	SRI INDU COLLEGE OF ENGG & TECH **QUESTION BANK** **(Regulation :R20)** **Department of Computer Science and Engineering(AIML)**		**Prepared on:29.9.21** **Rev1:**
	Sub. Code & Title	**(R20MTH2104) Mathematical and Statistical Foundations**	
	Academic Year: 2021-22	**Year/Sem./Section**	**II-I**
	Faculty Name & Designation	**Y.SRINIVAS, ASST.PROFESSOR**	

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

(1. Remembering 2. Understanding 3. Applying 4. Analyzing 5. Evaluating 6. Creating)

UNIT I

PART A

	1 MARK QUESTIONS	BT LEVEL	COURSE OUTCOME
1	Define Greatest Common Divisor.	1	CO1
2.	Find the greatest common factor of 15 and 35.	5	CO1
3.	Find the greatest common divisor for the set of integers 5, 25, 75.	5	CO1
4.	State Fundamental Theorem of Arithmetic.	1	CO1
5.	Find the prime factorization of 515.	5	CO1
6.	Express in terms of divisibility a ≡ b (mod m).	2	CO1
7.	Find the least nonnegative residue modulo 13 of -100.	5	CO1
8	Find an inverse modulo 17 of 5.	5	CO1
9	State Chinese Remainder Theorem.	1	CO1
10	Find an inverse modulo 5 for the matrix $\begin{bmatrix}2 & 2\\1 & 2\end{bmatrix}$	5	CO1

PART B

10 MARKS QUESTIONS

1	Show that the greatest common divisor of the integers a and b that are not both zero, is the least positive integer that is a linear combination of a and b.	4	CO1
2	State and Prove Fundamental Theorem of Arithmetic.	1	CO1
3	If c and d are integers and c = dq + r then (c , d) = (d , r).	3	CO1
4	Show that if p is a prime and a is an integer with p | a^2, then p | a.	4	CO1
5	Show that all the powers in the prime-factor factorization of an integer n are even if and if n is a perfect square	4	CO1
6	Prove that the relation “Congruence mod m” is an equivalence relation.	2	CO1
7	Solve the linear congruence of a) 17x ≡ 14(mod 21) b) 128x ≡ 833(mod 1001)	3	CO1

8	Solve the following system of congruences $x \equiv 2 \pmod{9}$ $x \equiv 8 \pmod{15}$ $x \equiv 10 \pmod{25}$.	3	CO1
9	Find the solutions of the following systems of linear congruences $2x + 3y \equiv 5 \pmod{7}$ $x + 5y \equiv 6 \pmod{7}$	5	CO1
10	How many incongruent solutions does each of the following systems of congruences have $2x + y + z \equiv 1 \pmod{5}$ $x + 2y + z \equiv 1 \pmod{5}$ $x + y + 2z \equiv 1 \pmod{5}$	5	CO1

UNIT II

PART A

	1 MARK QUESTIONS	**BT LEVEL**	**COURSE OUTCOME**
1.	What is the formula for An unbiased estimate of s^2?	1	CO2
2.	Write any two properties of least squares estimators.	2	CO2
3.	what are the normal equations for straight line ?	1	CO2
4.	Define the probability.	1	CO2
5.	what are the axioms of probability ?	2	CO2
6.	Find the probability of getting a sum of 10 if we throw two dies.	5	CO2
7.	What is the probability that a card is drawn at random from the pack of cards may be either king or queen.?**(P&S BR-16,March 2021)**	5	CO2
8	Write the mean, variance and standard deviation of a discrete probability distribution.	5	CO2
9	Define Binomial distribution and mean of binom0ial distribution.	1	CO2
10	Write the recurrence relation of Poisson distribution.	1	CO2
11.	A fair coin is tossed until a head or five tails occurs. Find the expected number of tosses of the coin. **(BR18-october-2020)**	5	CO2

PART B

10 MARKS QUESTIONS

1	From a sample of 200 pairs of observation the following quantities were calculated $\sum X=11.34$, $\sum Y=20.78$, $\sum X^2=12.16$, $\sum Y^2=84.96$,$\sum XY=22.13$from the above data compute the regression coefficients of the equation Y= $\alpha+\beta$X	5	CO2
2.	The grade of class of 9 students on a midterm report (x) and on the final examination(y) are as follows	5	CO2

X	77	50	71	72	81	94	96	99	67
Y	82	66	78	34	47	85	99	99	68

i) estimate the linear regression line ii) estimate the final examination grade of a student who received a grade of 85 on the midterm report

<table>
<tr><td>3.</td><td>In the following table S is weight of potassium bromide which will dissolve in 100 grms. of water V^0 c. Estimate α and β for the linear regression curve $\mu_{Y/x} = \alpha+\beta x$ ii)find the point estimate of $\mu_{Y/30}$</td><td>5</td><td>CO2</td></tr>
<tr><td>4.</td><td>Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box, what is the probability that they are both of same color?</td><td>1</td><td>CO2</td></tr>
<tr><td>5.</td><td>In a bolt factory machines A, B, C manufacture 29% , 30% and 50% of the total of their output and 6%,3% and 2% are defective. A bolt is drawn at random and found to be</td><td>1</td><td>CO2</td></tr>
<tr><td>6.</td><td>A random variable X has the following probability function :
<table>
<tr><td>$X = x$</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>$P(X = x)$</td><td>0</td><td>K</td><td>K</td><td>K</td><td>K</td><td>K^2</td><td>$2K^2$</td><td>$7K^2+K$</td></tr>
</table>
(i) Determine the value of K
(ii) Evaluate $P(X<6), P(X \geq 6)$ and $P(0<x<5)$
If $P(X \leq K) > \frac{1}{2}$, find the minimum value of K. **(BR18-october-2020)**</td><td>5</td><td>CO2</td></tr>
<tr><td>7.</td><td>If the probability density of a random variable is given by
$f(x) = K(1 - x^2);\ 0 < x < 1$ and $f(x) = 0\ otherwise$
Find the value of ‘K’ and the probabilities that a random variable will take on a value i) between 0.1 and 0.2 ii) greater than 0.5</td><td>5</td><td>CO2</td></tr>
<tr><td>8</td><td>The mean and variance of a binomial variable X with parameters n and p are 16 and 8. Then find P(X≥1) and P(X>2).</td><td>5</td><td>CO2</td></tr>
<tr><td>9</td><td>If X is Poisson variate such that, 3P(x=4) = 0.5 P(x=2) + P(x=0) then find the men of X and P(x≤2).</td><td>1</td><td>CO2</td></tr>
<tr><td>10</td><td>If 2% of light bulbs are defective, Find (i) At least one is defective (ii) Exactly 7 are defective (iii) P(1<x<8) in a sample of 100.</td><td>5</td><td>CO2</td></tr>
<tr><td>11</td><td>A,B,C are aiming to shoot a balloon. A will succeed 4 times out of 5 attempts. The chance of B to shoot the balloon is 3 out of 4 and that of C is 2 out of 3. If the three aim the balloon simultaneously, then find the probability that at least two of them hit the balloon.
Two digits are selected at random from the digits 1 through 9.
i) If the sum is odd, what is probability that 2 is one of the numbers selected?
ii) If 2 is one of the digits selected, what is the probability that the sum is odd?
(BR-18,sept 2021)</td><td></td><td></td></tr>
</table>

UNIT III

PART A

	1 MARK QUESTIONS	BT LEVEL	COURSE OUTCOME
1.	Define normal distribution.	1	CO3
2.	Write any three characteristics of the normal distribution?	1	CO3
3	What is the standard error of the statistic sample mean?	1	CO3
4.	Find the equation of normal distribution if the μ=5 S.D=2.	5	CO3
5	The marks of 5 students in one subject are 45,47,49,61,48 and mean of the population is 52.then t value ?	5	CO3
6.	What is sampling.?	1	CO4

7	If 36 size of sample mean and standard deviation are 157, 15 and population mean is 155 then z is?	5	CO4
8.	What the central limit theorem.	1	CO4
9.	How many different samples of size two can be chosen, from a finite population of size 25?	2	CO4
10.	What is finite population correction factor if n=5 and N=200.	1	CO4
11.	A population consists of five numbers 2,3,6,8 and 11. Consider all possible samples of size which can be drawn without replacement from this population. Find the standard deviation of sampling distribution of means.**(BR-16-December-2018)**	4	CO3
	PART B		
	10 MARKS QUESTIONS		
1	Give the Applications of normal distribution.	2	CO3
2.	In a Normal distribution 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution.	1	CO3
3.	The marks obtained in mathematics by 1000 students is normally distributed with mean 78% and standard deviation 11%.Determine (i) How many students got marks above 90% (ii) What is the highest mark obtained by the lowest 10 % of the students Within what limits did the middle of 90 % of the students lie. **(BR-18,October-2020)**		
4.	In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5, Assuming the distribution to be normal, find a) How many students score between 12 and 15? b) How many score above 18 c) How many score below 18	1	CO3
5	If X is a normal variate, find the area A I. to the left of $z = -1.78$ II. to the right of $z = -1.45$ III. Corresponding to $-0.8 \le z \le 1.53$ **IV.** to the left of $z = -2.52$ and to the right of $z = 1.83$	1	CO3
6.	A random sample of size 100 is taken from an infinite population having the mean μ=76 and variance 256. What is the probability that x will be between 75 and 78.	1	CO3
7	A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from this population. Find a. The populations mean. b. The population standard deviation. c. The mean of the sampling distribution of means. d. The standard deviation of the sampling distribution of means. **(BR-18,October-2020)**	1	CO4
8.	Find the probability that out of 100 patients between 84 and 95 inclusive will survive a heart-operation given that the chances of survival is 0.9.	5	CO4
9.	Explain briefly chi- square distribution.	2	CO4
10.	Explain briefly t-distribution.	2	CO4

<table>
<tr><td>11.</td><td>Explain briefly F – distribution.</td><td>2</td><td>CO4</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><th colspan="4">UNIT IV</th></tr>
<tr><th colspan="4">PART A</th></tr>
<tr><th colspan="2">1 MARK QUESTIONS</th><th>BT LEVEL</th><th>COURSE OUTCOME</th></tr>
<tr><td>1.</td><td>Define an unbiased estimator.</td><td>1</td><td>CO5</td></tr>
<tr><td>2.</td><td>Define point estimation and interval estimation.</td><td>1</td><td>CO5</td></tr>
<tr><td>3.</td><td>What is the formula for sample size for estimating population mean?</td><td>1</td><td>CO5</td></tr>
<tr><td>4.</td><td>What is the formula to calculate maximum error of estimate E?</td><td>1</td><td>CO5</td></tr>
<tr><td>5.</td><td>What is the formula for Bayesian interval for μ</td><td>1</td><td>CO5</td></tr>
<tr><td>6.</td><td>Define maximum likelihood estimation function.</td><td>1</td><td>CO5</td></tr>
<tr><td>7</td><td>Write the test statistic for single mean.</td><td>5</td><td>CO5</td></tr>
<tr><td>8</td><td>Write the test statistic for difference of two means.</td><td>5</td><td>CO5</td></tr>
<tr><td>9</td><td>Write the test statistic for single proportion.</td><td>5</td><td>CO5</td></tr>
<tr><td>10</td><td>Write the test statistic for difference of two proportions.</td><td>5</td><td>CO5</td></tr>
<tr><th colspan="4">PART B</th></tr>
<tr><th colspan="4">10 MARKS QUESTIONS</th></tr>
<tr><td>1.</td><td>. To compare two kinds of bumper guards, 6 of each kind were mounted on a car and then the car was run into a concrete well. The following are the costs of repair.
<table>
<tr><td>Guard I</td><td>107</td><td>148</td><td>123</td><td>165</td><td>102</td><td>119</td></tr>
<tr><td>Guard II</td><td>134</td><td>115</td><td>112</td><td>151</td><td>133</td><td>129</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Use 0.01 level of significance to test whether the difference between two sample means (BR-18,March-2021)</td><td>5</td><td>CO5</td></tr>
<tr><td>2.</td><td>What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence.</td><td>2</td><td>CO5</td></tr>
<tr><td>3.</td><td>Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14.</td><td>5</td><td>CO5</td></tr>
<tr><td>4.</td><td>A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs,487 with a standard deviation Rs.48. With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502 ?</td><td>1</td><td>CO5</td></tr>
<tr><td>5.</td><td>Explain the procedure of testing of hypothesis.</td><td>2</td><td>CO5</td></tr>
<tr><td>6.</td><td>A sample of 900 members has a mean of 3.4cms and S.D 2.61cm. Is this sample has been taken from a large population with mean 3.25cm If the population is normal and its mean is unknown, test the hypothesis and also find the 95% confidence limits of true mean.</td><td>4</td><td>CO5</td></tr>
<tr><td>7.</td><td>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 the mean IQ of 75 with a S.D of 15, in the second group there are 250 students having the mean IQ of 70 with S.D of 20.</td><td>4</td><td>CO5</td></tr>
<tr><td>8</td><td>The samples of students were drawn from two universities and from their weights in kilograms, means and standard deviations are calculated below. Make a large sample test to test the significance of the difference between the means.
<table>
<tr><th></th><th>Size of sample</th><th>Means</th><th>S.D's</th></tr>
<tr><td>University A</td><td>400</td><td>55</td><td>10</td></tr>
<tr><td>University B</td><td>100</td><td>57</td><td>15</td></tr>
</table></td><td>5</td><td>CO5</td></tr>
<tr><td>9</td><td>In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that the both rice and wheat are equally popular in this state at 1% level of significance?</td><td>4</td><td>CO5</td></tr>
<tr><td>10</td><td>In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from two</td><td>4</td><td>CO5</td></tr>
</table>

	populations?		

UNIT V

PART A

1 MARK QUESTIONS		BT LEVEL	COURSE OUTCOME
1.	Define State space and parameter space.	1	CO6
2.	Define stochastic process.	1	CO6
3.	What are the formulae for the measure of Gambler's ruin in biased and unbiased cases?	1	CO6
4.	Define the Markov process.	1	CO6
5.	Define the Stochastic matrix.	1	CO6
6.	What are the properties of stochastic matrix?	1	CO6
7.	What is the condition for the regular and non-regular matrices?	1	CO6
8.	Classify the stochastic process.	2	CO6
9.	What is the formula for expected duration of the game?	1	CO6
10	Define the ergodicity?	1	CO6

PART B

10 MARKS QUESTIONS

1	Find expected duration of the game (d_z) if $p={}^1/_3$, $q={}^1/_2$, $z=1$ and $a=1000$.	5	CO6
2	Ashok bought a share of stock for \$10, and it is believed that the stock price moves (day by day) as a simple random walk with p = 0.55. a) What is the probability that Ashok's stock reaches the high value of \$15 before the low value of \$5? b) What is the probability that Ashok will become infinitely rich? **(BR-18,March-2021**)	2	CO6
3.	Which of the following are regular matrices? $i)\begin{pmatrix}0 & 0 & 1\\ \frac{1}{2} & 0 & \frac{1}{2}\\ 0 & 1 & 0\end{pmatrix}$ ii) $\begin{pmatrix}\frac{1}{2} & \frac{1}{4} & \frac{1}{4}\\ 0 & 1 & 0\\ \frac{1}{2} & 0 & \frac{1}{2}\end{pmatrix}$ $iii)\begin{pmatrix}\frac{1}{2} & \frac{1}{2} & 0\\ \frac{1}{2} & \frac{1}{2} & 0\\ \frac{1}{4} & \frac{1}{4} & 0\end{pmatrix}$	1	CO6
4.	A fair die is tossed repeatedly. If X_n denotes the maximum of the numbers occurring in the first n tosses , Find the transition probability matrix P of the markov chain $\{X_n\}$. Find also P^2 and $P(X_2 = 6)$ **(BR-18-March2021)**	3	CO6
5.	Which of the following are stochastic matrices? $\begin{pmatrix}1 & 0\\ \frac{1}{2} & \frac{1}{2}\end{pmatrix} ii) \begin{pmatrix}½ & -\frac{1}{2}\\ \frac{1}{4} & \frac{3}{4}\end{pmatrix} iii) \begin{pmatrix}\frac{1}{3} & \frac{2}{3} & \frac{4}{3}\\ \frac{1}{2} & 1 & \frac{1}{2}\end{pmatrix}$	3	CO6
6.	The transition probability matrix (t p m) is given as follows. is the matrix irreducible? $\begin{pmatrix}0.3 & 0.7 & 0\\ 0.1 & 0.4 & 0.5\\ 0 & 0.2 & 0.8\end{pmatrix}$		CO6

7.	A training process considered as a two state Markov chain. If it rains, it is considered to be in state **'0'** and it does not rains 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. **.(BR-16-December-2018)**	5	CO6
8.	Three boys A, B and C are throwing a ball to each other. A always throw the ball to B and B always throws the ball to C: but C is just as likely to throw the ball to B as to A. Show that the process is the Markov chain. Find the transition matrix and classify the states.	5	CO6
9.	The transition probability matrix (t p m) of a markov chain$\{ X_n \}$1,2,3,…… having three states 1,2, and 3 is P =$\begin{pmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{pmatrix}$And the initial distribution is,P^0 = [0.7, 0.2, 0.1] Find (i) P$\{ X_2=3 \}$ (ii) P$\{ X_3=2 , X_2=3 , X_1=3 , X_0=2 \}$	1	CO6
10	Explain briefly about the stochastic matrix and the Markov process.	2	CO6

MID-1 MODEL PAPER

BR-20 **D4**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - I Mid Term Examinations (Model paper)

(R20MTH2104) MATHEMATICAL AND STASTICAL FOUNDATION

(COMMON TO AIML,CS&DS)

Duration: 90Mins **Max Marks: 25M**

Section – A

Answer *All* the questions **5Qx1M = 5M**

1. Find the greatest common factor of 15 and 35.
2. State Chinese Remainder Theorem.
3. What are the normal equations for straight line ?
4. Write the recurrence relation of Poisson distribution.
5. What is the standard error of the statistic sample mean?

Section – B

Answer any *FOUR* questions **4Qx5M = 20M**

1. Show that if a,b and c are integers with (a,b)=(a,c)=1 then (a,bc)=1.
2. Prove that if (a,m)=1 then the linear congruence ax ≡ b (mod m) has a unique solution
3. From a sample of 200 pairs of observation the following quantities were calculated ∑X=11.34, ∑Y=20.78, ∑X2=12.16, ∑Y2=84.96,∑XY=22.13from the above data compute the regression coefficients of the equation Y= $\alpha+\beta$X.
4. If X is Poisson variate such that, 3P(x=4) = 0.5 P(x=2) + P(x=0) then find the men of X and P(x≤2).
5. Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box, what is the probability that they are both of same colour.
6. In a Normal distribution 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution

MID-II MODEL PAPER

BR-20 **SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY** **D4**

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - II Mid Term Examinations (Model paper)

(R20MTH2104) MATHEMATICAL AND STATISTICAL FOUNDATIONS

(COMMON TO AIML,CS&DS)

Duration: 90Mins **Max Marks: 25M**

Section – A

Answer *All* the questions **5Qx1M = 5M**

1. What the central limit theorem
2. Define point estimation and interval estimation.
3. Write the test statistic for difference of two proportions
4. Define the Markov process.
5. Define the ergodicity?

Section – B

Answer any *FOUR* questions **4Qx5M = 20M**

1. Find the probability that out of 100 patients between 84 and 95 inclusive will survive a heart-operation given that the chances of survival is 0.9
2. A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs,487 with a standard deviation Rs.48. With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502 ?
3. Explain the procedure of testing of hypothesis.
4. In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from two populations?
5. Three boys A, B and C are throwing a ball to each other. A always throw the ball to B and B always throws the ball to C: but C is just as likely to throw the ball to B as to A. Show that the process is the Markov chain. Find the transition matrix and classify the states.
6. Explain briefly about the stochastic matrix and the Markov process.

R20

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)Recognized under 2(f) and 12(B) of UGC Act 1956

II B.Tech - I Semester –End Examinations (Model paper)

(R20MTH2104) MATHEMATICAL AND STATISTICAL FOUNDATIONS

(COMMON TO AIML,CS&DS)

Duration: 3 Hrs **Max Marks: 70M**

Answer *All* the following questions **Marks: 5Qx4M = 20M**

1. Show that if a,b and c are integers with (a,b)=(a,c)=1 then (a,bc)=1.
2. If X is Poisson variate such that, 3P(x=4) = 0.5 P(x=2) + P(x=0) then find the men of X and P(x≤2).
3. Explain briefly t-distribution
4. Explain about Null hypothesis & Alternative hypothesis.
5. Which of the following are regular matrices?

$$i)\begin{pmatrix} \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ 0 & 1 & 0 \\ \frac{1}{2} & 0 & \frac{1}{2} \end{pmatrix} \qquad ii)\begin{pmatrix} \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{2} & \frac{1}{2} & 0 \\ \frac{1}{4} & \frac{1}{4} & 0 \end{pmatrix}$$

Answer *All* the following questions **Marks: 5Qx10M = 50M**

6. How many incongruent solutions does each of the following systems of congruence have

i) 2x + y + z ≡ 1 (mod 5)

ii) x + 2y + z ≡ 1 (mod 5)

iii) x + y + 2z ≡ 1 (mod 5)

(or)

7. **Show that the greatest common divisor of the integers a and b that are not both zero, is the least positive integer that is a linear combination of a and b.**
8. If the probability density of a random variable is given by

$$f(x) = K(1 - x^2); \quad 0 < x < 1$$
$$0 \quad otherwise$$

Find the value of 'K' and the probabilities that a random variable will take on a value i) between 0.1 and 0.2 ii) greater than 0.5

(or)

9. .In a bolt factory machines A, B, C manufacture 29% , 30% and 50% of the total of their output and 6%,3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A (ii) Machine B (iii) Machine C.
10. If X is a normal variant, find the area A
    a. to the left of z = -1.78
    b. to the right of z = -1.45
    c. Corresponding to -0.8 ≤ z ≤ 1.53
    d. to the left of z = -2.52 and to the right of z = 1.83

(or)

11. Consider all the samples of size 2 are taken from population 3,6,9,15,27 with replacement. Then find

i)The populations mean.
ii)The population standard deviation.
iii)The mean of the sampling distribution of means.
iv)The standard deviation of the sampling distribution of means.

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

(or)

13. A sample of 900 members has a mean of 3.4cms and S.D 2.61cm. Is this sample has been taken from a large population with mean 3.25cm If the population is normal and its mean is unknown, test the hypothesis and also find the 95% confidence limits of true mean.

14. A training process considered as a two state Markov chain. If it rains, it is considered to be in state **'0'** and it does not rains 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.

(or)

15. The transition probability matrix (t p m) of a markov chain{ X_n} 1,2,3,…… having three states 1,2, and 3 is P =$\begin{pmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{pmatrix}$And the initial distribution is,

P^0 = [0.7, 0.2, 0.1] Find (i) P{ X_2=3 } (ii) P{ X_3=2 , X_2=3 , X_1=3 , X_0=2 }