MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution – UGC, Govt. of India) MODEL QUESTION PAPER-1 Probability and Statistics

Time: 3 hours

Max Marks: 70

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1a)	Α	random	variable	has	the	following	probability	y function
						0	P	

	Х	0	1	2	3	4	5	6	7		
	P(x)	0	Κ	2K	2K	3K	\mathbf{K}^2	$2K^2$	$7K^2 + K$		
Fi	nd i)l	k i	i)P(.	X≤6)	iii)	P(X >	6) iv	v)) fin	d'c' if P(X≤c)>1/2	[7M]

- b) A sample if 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number E of defective items. [7M]
- OR 2) For the following bivariate (two dimensional) probability distribution of X and Y find i) P (X ≤ 2 ,Y=2) ii) $F_X(2)$ iii) P(Y=3) iv) P(X ≤ 3 ,Y ≤ 4) v) $F_Y(3)$

X/Y	1	2	3	4
1	0.1	0	0.2	0.1
2	0.05	0.12	0.08	0.01
3	0.1	0.05	0.1	0.09

[14M]

SECTION-II

3) The average number of phone calls /minute coming into a switch board between 2pm and 4pm is 2.5.Determine the probability the probability that one particular minute there will be i) 4 or fewer ii) more than 6 calls [14M]

OR

4) Suppose the weights of 800 male students are normally distributed with 28.8kg and SD of 2.06 kg. Find the number of students whose weights are
i) Between 28.4 kg and 30.4kg ii) more than 31.3 kg [14M]

SECTION-III

5a) Find the Karl-Pearson's coefficient of correlation for the paired data:

wages	100	101	102	100	99	97	98	96	95	102	[7M]
Cost of living	98	99	99	95	92	95	94	90	91	97	

b) If θ is the angle between two regression lines and S.D of Y is twice the S.D of X and r = 1.25, find tan θ . [7M]

OR

6) The heights of mothers and daughters are given in the following table. From the two tables of regression estimate average height of daughter when the height of the mother is 64.5 inches

Height of mother	62	63	64	64	65	66	68	70
Height of daughter	64	65	61	69	67	68	71	65

[14M]

SECTION-IV

7a) A sample of size 64 and mean70 were taken from a population whose standard	deviation
is 10.Construct 95% confidence interval for the mean.	[7M]
b) Write about (i) Null hypothesis (ii) Type I and Type II errors	

(iii) Alternative hypothesis.

[7M]

OR

8a) In a study of automobile insurance a random sample of 80 body repair costs had a mean of Rs.472.36 and S.D of Rs.62.35. If x is used as point estimate to the true average repair costs, with what confidence we can assert that the maximum error doesn't exceed Rs.10 [7M]
b) Explain the procedure for Testing of Hypothesis. [7M]

SECTION-V

9) A survey of 320 families with 4children each revealed the following distribution. [14M]

No# of boy	S	5	4	3	2	1	0
No# of girls	5	0	1	2	3	4	5
No#	of	14	56	110	88	40	12
families							

Is this result consistent with the hypothesis that male and female births are equally popular?

OR

10) The following are the average weekly losses of worker hours due to accidents in

10 industrial plants before and after a certain safety programme was put into operation:

Before	45	73	46	124	33	57	83	34	26	17
After	36	60	44	119	35	51	77	29	24	11

Test whether the safety programme is effective in reducing the number of accidents at 5%LOS. [14M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution - UGC, Govt. of India) **MODEL QUESTION PAPER-2**

Probability and Statistics

Max. Marks: 70

NOTE: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks

SECTION-I

1 a) If the p.d.f of a r.v x is given by $f(x) = \begin{cases} k(1-x^2), & 0 < x < 1 \\ 0, & otherwise \end{cases}$

find i) k and ii) the cumulative distribution function of x.

b)Write the definitions of (i)Random variable (ii)Discrete random variable (iii) Continuous random variable and (iv)Probability Distribution function. [7M]

OR

2) A random sample with replacement of size 2 is taken from $S = \{1,2,3\}$. Let the random variable X denote the sum of the two numbers taken: (i) Write the probability distribution of X (ii) Find the mean

(iii) Find the variance.

SECTION-II

- 3. A sales tax officer has reported that the average sales of the 500 businesses that he has to deal with during a year is Rs.36,000 with a standard deviation of Rs.10,000. Assuming that the sales in these businesses are normally distributed, find :
- i) The number of business as the sales of which are greater than Rs.40,000
- ii) The percentage of business sales of which are likely to range between Rs.30,000 and Rs.40,000[14M]

OR

4. If 2% of light bulbs are defective, find

(i) atleast one is defective

(ii) exactly 7 are defective

(iii) p(1 < x < 8) in a sample of 100

(iv) atmost one is defective

SECTION-III

5 a) Fit	a str	aigl	nt lin	e Y=	a_0+a	1X f	or the following data and estimate the value of Y when $X = 25$	
-	Х	0	5	10	15	20		[7M]
	Y	7	11	16	20	26		
b) She	ow th	nat tl	he m	axim	um v	alue	of rank correlation coefficient is 1	[7M]

b) Show that the maximum value of rank correlation coefficient is 1

OR

6a) The marks obtained by 10 students in mathematics and statistics are given below. Find the rank correlation coefficient between the two subjects

Marks in mathematics	25	28	30	32	35	36	38	42	45	39	[7M]
Marks in Statistics	20	26	29	30	25	18	26	35	46	35	1
relation coefficient if b _{xx}	y = 0.	85,1	$o_{vx} =$	= 0.89).						[7M]

b) Find the Correlation coefficient if $b_{xy} = 0.85$, $b_{yx} = 0.89$.

TIME: 3hours

[14M]

[14M]

[7M]

SECTION-IV

7.a) Samples of size 2 are taken from the population 1,2,3,4,5,6 with replacement. Find

(i) The mean of the population

(ii) Standard deviation of population

(iii) The mean of the sampling distribution of means

(iv) The standard deviation of the sampling distribution of means	[12M]
b) What is a statistic? Give an example	[2M]

OR

8. a) Write about null hypothesis and testing of null hypothesis.

b) 20 people were attacked by a disease and only 18 survived. Will you reject the hypothesis that the survival rate if attacked by this disease is 85% in favour of the hypothesis that is more at 5% level. [10M]

SECTION-V

9. In an investigation on the machine performance the following results are obtained:

	No# of units inspected	No# of defectives
Machine 1	375	17
Machine 2	450	22

Test whether there is any significant performance of two machines at 5%LOS [14M]

OR

10. The following is the distribution of the daily number power failures reported in a city

No# of power failures	0	1	2	3	4	5	6	7	8	9
No# 0f days	9	43	64	62	42	36	22	14	6	2

Test the goodness of fit of Poisson distribution at 5% LOS

[14M]

[4M]

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous Institution – UGC, Govt. of India) MODEL QUESTION PAPER-3 Probability and Statistics

Time: 3 hours

Max Marks: 70

[10M]

[4M]

[14M]

Note: This question paper contains of 5 sections. Answer five questions, choosing one question from each section and each question carries 14 marks.

SECTION-I

1 a) If F(x) is the distribution function of x is given by $F(X) = \begin{cases} 0 & \text{if } x \le 1 \\ k(x-1)^4 & \text{if } 1 < x \le 3 \\ 1 & \text{if } x > 3 \end{cases}$

Determine i) f(x) ii) k iii)mean

b)Define (i) Probability mass function (ii) Probability density function .

OR

2 a) Two random variables x and y have the joint density function

$$f_{xy}(x,y) = \begin{cases} x^2 + \frac{xy}{3} \\ 0 \end{cases},$$

otherwise

 $0 \le x \le 1, 0 \le y \le 2$

Show that x and y are not independent . Find the conditional density function . check whether it is valid or not. [7M]

b) The joint density function of w and z is given by

$$f_{wz}(wz) = \begin{cases} bwz &, 1 \le w \le 3 , 2 \le z \le 4 \\ 0 &, otherwise \end{cases}$$

density function. [7M]
SECTION-II

Find b and marginal density function.

3a) Average number of accidents on any day on a national highway is 1.8 .Determine the probability that the number of accidents are i) atleast one ii) atmost one iii) exactly one. [7M]
b) Fit a binomial distribution to the following data [7M]

Х	0	1	2	3	4	5
f	38	144	342	287	164	25

OR

4) In a normal distribution,7% of the items are under 35 and 89% are under 63.Determine the mean and variance of the distribution. [14M]

SECTION-III

5) Obtain the rank correlation coefficient for the following data

Y	62	58	68	44	81	60	68	48	50	70
Х	68	64	75	50	64	80	75	40	55	64

6) A panel of two judges P and Q graded seven dramatic performances by independently awarding marks as follows:

Performance	1	2	3	4	5	6	7
Marks by P	46	42	44	40	43	41	45
Marks by Q	40	38	36	35	39	37	41

The eight performance, which judge Q would not attend, was awarded 37 marks by judge P. If judge Q had also been present, how many marks would be expected to have been awarded by him to the eighth performance. [14M]

SECTION-IV

7a) A population consists of 5,10,14,18,13,24. Consider all possible samples of size 2 which can be drawn without replacement from the population. Find

i)The mean of the population

ii) Standard deviation of the population

iii) The mean of the sampling distribution of means

iv) Standard deviation of the sampling distribution of means [10M] b) Write short notes on Type I and Type II error. [4M]

OR

8 a) A random sample of size 16 values from a normal population showed a mean of 53 and a sum of squares of deviations from the mean equals to 150. Can this sample be regarded as taken from the population having 56 as mean ? Obtain 95% confidence limits of the mean of the population .[10M] [4M]

b) Write step procedure for difference of means of two independent samples.

SECTION-V

[4M]

9 a) Explain χ^2 test for independence of attributes.

b) The measurements of the output of two units have given the following results. Assuming that both Samples have been obtained from the normal distribution at 10% LOS. Test whether the two Populations have the same variance.

Unit –A	14.1	10.1	14.7	13.7	14.0
Unit -B	14.0	14.5	13.7	12.7	14.1

OR

10) 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% LOS. [14M]

R15 Code No: R15A0024 ode No: RISA0024 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India) II B. Tech I Semester Supplementary Examinations, Dec-21/Jan-22 **Probability and Statistics** (CSE & IT) **Roll No**

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B Part A is compulsory which carriers 25 marks and Answer all questions. Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question From each SECTION and each Question carries 10 marks. ****

PART-A (25 Marks)

Prove that correlation coefficient is the geometric mean of the two regression [2M] 1). a coefficients. [3M]

Define b

3

- i) Sample Space
- ii) Conditional probability
- ndom variable D.C

[10M]

Define a random variable.	[21,1]
The mean and variance of a binomial distribution are 4 and 4/3 respectively. Find	[3M]
n.	
Find the value of finite population correction factor for n=10 and N=1000.	[2M]
Define the Type-I and Type -II Errors.	[3M]
Define degrees of freedom.	[2M]
Define Chi-Square distribution.	[3M]
Define mean arrival rate in the Queuing Theory.	[2M]
Write a regular Markov Chain.	[3M]
PART-B (50 MARKS)	
	Define a random variable. The mean and variance of a binomial distribution are 4 and 4/3 respectively. Find n. Find the value of finite population correction factor for n=10 and N=1000. Define the Type-I and Type -II Errors. Define degrees of freedom. Define Chi-Square distribution. Define mean arrival rate in the Queuing Theory. Write a regular Markov Chain. PART-B (50 MARKS)

SECTION-I

Calculate the rank Correlation Coefficient for the following data 2

72 68 69 70 67 67 65 X 66 72 69 71 72 68 67 68 65 Y OR

In a bolt factory, machines A,B and C manufacture 25%,35% and 40% of the total [10M] of their output 5%,4% and 2% are defective bolts. A bolt is drawn at random from the product and is found to be defective .What are the probabilities that it was manufactured by machine A,B and C



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SECTION-II

A Continuous random variable has the p.d.f $f(x) = \begin{cases} k(1-x^2) \text{ if } 0 \le x \le 1 \\ 0 \text{ , otherwise} \end{cases}$ 4

Determine

i.K ii. Mean iii. Variance

OR

Derive Mean and Variance of Binomial distribution 5

SECTION-III

- A population consists of four numbers 2,3,4,5 .Consider all possible samples of 6 size two that can be drawn with replacement from this population. Find
 - The population Mean i)
 - ii) The population standard deviation
 - iii) The mean of the sampling distribution of means

OR

An ambulance service claims that it takes on the average less than 10 minutes to [10M] 7 reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level significance.

SECTION-IV

What is the size of smallest sample required to estimate an unknown proportion to [10M] 8 within a maximum error of 0.06 with at least 95% confidence

OR

Explain briefly the Variance Ratio test (or F-test) and write it's properties 9

SECTION-V

- A fast food restaurant has one drive-in window .It is estimated that cars arrive according to a Poisson Distribution at the rate of 2 every 5 minutes and that there 10 is enough space to accommodate a line of 10 cars. Other arriving cars can wait outside the space, if necessary .It takes 15 minutes on an average to fill an order, but the service time actually varies according to an exponential distribution. Determine the following
 - a) The probability that the facility is idle.
 - b) The expected number of customers waiting to be served.

OR

A training process is considered as a two state Markov Chain. If it rains, it is 11 considered to be in state '0' and if doesn't rain, the chain is in the state of '1'. The transition probability of the Markov Chain is defined by

$$P = \begin{pmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{pmatrix}$$

Find the probability that it will rain for 3 days from today assuming that it is raining today. Assume that the mutual probability of state 0 or state 1 as 0.4 and 0.6 respectively.

[10M]

[10M]

[10M]

[10M]

[10M]

[10M]



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Time: 3 hours

Max. Marks: 70

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

1 A random variable X has the following probability distribution.

X=x	1	2	3	4	5	6	7	8
P(X=x)	K	2k	3k	4k	5k	6k	7k	8k

Find

- i) K
- ii) Mean
- iii) Variance

iv) $P(X \leq 2)$

2 A Continuous Random variable has the p.d.f $f(x) = \begin{cases} kxe^{-\lambda x}, & x \ge 0, \lambda \ge 0\\ 0, & \text{elsewhere} \end{cases}$

Determine i. K ii. Mean iii. Variance SECTION-II

- 3 If the Variance of Poisson Variate is 3. Find the probability that
 - i) P(X=0)
 - ii) $P(1 \le X \le 4)$
 - iii) P(X>2)

5

6

OR

4 In a Normal distribution, 7% of the items are under 35 and 89% are under 63. [14M] Determine the Mean and Variance of the distribution.

SECTION-III

Calculate the coefficient of correlation for the following data

/	0	1	0	15	4	3	14	1
Y 15	16	14	13	11	12	10	8	9

OR

For 20 army personal the regression of weight of Kidneys (Y) on weight of Heart [14M] (X) is Y=399X+6.394 and the regression of weight of heart on weight of kidneys is X=1.212Y + 2.461. Find the Correlation Coefficient between the two variables and also their means.

[14M]

[14M]

[14M]

[14M]



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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. 7

Find

- a) The mean of the population
- b) The standard deviation of the population
- c) The mean of sampling distribution of means
- d) The standard deviation of the sampling distribution of means

OR

A random sample of 100 teachers in a large metropolitan area revealed a mean 8 weekly salary of Rs.487 with a standard deviation Rs.48. With what degree of confidence can we assert the average weekly salary of all teachers in the metropolitan area is between Rs.472 to Rs.502?

SECTION-V

- Two types of new cars produced in U.S.A are tested for petrol mileage, one 9 sample is consisting of 42 cars averaged 15kmpl .While the other sample consisting of 80 cars averaged 11.5 kmpl with population variances as $\sigma_1^2=2.0$ and $\sigma_2^2 = 1.5$ respectively. Test whether there is any significance difference in two petrol consumption of these two types of cars (use $\alpha=0.01$) OR
- In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat [14M] 10 eaters. Can we assume that both rice and wheat are equally popular in the state at 1% level of significance?

[14M]

[14M]

[14M]



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(iii) Variance. (i)Determine K (ii) Mean

SECTION-II

- a) Define binomial distribution. obtain mean and variance of the distribution. 3
 - b) Components are packed in boxes of 20. The probability of a component being [8M] defective is 0.1. What is the probability of a box containing 2 defective components?

OR

Suppose the weights of 800 male students are normally distributed with 28.8kg and [14M] 4 SD of 2.06 kg. Find the number of students whose weights are i) Between 28.4 kg and 30.4kg ii) more than 31.3 kg

SECTION-III

Calculate the correlation coefficient for the following heights (in inches) of fathers [14M] 5 (X) and their sons (Y):

X:65 66 67 67 68 69 70 72 Y:67 68 65 68 72 72 69 71 OR

p(x)

The following are midterm and final examination test scores for 10 students from [14M] 6 a class of a college, where x denotes the midterm score and y denotes the final score for each student.

X:68 87 75 91 82 77 86 82 75 79 Y: 74 79 80 93 88 79 97 95 89 92 Calculate the least-squares regression lines for these data.

Page 1 of

[6M]





SECTION-IV

1	a)Define (i)Sampling distribution (ii) point estimate (iii) Types of errors	[8M]
	b) Explain in brief one tailed and two tailed tests	[6M]
	OR	
8	a) Explain the procedure for hypothesis testing	[7M]
-	b) Discuss the test procedure for testing single mean of the population when	[7M]
	size of the sample is large.	
	SECTION-V	ITMI
9	a) Test the significance of the difference between the means of the samples from	[\IM]
	the following data:	
	Sample A Sample B	
	Size of sample 100 150	
	Mean 50 51	
	Standard deviation 4 5 (Table value=1.96)	
	L coo ware asked whether they would	[7M]

b) Random samples of 400 men and 600 women were asked whether they would [like to have a flyover near their residence. 200 men and 325 women were in like to have a flyover near their residence. 200 men and 325 men and women

- favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same at 5% level. OR
- Fit a Poisson distribution to the following data and test the goodness of fit at [14M] 0.05 levels:

No. of days :	150	05	+++	**			
No. of accidents.	150	65	45	34	10	6	2
C 'Jantas	0	1	2	3	4	•	U

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Code No: R17A0024 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution - UGC, Govt. of India)

II B. Tech I Semester Supplementary Examinations, November 2019 Probability and Statistics

(CSE & IT)

Roll No

Time: 3 hours

Note: This question paper Consists of 5 Sections. Answer FIVE Questions, Cheesing ONE Question from each SECTION and each Question carries 14 marks.

SECTION-I

- 1a Define Discrete and Continuous Random Variable
- b A random variable X has the following distribution

X:	1	2	3	4	5	6
P(x) :	K	3K	5K.	7K	9K	HK
Determine	- it K	in POL	10-15	III) Dr.	23	



[7M]

[4M]

[10M]

[14M]

[4M]

[10M]

[484]

11054

[14M]

- 2a Ten coins are thrown simultaneously. Find the probability of getting :
- i) At least one head ii) At most seven heads
- b if 'X' is a normal variate with mean 30 and standard deviation 5. Find the probabilities [7M] that

OR

(i) $26 \le X \le 40$ (ii) $X \ge 45$

SECTION-II

- 3a Write the properties of Correlation coefficient.
- b Calculate the coefficient of correlation from the following data

X	12	9	8	10	41	13	7
Y	14	8	6	9	11	12	3

OR

Using the following data obtain the equations of two regression lines:

x	16	21	26	23	28	24	17	22	21
Y	33	38	50	39	52	47	35	43	41

SECTION-III

5a Define Sample and Population

4

- b Random sample of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same, at 5% level. OR
- 6a Define Parameter and Statistic
- Explain the procedure for testing of hypothesis. SECTION-IV
 - A random sample of 10 boys had the following LQ's: 70, 120, 110, 101, 85, 83, 95, 98,





- 107 and 100. Do these data support the assumption of a population mean LQ of 1002. OR
- The following table gives the classification of hair colour ad eye colour. Find the value [14M] of chi-square. Is there good association between two?

		Hai	r Colour		
		Fair	Brown	Black	Total
	Blue	15	5	20	40
Eye Colour	Grey	20	10	20	50
	Brown	25	15	20	60
	Total	60	30	60	150

SEC FION-V

- A self service canteen employs one cashier at its counter. 8 customers arrive per every 10 minutes on average. The cashier can serve on average one per minute. Assuming that the arrivals are poisson and service time distribution is exponential, determine:
- (i). The Average number of customers in the system (ii). The Average Queue length (iii). The Average time a customer spends in the system (iv). Average time a customer spends in the queue.

OR

- Define Marcov chain and Marcov process 10a
 - A training process is considered as a two state Marcov chain. If it rains it is considered b to be in state '0' and it does not rain the chain is in the state '1'. The transition probability matrix of the Marcov chain is defined by
 - $P = \begin{bmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{bmatrix}$

8

9

Find the probability that it will rain after three days from today, assuming that the initial probabilities are 0.4 and 0.6.



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[14M]

[4M]

[10M]



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Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A (25 Marks)

1). a State Baye's Theorem.



b	Derive mean of the poisson distribution.	[ours]								
C	Write the Formula of Rank Correlation Coefficient.									
d c f g h	Show that correlation coefficient is geometric mean of regression coefficients. What is Degree of Freedom (d.f) in small samples? Define Point Estimation. What are Type-I and Type-II errors in sampling? What are Type-I and Type-II errors in sampling?	[3M] [2M] [3M] [3M]								
	Arrival rate is 3per hour and service rate is 5 per hour then find traffic intensity.	[2M]								
j	Verify whether the following matrix is stochastic or not $\begin{bmatrix} 0 & 1 \\ 1/3 & 5/3 \end{bmatrix}$. BADT D (50 MARKS)	[3M]								
2	Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each draw. Find the probability that (i) Both are white (ii) First is red and second is white.	[10M]								
3	OR A rundom variable X has the following probability function 7 7 7 7 7 7 7 7	[10M]								
	$P(x) = 0$ K $2K = 2K = 3K = K^2 = 2K^2 = 7K^2 + K$									

(i)Determine K (ii) Mean (iii) Variance.





- $\sum x = 125, \sum x^{2} = 650, \sum y = 100, \sum y^{2} = 460, \sum xy = 508 \text{ are the results [10M]}$ obtained in calculating correlation coefficient of x, y of 25 pairs. Later it is found that two pairs of x and x (8, 12) that two pairs of x and y (8, 12) and (6, 8) are wrongly noted as (6, 14) and (8, 6) respectively. Obtain correct value of correlation coefficient.
- The regression equations of two variables x and y are 3x + 2y 26 = 0, 6x + y 31 [10M] = 0 find the correlation 5 = 0 find the correlation coefficient between x and y.

A random sample of size 81 was taken whose variance is 20.25 and mean is 32, [10M] 6 construct 95% confidence interval.

OR

A population consists of 5, 10, 14, 18, 13 and 24. Consider all possible samples of [10M] sizes two which can be drawn without replacement from the population. Find (i) The mean of the population (ii) The standard deviation of the population (iii) The mean of the sampling distribution of means (iv) The standard deviation of sampling distribution of means.

SECTION-IV

A random sample of 10 bags of pesticide is taken whose weights are 50, 49, 52, [10M] 8 44, 45, 48, 46, 45, 49, and 45 (in kgs). Test whether the average packing can be taken to be 50 kgs.

OR

It is claimed that a random sample of 49 tyres has a mean life of 15200km. This [10M] 9 sample was drawn from a population whose mean is 15150kms and a standard deviation of 1200km. Test the significance at 0.05 level.

SECTION-V

A toll gate is operated on a frequency where cars arrive according to a poisson [10M] 10 distribution with mean frequency 1.2 cars/min the time of completing payment follows an exponential distribution with mean of 20 seconds. find(i)the idle time of the counter (ii) average number of cars in the system (iii) average number of cars in the queue (iv) average time that a car spends in the system (v) average time that a car spends in the queue.

OR

Explain stochastic matrix, Regular matrices with examples. Explain about 11 [10M] Classification of Stochastic Processes.





R 20

Max Marks: 70

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING PROBABILITY AND STATISTICS (COMMON FOR ALL DATASCIENCE,CYBER SECURITY,IOT)

B. Tech II Year I Semester Examinations

(MODEL PAPER - I)

Time: 3 hours

Note: Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

5I No		Course	Blooms Taxonomy
1	SECTION-IA random variable has the following probability function x 01234567 $P(x)$ 0K2K2K3KK ² 2K ² 7K ² +KFind i)k ii)P(X<6) iii) P(X>6) iv)) find'c' if P(X≤c)>1/2[14]	CO1	L1
2	(OR) For the following bivariate (two dimensional) probability distribution of X and Y find i) P (X ≤ 2,Y=2) ii) $F_X(2)$ iii) P(Y=3) iv) P(X < 3,Y ≤ 4) v) $F_Y(3)$ [14]		
	1 0.1 0 0.2 0.1 2 0.05 0.12 0.08 0.01 3 0.1 0.05 0.1 0.09		
3	The average number of phone calls /minute coming into a switch board between 2pm and 4pm is 2.5.Determine the probability the probability that one particular minute there will be i) 4 or fewer ii) more than 6 calls [14]	CO2	L5/L1
	(OR)		
4	Suppose the weights of 800 male students are normally distributed with 28.8kg and SD of 2.06 kg. Find the number of students whose weights are i)Between 28.4 kg and 30.4kg ii) more than 31.3 kg Edit with WPS Office [14]		

			11/15
5	SECTION – IIIFind the Karl-Pearson's coefficient of correlation for the paired data:Wages1001011021009997989695102Cost of living98999995929594909197		L1/L5
	b) If θ is the angle between two regression lines and S.D of Y is twice the S.D of X and r =1.25, find tan θ .	CO3	
	[/+/] (OR)		
6	The heights of mothers and daughters are given in the following table. From the two tables of regression estimate average height of daughter when the height of the mother is 64.5 inches		
	Height of mother6263646465666870[14]Height of daughter6465616967687165		
7	SECTION – IV a) A sample of size 64 and mean70 were taken from a population whose standard deviation is 10.Construct 95% confidence interval for the mean. b) Explain about (i) Null hypothesis (ii) Type I and Type II errors (iii) Alternative hypothesis. [7+7] (OR)	CO4	L3/L2/L1
8	In a study of automobile insurance a random sample of 80 body repair costs had a mean of Rs.472.36 and S.D of Rs.62.35. If x is used as point estimate to the true average repair costs,with what confidence we can assert that the maximum error doesn't exceed Rs.10 b) Explain the procedure for Testing of Hypothesis. [7+7]		
0	SECTION - V		
ש	i ne tollowing are the average weekly losses of worker hours due to accidents in		
	10 industrial plants before and after a certain safety programme was put into	CO5	L4/L3
	operation: Before 45 73 46 124 33 57 83 34 26 17		
	After 36 60 44 119 35 51 77 29 24 11		
	lest whether the safety programme is effective in reducing the number of accidents at		
	5%LOS. [14]		
10	(OR) A survey of 320 families with 4children each revealed the following		
10	distribution.		

Number of boys	5	4	3	2	1	0	
Number of girls	0	1	2	3	4	5	
Number of families	14	56	110	88	40	12	
			1.10	100			
Is the result consiste	nt wi	th tl	he hy	potl	hesi	is th	່ າat



R 20

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (COMMON FOR ALL DATASCIENCE,CYBER SECURITY,IOT)

B. Tech II Year I Semester Examinations OPERATING SYSTEMS (MODEL PAPER - I)

Time: 3 hours

Max Marks: 70

Note: Question paper Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

SI No		Course Outcomes	Blooms Taxonomy
1	SECTION-IA random variable has the following probability function x 01234567 $P(x)$ 0K2K2K3K K^2 $2K^2$ $7K^2 + K$	CO1	L1
	Find i)k ii)P(X≤6) iii) P(X>6) iv)) find'c' if P(X≤c)>1/2 [14] (OR)		
2	For the following bivariate (two dimensional) probability distribution of X and Y find i) P (X \leq 2,Y=2) ii) $F_x(2)$ iii) P(Y=3) iv) P(X \leq 3,Y \leq 4) v) $F_y(3)$ [14]		
	X/Y 1 2 3 4 1 0.1 0 0.2 0.1 2 0.05 0.12 0.08 0.01 3 0.1 0.05 0.1 0.09		
	SECTION – II		
3	The average number of phone calls /minute coming into a switch board between 2pm and 4pm is 2.5.Determine the probability the probability that one particular minute there will be i) 4 or fewer ii) more than 6 calls [14]	CO2	L5/L1
	(OR)		
4	Suppose the weights of 800 male students are normally distributed with 28.8kg and SD of 2.06 kg. Find the number of students whose weights are i)Between 28.4 kg and 30.4kg ii) more than 31.3 kg [14]		
	Edit with WPS Office		

5	SECTION – III Find the Karl-Pearson's coefficient of correlation for the paired data: Wages 100 101 102 100 99 97 98 96 95 102 Cost of living 98 99 95 92 95 94 90 91 97		L1/L5
6	 b) If θ is the angle between two regression lines and S.D of Y is twice the S.D of X and r =1.25, find tanθ. [7+7] (OR) 	CO3	
0	The heights of mothers and daughters are given in the following table. From the two tables of regression estimate average height of daughter when the height of the mother is 64.5 inches		
	Height of daughter 64 65 61 69 67 68 70 [14]		
7	a) A sample of size 64 and mean70 were taken from a population whose standard deviation is 10.Construct 95% confidence interval for the mean. b) Explain about (i) Null hypothesis (ii) Type I and Type II errors	CO4	L3/L2/L1
	(iii) Alternative hypothesis		
	[/+/] (OR)		
8	In a study of automobile insurance a random sample of 80 body repair costs		
	had a mean of Rs.472.36 and S.D of Rs.62.35. If x is used as point estimate to		
	the true average repair costs, with what confidence we can assert that the		
	maximum error doesn't exceed Rs.10		
	b) Explain the procedure for Testing of Hypothesis. [7+7]		
	SECTION – V		
9	The following are the average weekly losses of worker hours due to accidents		
	in	COF	11/12
	10 industrial plants before and after a certain safety programme was put into	000	L4/ LJ
	operation:		
	Before 45 73 46 124 33 57 83 34 26 17		
	Atter 36 60 44 119 35 51 77 29 24 11		
	Test whether the safety programme is effective in reducing the number of		
	accidents at		
	5%LUS. [14]		
	(UR)		
10	A survey of 320 families with 4children each revealed the following		
	distribution.		
	Number of boys 5 4 3 Ma Italiuwith WPS Office		

Number of girls	0	1	2	3	4	5		
Number of families	14	56	110	88	40	12		
Is the result consisten equally popular?	t wi	th tł	ne hy	potl	hesi	s th	at male and female births are	



Code No: R15A0024-161 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution - UGC, Govt, of India)



(Autonomous Institution – UGC, Govt. of India)

B.Tech. III Semester Regular Examinations, NOV 2016 PROBABILITY AND STATISTICS



Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A (25 Marks)

- 1.
- 2, a) What are the measures of central tendency?
- 3 b) If A and B are both random events. $P(\overline{A})=2/3$, $P(A \cup B)=3/4$, $P(A \cap B)=1/4$. Find $P(A \cap \overline{B})$.
- 3 c) A typist makes on average 2 mistakes per page. What is the probability of a particular page having no errors on it?
- 2_d) State any two properties of two regression coefficients.
- 2e) What is a standard error of an estimate?
- 3 f) Explain the terms: (i) Statistical Hypothesis (ii) Types of errors.
- 3 g) What are the applications of student t- distribution?
- 2 h) State the properties of Chi-square distribution.
- 3 i) What are the characteristics of a Queue?
- 2 j) Define Markov chain.

PART – B SECTION-I

(50 marks)

- 32. a) State and Prove addition law of Probability for two events.
 - b) A factory production line is manufacturing bolts using three machines, A, B and C. Of the total output, machine A is responsible for 25%, machine B for 35% and machine C for the rest. It is known from previous experience with the machines that 5% of the output from machine A is defective, 4% from machine B and 2% from machine C. A bolt is chosen at random from the production line and found to be defective. What is the probability that it came from,(i).machine A (ii) machine B (iii) machine C?

OR

- 5 3. a) A random variable X has the following probability distribution
 - X:01234567P(x):0k2k2k3kk22k27k2+kFind (i) constant k(ii) $P(X \le 6)$ (iii) $P(X \ge 6)$ (iv) find 'c' if $P(X \le c) > 1/2$.5b) X is a normally distributed with mean $\mu = 30$ and SD $\sigma = 4$. Find (i) P(x < 40)(ii) P(30 < x < 35).





SECTION -II

6 4.a) Obtain the correlation coefficient to the following data

X	65	66	67	67	60	160	70	72
Y	67	68	65	60	08	72	69	71
T. 1.	-1			00	112	12	107	

b) Explain the concept of repeated ranks. 4

5

4

6

OR

- 5. a) Explain the fitting procedure of line of regression Y on X.
 - b) For a set of 10 pairs of values of x and y, the regression line of x on y is x 2y + 12 = 0; mean and standard deviation of y being 8 and 2 respectively. Later it is known that a pair (x = 3, y = 8) was wrongly recorded and the correct pair detected is (x = 8, y = 3). Find the correct regression line of x on y.

SECTION -III

3 6.a) Explain the procedure of a hypothesis testing problem.

b) The mean lifetime of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. If μ is the mean lifetime of all the bulbs produced by the company, test the hypothesis $\mu = 1600$ hours against the alternative hypothesis $\mu \neq 1600$ hours using a 5% level.(Table value=1.96)

- 7. a)The means of two large samples of 1000 and 2000 items are 67.5 cms and 68.0cms 5 respectively. Can the samples be regarded as drawn from the population with standard deviation 2.5 cms. Test at 5% level of significance.(Table value=1.96)
- b) In a sample of 1000 people in a state, 540 are rice eaters and the rest are wheat eaters. 5 Can we assume that both rice and wheat eaters are equally popular in this state at 1% level of significance? (Table value=2.58)

SECTION -IV

- 7 8. a) sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance. (Table value=2.262)
- b) Explain the test procedure for paired t-test for means 3

CIR

- 9. A survey of 320 families with 5 children each, revealed the following distribution. Is the 3 result consistent with the hypothesis that male and female births are equally probable at 0.01 significance level?(table value=12.832)
 - 5 No. of Boys: 0 1 2 3 No. of Girls: No. of families: 14 56 110 88 40 12

SECTION -V

10 a) What are the measures of queuing model $(M/M/):(\infty/FCFS)$

b) In railway marshalling yard goods trains arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows an exponential distribution and service time distribution is also exponential with an average 36 minutes. Calculate: (i) The mean queue size (ii) The probability that the queue length exceeds 10.

OR

- (0 11. A gambler has Rs.2. He bets Rs.1 at a time and wins Rs.1 with probability 0.5. He stops playing if he loses Rs.2 or wins Rs.4.
 - i) What is the transition probability matrix of the related Markov chain?
 - ii) What is the probability that he has lost his money at the end of 5 plays?





Code No: R15A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B. Tech I Semester Regular/Supplementary Examinations, November 2017

Probability and Statistics

	(CSE, IT)	1977 - 1980
Roll No		
Contraction of the second second		

Time: 3 hours

Max. Marks: 75

R15

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART-A

(25 Marks)

(a) What are the measures of Central tendency? 1.

(b) A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box

- at random. Find the probability that among the balls drawn there is at least one ball of each color. (c) What is principle of least square?
- (d) In a record of an analysis of correlation data, the following results are readable: Variance of X = 9; Regression equations: 8X-10Y+66 = 0 and 40X-18Y = 214. Find the mean values of X and Y.

Han the state of the weather lies.

- (e) Define sampling distribution.
- (f) What are the types of errors in testing of hypothesis?
- (g) State applications of student t- distribution.
- (h) Write all the properties of Chi-square distribution.
- (i) What are the characteristics of a queue in queuing system?
- (j) Write a short note on stochastic process.

PART - B

(50 Marks)

SECTION-I

- 2. a) State and prove addition law of probability for two events
 - b) In a bolt factory machines A1, A2, A3 manufacture respectively 25%, 35% and 40% of the total output. Of these 5, 4, and 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine A_2 .

(OR)





SECTION - II

4. Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):

X:65 66 67 67 68 69 70 72 Y:67 68 65 68 72 72 69 71

(OR)

5. Fit a linear regression equation of Y on X to the following data:

X: 58764Y: 34521

SECTION - III

6. A sample of 900 members has a mean 3.4 cms and s.d 2.61 cms. Is the sample drawn from a large population of mean 3.25 cms and s.d 2.61 cms? 5% level.

(OR)

7. In a sample of 1000 people in a state, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat eaters are equally popular in this state at 1% level of significance?

SECTION - IV

if there o there is at les.

- 8. A sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance.
 Subscreen students game (I.G)
 (OR)
- 9. A survey of 320 families with 5 children each, revealed the following distribution. Is the result consistent with the hypothesis that male and female births are equally probable at 0.01 significance level?

No. of Boys	:	5	4	3	2	1	0
No. of Girls	:	0	1	2	3	4	5
No. of familie	s:	14	6	110	88	40	12

SECTION - V

10. A television repairman finds that the time spent on his jobs an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they came in, and if the arrival of sets follows a poisson distribution approximately with an average rate of 10 per 8-hour daily, what is the repairman's expected idle time each day? How many jobs are a head of the average set just brought in?

(OR)

11. Explain Markov chain by an example.







Code No: R15A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester supplementary Examinations, May 2017

Probability and Statistics



Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

PART - A

(25 Marks)

1. a Define classical definition of probability.

b. A box contains 6 red, 4 white and 5 black balls. A person draws 4 balls from the box at Find the probability that among the balls drawn there is at least one ball of each random. color.

c. What is angle between two regressions lines?

d. Explain the term Regression.

_e. Define sampling distribution.

A. Explain (1) Type-I-error (2) Type-II-error.

g. Write a short note on Chi-square test.

h. Obtain 95% confidence interval for mean with n = 16, 400, x = 3.42, s = 0.68. (table value=2.947)

i. What is a waiting line?

j. Define Markov processes.

PART – B

(50 marks)

SECTION-I

2. a) Two persons A and B appeared for an interview for a job. The probability of selection of A is 1/3 and that of B is 1/2. Find the probability that (i) both of them will be selected (ii) only one of them will be selected (iii) none of them will be selected

b) State Baye's theorem.

OR

3. a) The diameter of an electric cable assumed to be a continuous r.v with the p.d.f $f(x) = 6x(1 - x), 0 \le x \le 1$. Check that f(x) is p.d.f, and find b such that P(x < b) = P(x > b) .

b) Components are packed in boxes of 20. The probability of a component being defective





SECTION -II

4.a) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y):

X:65	66	67	67	68	69	70	72
Y:67	68	65	68	72	72	69	71

b) In a record of an analysis of correlation data, the following results are readable:
 variance of X = 9; Regression equations: 8X-10Y+66 = 0 and 40X-18Y = 214.
 Find (i) the mean values of X and Y
 (ii) The correlation of X is the transformed of X and Y

(ii) The correlation coefficient between X and Y and

(iii) The standard deviation of Y

OR

5. The following are midterm and final examination test scores for 10 students from a calculus class, where x denotes the midterm score and y denotes the final score for each student. X: 68 87 75 91 82 77 86 82 75 79

Y: 74 79 80 93 88 79 97 95 89 92

Calculate the least-squares regression lines for these data.

SECTION -III

- . a) Discuss the test procedure for testing single mean of the population when size of the
 - sample is large.

- b) The mean lifetime of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. If μ is the mean lifetime of all the bulbs produced by the company, test the hypothesis $\mu = 1600$ hours against the alternative hypothesis $\mu \neq 1600$ hours using a 5% level.(Table value=1.96)

OR

7. a) Test the significance of the difference between the means of the samples from the following data:

	Sample A	Sample B	
Size of sample	100	150	
Mean	50	51	

- Standard deviation 4 5 (Table value=1.96)
- b) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of theproposal are same at 5% level.



SECTION -IV

8. a) sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance. (Table value=2.262)

b) Explain the test procedure for t-test for difference of population means.

OR

9. Fit a Poisson distribution to the following data and test the goodness of fit at 0.05 levels:

rto. or acoracinto.	Ĭ	Ċ	2	5		5	Ŭ
No. of days :	150	65	45	34	10	6	2
		S	ECT	TION	-V		

10 a) What are the characteristics of queuing model $M/M/1:\infty/FCFS$

b) A single server queuing system with Poisson input, exponential service times. Suppose the mean arrival rate is 3 calling units per hour, the expected service time is 0.25 hours and the maximum permissible number calling units in the system is two. Calculate the expected number in the system.

OR

11. a) Define Markov chain. Give examples.

b) Explain about limiting distribution of a Markov chain.

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R15

Code No: R15A0024 MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution - UGC, Govt. of India)

II B. Tech I Semester Supplementary Examinations, May 2018

Probability and Statics





Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B

Part A is compulsory which carriers 25 marks and Answer all questions.

Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

*** PART – A

(25 Marks)

- 1. (a) Define Random variable? (2M)
 - (b) A problem in statistics is given to three students A, B and C, whose chances of solving it are respectively.1/2, 1/3 and 1/4. What is the probability that the problem will be solved? (3M)
 - (c) What are the normal equations to fit a straight line equation? (2M)
 - (d) From the following data, compute the coefficient of correlation between X and Y. (3M)

X Series Y Series

No. of Items

Sum of squares of deviations from mean: 136 138 Sum of products of deviations of X and Y from their means : 122

(e) Define standard error of an estimate. (2M)
(f) Explain types of errors in tests of significance? (3M)
(g) State applications of Chi-square distribution. (2M)
(h) Write all the properties of t- distribution. (3M)
(i) What is a queue in queuing system? (2M)
(j) Write a short note on Markov chain. (3M)
PART - B

(50 Marks)

SECTION-I

2. a) State Baye's theorem. (3M)
b). A random variable X has the following probability function. (7M)
X 0 1 2 3 4 5 6 7
P(X) 0 k 2k 2k 3k k2 2k2 7k2+k
Find (i) k (ii) E(x)

3. X is a normally distributed with mean $\mu = 30$ and SD $\sigma = 4$. Find a) P(x < 40) b) P(x > 21)





SECTION - II

4. Find the spearman rank correlation coefficient to the following data: (10M)

X: 11 12 43 84 15 Y: 8 15 30 60 12 (OR)

5. Estimate the production for the year 2008, by fitting regression line to the following data:

(10M)

Year:	2003	2004	2005	2006	2007	
Production:	5	8	14	12	13	
(in thousand Qt).						

SECTION - III

6. The means of two large samples of 1000 and 2000 items are 67.5 cms and 68.0cms respectively. Can the samples be regarded as drawn from the population with standard deviation 2.5 cms. Test at 5% level of significance.. (10M)

(OR)

7. A random sample of 500 apples was taken from a large consignment and 60 were found bad. Obtain the 98% confidence limits for the percentage of bad apples in the consignment. (given z = 2.33) (10M)

SECTION - IV

- 8. Fit a Poisson distribution to the following data and test the goodness of fit: (10M) No. of accidents: 0 1 2 3 4 5 6 No. of days : 150^{221} 65 2145 and 34 10 6 2.
- A sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance. (10M)

SECTION - V

10. What are the characteristics of a queuing system explain them in detail? (10M) (OR)
 11. Explain stochastic processes in detail. (10M)





Code No: R17A0024 **R17** MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution - UGC, Govt. of India) II B. Tech I Semester Regular Examinations, November 2018 **Probability and Statistics** (CSE& IT) Roll No Time: 3 hours Max. Marks: 70 This question paper Consists of 5 Sections. Answer FIVE Questions, Choosing ONE Question from Note: each SECTION and each Question carries 14 marks. SECTION-I a) Average number of accidents on any day on a national highway is 1.8. Determine the [7M] probability that number of accidents are At least one **(I)** (II) Atta most one Four coins are tossed 160 times. The number of times X heads occurs is given below [7M] b) Х 0 2 3 4 No of times 8 34 69 43 6 Fit the binomial distribution for the above data OR A random variable X has the following probability distribution [7M] a) х -3 6 9 P(X=x) 1/6 1/2 1/3 [7M] Find (1) Mean and variance (2) Find E[Y], Var[Y], given that Y=2X+1. b) A r.v X is a normally distributed with mean 30 and SD 5. Find the probabilities that (i) $26 \le 10^{-10}$

1

2

X	≤40	(ii) X	≥ 45	•				
the state of the second		• •				5	SECTION-II	
a)7]	Fit a li	пеаг ге	gressi	on eq	uatio	on of	Y on X to the following data:	7M]
	X:	5	8	7	6	4		
	Y:	3	4	5	9	. : 1		
b) Fin	d the	spearm	an rar	k con	relat	ion co	befficient to the following data:	[7M]
0,11	X.	1	1 12	4	13	84	15	
	v.	8	15		30	60	12	
	1.	°	15				OR	
a)In a rec Regressio 40X-18Y and (iii) T b) Calcula	ord of n = 214 The standard of the standa	an ana ations: . Find ndard e corre	alysis 8X-1((i) the deviat lation)Y+6 mea ion o coef	6 = 0 n val f Y ficien) and ues o nt for	f X and Y (ii) The correlation coefficient between X and Y the following heights (in inches) of fathers (X) and their	[7M]
sons (Y):			10	60	70	72	1**	
X:65 6	6 67	67.	68	09	10	71		
Y:67 6	8 65	68	72	12	69	11	SECTION III	
		1.2.1			2		SECTION-III	IAM
a) E	xplain	in brie	ef one	taile	d and	i two	tailed tests	[4114]
b) A re	rando	om san bly reg	ple o	f 400 as a	sam	lents ple fr	om a large population with mean height 171.38 cms. Can it be	[5M]

standard deviation 3.30 cms. (Test at 5% level of significance

c) A random sample of 500 apples was taken from a large consignment and 60 were found



bad. Obtain the 98% confidence limits for the percentage of bad apples in the consignment

Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis [14M] that proportions of men and women in favour of the proposal are same at 5% level.

SECTION-IV

A sample of 10 boys has the I.Q's 70, 120, 110,101, 88, 83, 95, 98, 107 and 100. Test the mean I.Q of the students is 100 at 0.05 level of significance. [14M]

OR Fit a Poisson distribution to the following data and test the goodness of fit: No. of accidents: 0 2 3 5 No. of days 0 150 65 : 45 34 10 2 6 SECTION-V

What are the measures of queuing model M/M/1: N/FCFS.

b A self service canteen employs one cashier at its counter. 8 customers arrive per every 10 minutes on an average. The cashier can serve on average one per minute. Assuming that arrivals are Poisson and the service time distribution is exponential. Determine

i) The average number of customers in the system

ii) The average queue length

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iii) The average time a customer spends in the system iv) Average waiting time of each customer.

[14M]

[14M]

[5M]

OR

a)Define Markov chain. Give examples. b) Explai about limiting distribution of a Markov chain









g h i	Write prop Write appl Write the t	erties of ications	f chi-sq of t-dis queue d	uare dist tribution iscipline	ribution	•					[2M] [3M] [2M] [3M]
J	If $p = \frac{1}{2}$, q	$=\frac{1}{2}, z$	= 1, a =5	00, then PA	$\frac{d_z}{RT-B}$	50 MA	RKS)				
	A problem it are, 1/2,	in stati 3/4, and	tics is g 1 ¼ resp	iven to t ectively	SEC he three What i	s the pr	ts A,B, obabili	C, whose ty that th	e chances o e problem	of solving is solved?	[10M
	Fit a binom	al dist	ibution	to the fo	llowing	data					[10M
			0	1	2	3	4	3	6. P		
		· A	38	144	342	287	164	25			
	Calculate the	f	38 ation co	144 efficien	342 SECT t for the	287 <u>ION-I</u> follov	164 I ving hei	25 ights (in	inches) of	fathers (x)	[10]
(8	Calculate the	f correl s(y):	38 ation co	144 efficien	342 SECT t for the	287 ION-I follov	164 I ving hei	ights (in	inches) of	fathers (x)	[10]

OR

5 The two regression lines are 7x - 16y + 9 = 0 and 5y - 4x - 3 = 0. Find the coefficient of [10M correlation and the means of x and y.





SECTION-III

The mean height of students in a college is 155 cms. and standard deviation is 15. [10M] What is the probability that the mean height of 36 students is less than 157 cms. OR

7 In a sample of 500 from a village in Telangana, 280 are found to be rice eaters and the [10M] rest wheat eaters. Can we assume that both articles are equally popular?

SECTION-IV

[10M] A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is unbiased. Use a 0.05 Level of significance.

OR

A random sample of 10 bags of pesticide are taken whose weights are 50,49,52,44,45,48,46,45,49,45 (in kgs). Test whether the average packing can be taken to be 50 kgs.

SECTION-V

- A fast food restaurant has one drive in window. It is estimated that cars arrive according to a Poisson distribution at the rate of 2 every 5 minutes and that there is enough space to accommodate a line of 10 cars. Other arriving cars can wait outside this space , if necessary. It takes 15 minutes on the average to fill an order, but the service time actually varies according to an exponential distribution . Determine the following
 - a) The probability that the facility is idle

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[10M]

[10M]





