R-19

Code: 19DC11T

M.C.A. I Semester Supplementary Examinations June 2022
Probability and Statistics

Max. Marks: 60   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)
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	Marks	CO	BL

UNIT–I

1. a) A problem is given to four students A, B, C, D. Probability of solving them independently are $\frac{2}{3}, \frac{2}{5}, \frac{1}{4}, \frac{3}{4}$. If all of them try to solve the problem, what is the probability that problem is solved?   **4M   CO1   L2**

   b) A random variable X has the following probability function

X=x	1	2	3	4	5	6
P(X=x)	k	3k	5k	7k	9k	11k

   Find (i) k   (ii) Mean (iiii) Variance (iv) P(1<X<5)   **8M   CO1   L3**

OR

2. a) A bag A contains 2 white and 3 red balls and bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from bag B.   **6M   CO1   L2**

   b) balls. One ball rob drawn at random of a random variable is given by red. Find the probability that the If the probability density function $f(x) = kx2e-x$ when $x \geq 0$. Find (i)k (ii)Mean (iii) Variance   **6M   CO1   L3**

UNIT–II

3. a) The probability that the life of a bulb is 100 days is 0.05. Find the probability that out of 6 bulbs (i) at least one   (ii) none (iii) greater than 4 will be having a life of 100 days.   **6M   CO2   L3**

   b) In a test on 2000 electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hrs and standard deviation 40 hrs. Estimate the no. of bulbs likely to burn for i) more than 2140 hrs ii) between 1920 and 2020 iii) less than 1960 hrs   **6M   CO2   L3**

OR

4. Four coins are tossed 160 times. The number of times x heads occur is given below.

X	0	1	2	3	4
No.of times	8	34	69	43	6

   Fit a binomial distribution to this data on the hypothesis that coins are unbiased.   **12M   CO2   L4**

UNIT–III

5. A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size 2 which can be drawn without replacement from this population. Find
   (i)   The population mean
   (ii) The population standard deviation
   (iii) the mean of sampling distribution of means
   (iv) The standard deviation of sampling distribution of means.   **12M   CO3   L3**

OR

6. a) To estimate the average time it takes to assemble a certain computer components, the industrial engineer at an electronics firm timed 40 technicians in the performance of the task, getting a mean of 12.73 minutes and a standard deviation of 2.06 minutes.
   (i) What can we say with 99% confidence about the maximum error if 12.73 is used as a point estimate of the actual average time required to do the job.
   (ii) Use the given data to construct a 99% confidence interval. **8M CO3 L4**

   b) It is desired to estimate the mean time of continuous use until an answering machine will first require service. If it can be assumed that standard deviation is equal to 60 days, how large a sample is needed so that one will be able to assert with 90% confidence that the sample mean is off by at most 10 days. **4M CO3 L4**

UNIT–IV

7. a) In a sample of 600 students of a certain college 400 are found to use ball pens. In another college from a sample of 900 students 450 were found to use ball pens. Test whether 2 colleges are significantly different with respect to the habit of using ball pens. take level of significance as 5% **6M CO4 L4**

   b) The following table gives the number of aircraft accidents that occurred during the six days of the week. Find whether the accidents are uniformly distributed over the week.

Days	Mon	Tue	Wed	Thurs	Fri	Sat
No.of accidents	14	18	12	11	15	14

6M CO4 L4

OR

8. Two independent samples 8 and 7 items respectively had the following values of the variables.

Sample I	9	11	13	11	16	10	12	14
Sample II	11	13	11	14	10	8	10	

Do the estimates of population variance differ significantly at 5% level of significance **12M CO4 L4**

UNIT–V

9. Patients arrive at a hospital at random with a mean arrival rate of 3 per hour. The department is an average 15 minutes with each patient, actual consulting times being exponentially distributed. Find
   (i) The proportion of time that the doctor is idle
   (ii) The mean number of patients waiting to see the doctor
   (iii) The probability of there being more than 3 patients waiting
   (iv) The mean waiting time for patients **12M CO5 L3**

OR

10. A super market has a single cashier. During peak hours, customers arrive at a rate of 20 customers per hour. The average number of customers that can be processed by the cashier is 24 per hour. Calculate
    (i) The probability that cashier is idle
    (ii) The average number of customers in the queuing system.
    (iii) The average time a customer spends in the system
    (iv) The average time the customers are in the queue
    (v) The average time a customer spends in the queue waiting for service. **12M CO5 L3**

END

Code: 19DF11T

M.C.A. I Semester Supplementary Examinations June 2022

Mathematical Foundations of Computer Science

Max. Marks: 60   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x12 = 60 Marks)

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			Marks	CO	BL

UNIT–I

1.	a)	Define Statement and Explain all the Connectivity's with the help of Truth Table	6M	CO1	L3
	b)	Obtain the principal disjunctive normal form of the given Compound Statement (P^~Q ^~R)v(Q ^R)	6M	CO1	L4

OR

2.	a)	Define Quantifiers and write all the properties of Quantifiers with Examples.	6M	CO1	L3
		Show that (R V S) follows logically from the premises C V D ,(C V D)			
		~H,~H (A ~B) and (A ~B) (RVS)	6M	CO1	L2

UNIT–II

3.	a)	Define binary relation? Write the properties of binary relation with an example.	6M	CO2	L3
	b)	Define partition set? prove that any equivalence relation R on A induces a partition of A	6M	CO2	L3

4.	a)	Let A={ 1,2,3,…19,20} , and R be the equivalence relation on A defined by aRb if and only if a – b is divisible by 5. Find the partition of A induced by R	6M	CO2	L1,L2
	b)	Let A={1,2,3,4,6,8,12 }. On A , define the partial ordering relation R by aRb if and only if a|b. Draw hasse diagram	6M	CO2	L1,L2

UNIT–III

5.	a)	Define the terms Combinations & Permutations with examples.	6M	CO3	L3
	b)	How many numbers can be formed using the digits 1, 3, 4, 5, 6, 8, 9 if no repetitions are allowed?	6M	CO3	L4

6.	a)	How many committees of five with a given Chairperson can be selected from 12 Students	6M	CO3	L4
	b)	In how many ways can the 26 letters of the English alphabet be permitted So that none of the patterns CAR, DOG, PUN or BYTE occurs?	6M	CO3	L4

UNIT–IV

7.		Solve the recurrence relation $a_n + a_{n-1} - 6a_{n-2} = 0$ for n 2 given that a_0= -1 and a_1=8	12M	CO4	L1

OR

8.	a)	Find the sequences generated by the following functions: $(3 + x)^3$	6M	CO4	L4
	b)	Solve the recurrence relation $3a_{n+1} – 4a_n = 0$, n 0 , a_1=5.	6M	CO4	L4

UNIT–V

9.	a)	Define Graph and explain various types of representation of a Graph	6M	CO5	L3
	b)	Define and explain Bipartite Graph with neat Diagram	6M	CO5	L3

OR

10.	a)	Define and Explain various properties of Tree.	6M	CO5	L3
	b)	Define Spanning Tree and explain step by step procedure for the derivation of spanning tree by using Primes Algorithm	6M	CO5	L3

END