii) between 13.6 and 18.8.

b) State central limit theorem and discuss about its applications. [6+4]

OR

7. A population consists of five numbers 2,3,6,8 and 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find
a) The mean of the population.
b) The standard deviation of the population.
c) The mean of the sampling distribution of means and
d) The standard deviation of the sampling distribution of means. [2+3+2+3]

8. An investigator states that the husbands are more intelligent than the wives. The following is the results of 10 samples of IQs. Test a hypothesis with a reasonable test at the 0.05 level of significance. [10]

Husbands	117	105	97	105	123	109	86	78	103	107
Wives	106	98	87	104	116	95	90	69	108	85

OR

9.a) To test the claim that the resistance of electric wire can be reduced by more than 0.050 ohm by alloying, 32 values obtained for standard wire yielded mean of 0.136 ohm and standard deviation 0.004 ohm, and another 32 values obtained for alloyed wire yielded mean 0.083 ohm and standard deviation 0.005 ohm. At 0.05 level of significance, does this support the claim?

b) A cigarette manufacturing firm claims that its brand A line of cigarettes outsells its brand B by 8%. If it is found that 42 out of a sample of 200 smokers prefer brand A and 18 out of another sample of 100 smokers prefer brand B, test whether the 8% difference is a valid claim. [5+5]

10. Describe the first order and higher order Markov process. [10]

OR

11. Describe Markov chain, steady state condition, Markov analysis. [10]

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