SRI Y.N.COLLEGE(Autonomous), Narsapur
Affiliated to Adikavi Nannayya University
Thrice accredited by NAAC with 'A' Grade
Recognized by UGC as 'College with potential for Excellence'
I B.Sc Statistics (for 2019-2022 batch, w.e.f 2017-18)
Paper I, Syllabus for I semester

Descriptive Statistics And Probability

Unit – I (10 Marks-2,5 Marks-2)

Introduction to Statistics: Concepts of Primary and Secondary data. Methods of collection and editing of primary data, Secondary data. Designing a questionnaire and a schedule. Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean.

Unit - II(10 Marks-3,5 Marks-2)

Measures of dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation. Descriptive Statistics - Central and Non-Central moments and their interrelationship. Sheppard's correction for moments. Skewness and kurtosis.

Unit - III(10 Marks1-,5 Marks-1)

Introduction to Probability: Basic Concepts of Probability, random experiments, trial, outcome, sample space, event, mutually exclusive and exhaustive events, equally likely and favorable outcomes. Mathematical, Statistical, axiomatic definitions of probability. Conditional Probability and independence of events.

Unit - IV(10 Marks-2,5 Marks-2)

Probability theorems: Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorems and problems based on Baye's theorem.
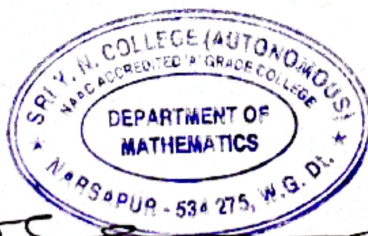
Unit - V(10 Marks-2,5 Marks-1)

Random variable: Definition of random variable, discrete and continuous random variables, functions of random variable. Probability mass function. Probability density function, Distribution function and its properties. Bivariate random variable - meaning, joint, marginal and conditional Distributions, independence of random variables.

Note:

MS-Excel methods to be made mandatory for all the Semesters after proper training only to the teaching staff by the University concerned.

Prescribed Books:

1. B.Sc Statistics-Paper-I : DVLN Jogi Raju, C Srikala, LP Raj Kumar, Kalyan Publications,2014.
2. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
3. BA/BSc I year statistics - descriptive statistics, probability distribution - Telugu Academy – Dr M.Jaganmohan Rao,Dr N.Srinivasa Rao, Dr P.Tirupathi Rao, Smt.D.Vijayalakshmi.
4. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI

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of Mathematics
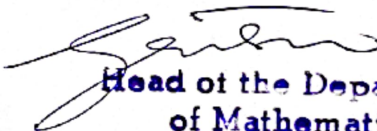SRI Y. N. COLLEGE
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Reference books:

1. Willam Feller: Introduction to Probability theory and its applications. Volume –I, Wiley
2. Goon AM, Gupta MK, Das Gupta B : Fundamentals of Statistics , Vol-I, the World Press Pvt.Ltd., Kolakota.
3. Hoel P.G: Introduction to mathematical statistics, Asia Publishing house.
4. M. JaganMohan Rao and Papa Rao: A Text book of Statistics Paper-I.
5. Sanjay Arora and Bansi Lal: New Mathematical Statistics: Satya Prakashan , New Delhi
6. Hogg Tanis Rao: Probability and Statistical Inference. 7th edition. Pearson.
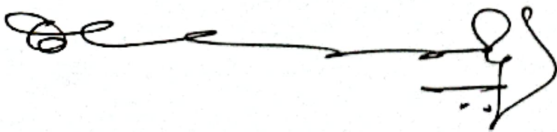
Practicals

Conduct any 6 (Ms -excel is compulsory)

1. Computation of mean, median and mode.
2. Computation of quartile deviation.
3. Computation of mean deviation
4. Computation of Standard deviation.
5. Non-central moments and central moments, Sheppard corrections & Skewness based on moments and Kurtosis
6. MS-Excel methods for the above Serial numbers 1,2,3,4.

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C.Q.(ఉపాధ్యా) A. Deepthi

B.S.

Time: 3Hrs.

Max. Marks:75

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

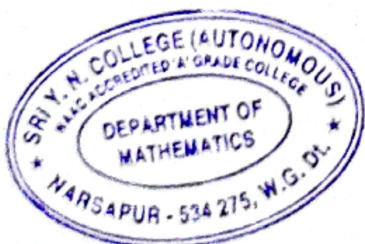|	
Unit - I	: 2 questions
Unit - II	: 2 questions
Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 1 question

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.

SECTION-A

Unit - I	: 2 questions
Unit - II	: 3 questions

SECTION-B

Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

Head of the Department
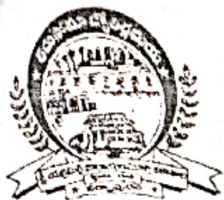of Mathematics
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A.Deepthi

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1 B.Sc. Statistics – Paper 1

Descriptive Statistics And Probability

Model Question Paper (Theory) (for 2019-22 batch w. e. f 2017-2018)

Max Marks: 75

Time: 3Hrs

PART-I

5x5M =25M

Answer any FIVE Questions, each question carries FIVE marks.

1. Distinguish between primary and secondary data.
2. Find the Geometric mean to the following data.

X	110	115	118	119	120
f	4	11	21	6	2

3. Calculate Quartile deviation to the following data

Class interval	10-20	20-30	30-40	40-50	50-60
Frequency	5	10	15	10	5

4. Prove that limits of Bowley's Coefficient of skewness is -1 to +1.
5. Explain mutually exclusive and exhaustive events.
6. Two cards are drawn from a well shuffled pack of 52 cards. Find the Probability that they are (i) two aces (ii) a king and a queen
7. A problem is given to three students A,B & C whose chances of solving it are ½, ¾ and ¼ respectively. What is the probability that the problem will be solved if all of them try independently.
8. A random variable X as the following probability function :

X	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

(i) Find K , (ii) Evaluate $P(X < 6)$, $P(X \geq 6)$ and $P(0 < X < 5)$

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section. Each question carries 10 marks.

5x10M = 50M

SECTION – A

9 . Calculate Arithmetic Mean to the following data

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	12	18	27	20	17	6

10. Explain different methods of Primary Data Collection.
11. Calculate Standard Deviation to the following data.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students	2	3	5	6	4	1

12 . Find Karl Pearson's co efficient of Skewness to the following data

Class interval	0-2	2-4	4-6	6-8	8-10	10-12	12-14
Frequency	6	8	17	21	15	11	2

13. The first four movements of distribution about the value 4 of the variable are -1.5, 17, -30 and 108. Find the movements about mean, β_1, β_2. Also find movements about origin.

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SECTION-B

14 Define the following with examples
  (a) Sample Space   (b) Random Experiment
  (c) Favourable Outcomes   (d) Equality likely outcomes

15. Explain Multiplication theorem on probability for n events.

16. State and prove Bayes theorem.

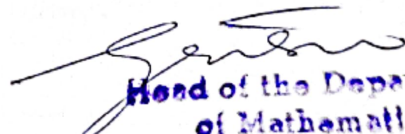17. A continuous random variable X as the Probability Density Function (p.d.f.).

$$f(x) = \begin{cases} \dfrac{1}{16}(3+x)^2, & -3 \leq x \leq -1 \\ \dfrac{1}{16}(6-2x^2), & -1 \leq x \leq 1 \\ \dfrac{1}{16}(3-x)^2, & 1 \leq x \leq 3 \end{cases}$$

  (i)   Verify that area under the curve is unity
  (ii)   Find the mean and variance.

18. Define Bivariate Random Variable. Joint distribution of X and Y is given by
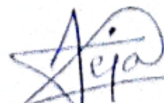$$f(x,y) = 4xy$$

Test whether X and Y are independent. For the above joint distribution, find the conditional density of X given Y=y.
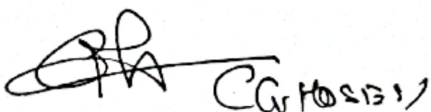
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I B.Sc Statistics (for 2019-2022 batch, w.e.f 2017-18)
Paper II, Syllabus for II semester

MATHEMATICAL EXPECTATION AND PROBABILITY DISTRIBUTIONS

Unit-I (10 Marks-2,5 Marks-2)

Mathematical expectation: Mathematical expectation(ME)of random variable and function of a random variable. Moments and covariance using mathematical expectation with examples. Addition and Multiplication theorems on expectation. Definitions of M.G.F, C.G.F, P.G.F, C.F. its properties. Chebyshev and Cauchy –Schwartz and inequalities

Unit-II (10 Marks-2,5 Marks-2)

Discrete Distributions : Binomial and Poisson distributions, their definitions , 1st to 4 central moments, M.G.F, C.F, C.G.F, P.G.F, mean, variance, additive property if exists. Possion approximation to Binomial distribution.

Unit-III (10 Marks-2,5 Marks-1)

Negative Binomial, Geomertric, Hyper Geometric Distributions –Definitions , means , variances, M.G.F , C.F, C.G.F, P.G.F, reproductive property if exists. Binomial approximation to Hyper Geometric distribution , Poisson approximation to Negative Binomial distribution

Unit-IV (10 Marks-2,5 Marks-1)

Continuous Distributions: Rectangular, Exponential, Gamma, Beta distributions of two kinds. Other properties such as mean, variance, M.G.F, C.G.F, C.F, reproductive property.

Unit-V(10 Marks-2,5 Marks-2)

Normal Distribution: Definition, Importance, properties, M.G.F, Additive property, Interrelation between Normal & Binomial, Normal & Poisson distribution . Cauchy Distribution.
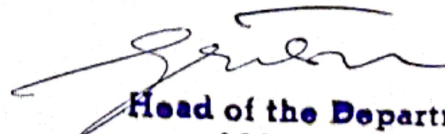
Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, S Chand & Sons, New Delhi.

2. BA/BSc I year-Descriptive Statistics, Probability Distribution –Telugu Academy-
   Dr. M. Jaganmohan, Dr N.Srinivasa, Dr P Tirupathi Rao , Smt.D.Vijayalakshmi

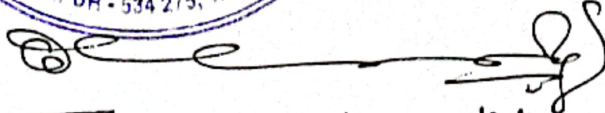3. K.V.S. Sarma: Statistics Made. Simple: Do it yourself on PC. PHI
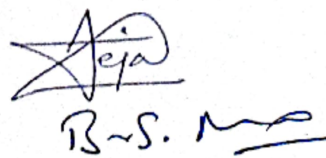
Reference books:

1. .Willam Feller : Introduction to Probability theory and its applications, Volume–I, Wiley

2. Goon AM, Gupta MK, Das Gupta -I,B : Fundamentals Statistics, Volume – I, The World Press Pvt.Ltd., Kolakota.

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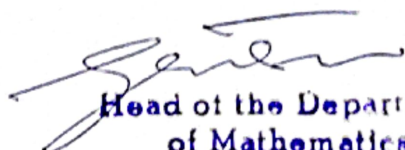
G. Mohan   A. Deepthi   B~S.

Practicals

Conduct any 6 (Ms Excel is compulsory)

1. Fitting of Binomial Distribution – Recurrence relation method.
2. Fitting of Poisson Distribution – Recurrence relation method.
3. Fitting of Negative Binomial Distribution.
4. Fitting of Geometric Distribution.
5. Fitting of Normal Distribution – Areas methods.
6. Fitting of Normal Distribution – Ordinates methods.
7. MS Excel methods for the above serial numbers 1 and 2

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SEMESTER-II
BLUE PRINT

Time: 3Hrs.   Max. Marks:75

PART-I(5 x 5 = 25 M)
Answer any FIVE Questions, each question carries FIVE marks.

Unit - 1	: 2 questions
Unit - II	: 2 questions
Unit - III	: 1 question
Unit - IV	: 1 question
Unit - V	: 2 questions

PART-II(5 x 10 M= 50 M)
Answer any FIVE questions. Choosing atleast TWO questions from each section.
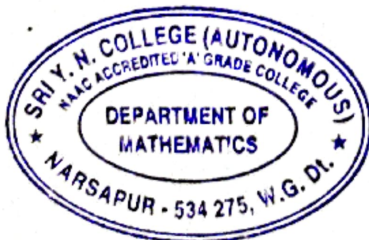
Each question carries 10 marks.

Note : Under Section –A (Q. No: 13) and Section – B (Q. No: 14) will be given from UNIT-III

SECTION-A

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit – III	: 1 question

SECTION-B

Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

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A. Deepthi

B.S. Rao

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1 B.Sc. Statistics – Paper II
MATHEMATICAL EXPECTATION AND PROBABILITY DISTRIBUTIONS
Model Question Paper (Theory) (for 2019-22 batch w. e. f 2017-2018)

Time: 3Hrs   Max Marks: 75

PART-I
Answer any FIVE Questions, each question carries FIVE marks.   5x5M =25M

1. State and prove Cauchy – Schwartz inequality.
2. Define Moment generating function. Prove that M.G.F of the sum of n independent random variables is equal to the product of their respective M.G.Fs
3. Derive the additive property of Binomial Distribution.
4. Derive the Moment Generating Function of Poisson Distribution.
5. Derive and explain the Negative Binomial Distribution.
6. Derive the M.G.F and Characteristic function of Rectangular Distribution.
7. Write the important properties of Normal Distribution.
8. Define and explain the Cauchy Distribution.

PART-II
Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.   5x10M = 50M

SECTION – A

9. Define Characteristic function. State and prove Chebyshev's inequality.
10. State and prove Addition theorem of Expectation.
11. Derive the M.G.F , Mean & Variance of Binomial Distribution.
12. Derive the Poisson Distribution as a limiting case of Binomial Distribution.
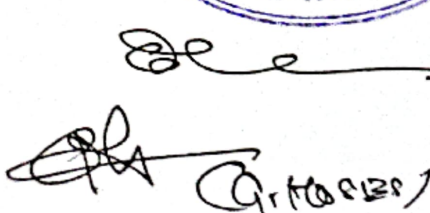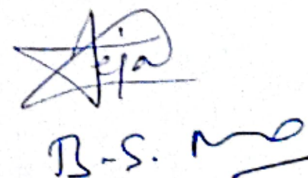13. Define Geometric Distribution. Derive its Mean , Variance & M.G.F.

SECTION-B

14. Define Hyper Geometric Distribution. Obtain Binomial Distribution as a limiting case of Hyper Geometric Distribution.
15. Define Gamma Distribution. Derive its M.G.F, Mean & Variance.
16. Define Exponential Distribution. Find its M.G.F, Mean & Variance.
17. Prove that a linear combination of independent normal variates is also a normal variate.
18. Define Normal Distribution and also find out M.G.F., , Mean & Variance of Normal Distribution.

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II B.Sc Statistics (for 2018-2021 batch, w.e.f 2018-19)
Paper III, Syllabus for III semester

STATISTICAL METHODS

Unit-I (10 Marks-2,5 Marks-2)

Correlation: Def.,scatter diagram ,its coefficient and its properties., scatter diagram, computation of correlation coefficient for ungrouped data. spearman's rank correlation coefficient, properties of spearman's correlation coefficients and problems.

Unit-II (10 Marks-2,5 Marks-2)

Regression: simple linear regression, properties of regression coefficients. Regression lines. Concept of Correlation ratio, partial and multiple correlation coefficients, correlation verses regression and their problems.

Unit –III (10 Marks-2,5 Marks-1)

Curve fitting: Method of least square - Fitting of linear, quadratic, Exponential and power curves and their problems.

Unit-IV (10 Marks-2,5 Marks-2)

Attributes : Introduction, Nature, and consistency and mention its conditions. Independence and association of attributes, co-efficient of association, coefficients of contingency and their problems.

Unit –V (10 Marks-2,5 Marks-1)

Exact sampling distributions: Concept of population, Parameter, random sample, statistic, sampling distribution, standard error. Statement and Properties of χ^2, t, F distributions and their interrelationships.
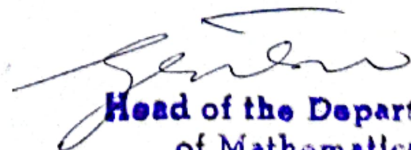
Text books

1. BA/BSc II year statistics - statistical methods and inference - Telugu Academy by A.Mohanrao, N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C. Ravichandra Kum.

2. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

3. Fundamentals of Mathematics statistics: VK Kapoor and SC Guptha.

Reference Books:

1. Outlines of statistics, Vol II : Goon Guptha, M.K.Guptha, Das Guptha B.
2. Introduction to Mathematical Statistics : Hoel P.G.

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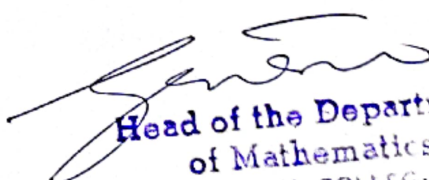NARSAPUR - 534 27

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Practicals

Conduct any 6 (Ms -exel is compulsory)

1. Fitting of straight line.
2. Fitting of exponential curves.
3. Fitting of power curve.
4. Computation of correlation coefficient & Fitting of Regression lines.
5. Rank correlation coefficient.
6. Computation of Contingency coefficients.
7. MS-Excel methods any for the Serial Numbers 1,2,4,5.

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B.S.

Max. Marks:75

Time: 3Hrs.

PART-I(5 x 5 = 25 M)

Answer any FIVE Questions, each question carries FIVE marks.

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 1 question

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14) will be given from UNIT-III.

SECTION-A

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit - III	: 1 question

SECTION-B

Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

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(Cordinator) A.Deepthi

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II B.Sc Statistics (for 2018-2021 batch, w.e.f 2018-19)
Statistical Methods
Model Question Paper (Theory) (for 2017-20 batch w. e. f 2018-2019)

Time: 3Hrs   Max Marks: 75

PART-I
Answer any FIVE Questions, each question carries FIVE marks.   5x5M =25M

1. Explain the types of Correlation.
2. Explain the difference between Correlation Analysis and Regressive Analysis.
3. Explain the method of Least Squares.
4. Explain the independence of attributes .
5. Explain the concept of Standard Error.
6. The ranks of 10 students in Maths & Statistics are as follows.

M	3	6	4	2	1	7	10	9	5	8
S	1	7	4	5	6	8	9	3	2	10

   Calculate the rank Correlation Coefficient between two given subjects.
7. Calculate the regression equation of Y on X for the following data.

X	6	2	10	4	8
Y	9	11	5	8	7

8. Examine the consistency of the following data.
   N = 1000, (A) = 525 , (B) = 312 , (C) = 470, (AB) = 42 , (BC) = 86, (AC) = 147 &
   (ABC) = 25

PART-II
Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.   5x10M = 50M

SECTION – A
9. Define Correlation Coefficient. Derive the limits for Correlation coefficient are ± 1.
10. State and prove the Edward Spearman's Rank Correlation Coefficient.
11. Define Regression Coefficients. Derive the Regression Coefficients are not affected
    by the change of origin but affected by the change of Scale.
12. Explain Partial and Multiple Correlation Coefficients.
13. How do you fit a straight line using the principle of least squares?

SECTION-B
14. Explain the fitting of an exponential Curve.
15. Derive the relation between Coefficient of association (Q) and Coefficient of
    Colligation (Y).
16. Explain the conditions for consistency of three attributes.
17. Derive the relationship between F and χ^2 distributions.
18. Define and explain the χ^2, t and F distributions.

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II B.Sc Statistics (for 2018-2021 batch, w.e.f 2018-19)
Paper IV, Syllabus for IV semester

STATISTICAL INFERENCE

Unit-I (10 Marks-2,5 Marks-2)

Theory of estimation: Estimation of parameter, criteria of a good estimator- unbiasedness, consistency, efficiency , sufficiency and Statement of Neyman's factorization theorem. Estimation of parameters by the methods of moments and maximum likelihood (M.L), properties of MLE's. Binomial, Poisson & Normal Population Parameters estimate by ML method. Confidence intervals of the parameters of normal population.

Unit-II (10 Marks-2,5 Marks-2)

Concepts of Statistical hypothesis: Null and alternative hypothesis, critical region, two types of errors, level of significance , power of a test, 1 tailed, 2 tailed tests, Neymann-Pearson's lemma. Examples in of Binomial, Poisson , Normal distributions.

Unit-III (10 Marks-2,5 Marks-2)

Large Sample Tests: Large sample tests for single mean, two means, Single proportion . Two proportions, Standard Deviation of single and double samples and Fisher's Z transformation.

Unit-IV (10 Marks-2,5 Marks-1)

Small sample tests: Tests of significance based on $\chi 2$, t and F. $\chi 2$-test for test for independence of attributes, t – test for single, double ad paired tests, variance ration test (F-test).

Unit-V (10 Marks-2,5 Marks-1)

Non-parametric tests – advantages and disadvantages. Two sample run test, Two sample Median test and Two sample sign test.

TEXT BOOKS

1. BA / BSc II Year statistics – stastical methods and inference – Telugu Academy by A. Mohanrao, N.Srinivasa Rao, Dr R.Sudhakar Reddy, Dr T.C.Ravichandra Kumar.
2. K.V.S.Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

REFERENCE BOOKS:

1. Fundamentals of Mathematics Statistics: VK Kapoor and SC Guptha.
2. Outlines of Statistics, Vol II: Goon Guptha, M.K.Guptha, Das Guptha B.
3. Introduction to Mathematical Statistics : Hoel P.G.

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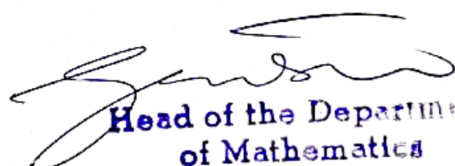SRI Y. N. COLLEGE
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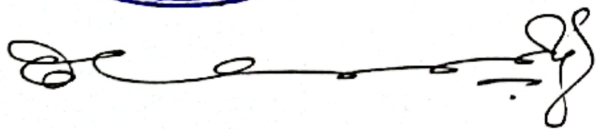CG.MOSES A.Deepthi

Practicals Semester – IV

Conduct any 6 (Ms-excel is compulsory)

1. Large sample tests for mean(s).
2. Large sample tests for proportion(s).
3. Large sample tests for standard deviation(s).
4. Large sample tests Fisher's Z-transformation.
5. Small sample tests for Single and Doublet – test
6. Small sample tests for Paired t – test.
7. F – Test.
8. Chi square test for independence of attributes .
9. Non – parametric tests – run test.
10. Non – parametric tests – median test.
11. Non parametric tests – sign tests.
12. MS-Excel methods for the above Serial Numers 1,2,3,4.(any one of above).

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B-S.

Time: 3Hrs.   Max. Marks:75

PART-I(5 x 5 = 25 M)
Answer any FIVE Questions, each question carries FIVE marks.

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit - III	: 2 questions
Unit - IV	: 1 question
Unit - V	: 1 question

PART-II(5 x 10 M= 50 M)
Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note: Under SECTION-A (Q.NO:13) & SECTION-B (Q.NO:14) will be given from UNIT-III.
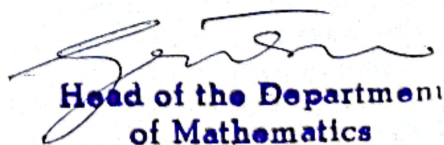
SECTION-A

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit - III	: 1 question

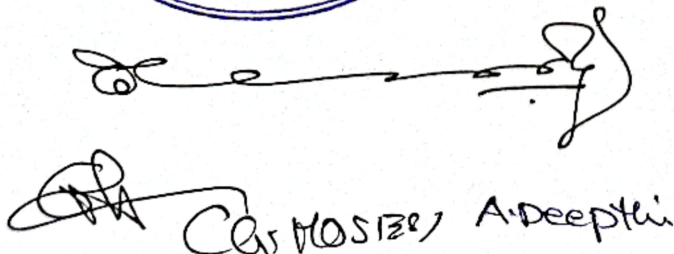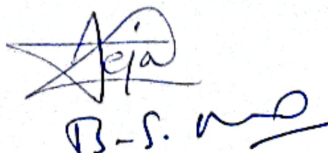### SECTION-B

Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

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II B.Sc Statistics (for 2017-2020 batch, w.e.f 2018-19)

Statistical Inference
Model Question Paper (Theory) (for 2018-21 batch w. e. f 2018-2019)

Time: 3Hrs

Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks.   5x5M =25M

1. Explain the type I and type II errors.
2. Write the statement of Fisher – Neyman Factorization Theorem.
3. Explain the large sample test for single proportion .
4. Explain the paired t – test for difference of means.
5. What are the advantages of Non – parametric test.
6. Explain difference between large and small sample tests.
7. Explain the method of moments.
8. Explain One tailed and two tailed tests.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.   5x10M = 50M

SECTION – A

9. State and prove Rao – Cramer's inequality.
10. Explain the concept of Criteria of a good estimator.
11. State and prove Neyman – Pearson Lemma.
12. Explain the following.
    - (i)   Null and Alternative Hypothesis.
    - (ii)   Level of Significance.
    - (iii) Degrees of Freedom.
    - (iv)   Power of the test.
    - (v)   Critical Region.
13. Explain a large sample test for difference of two sample means.

SECTION-B

14. Explain the large sample test of significance for difference of standard deviations.
15. Explain the t – test for single mean.
16. Explain the chi – square test for the independence of attributes.
17. Explain the two sample sign test.
18. Explain the two sample median test.

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III B.Sc Statistics (for 2017-2020 batch, w.e.f 2019-20)
Paper V, Syllabus for V semester

SAMPLING TECHNIQUES & DESIGN OF EXPERIMENTS

Unit-I (10 Marks-2,5 Marks-2)

Sampling Theory: Principle steps in a sample survey, Census versus Sample survey, Sampling and Non sampling errors. Types of sampling – Subjective, Probability and mixed sampling methods.

Unit-II (10 Marks-2,5 Marks-1)

Simple Random Sampling : Meaning of samples and methods to draw, estimation of population mean, variances in SRSWR & SRSWOR, Advantages and disadvantages of these methods.

Unit-III (10 Marks-2,5 Marks-2)

Stratified Random Sampling : Proportional and optimum allocation of sample sizes in stratification. Variances of these methods. Comparison of their relative efficiencies. Advantages and Disadvantages of Stratified sampling. Concept of Systematic sampling, Advantages and Disadvantages.

Unit-IV (10 Marks-2,5 Marks-1)

Analysis of Variance: Causes of variation, statement of Cochran's theorem, One – Way with equal and unequal classifications and two way classifications.

Unit-V(10 Marks-2,5 Marks-2)

Design of Experiments: Principles of Experimentation in Designs Analysis of Completely randomized design (CRD) , Randomized block design (RBD) and Latin Square Design (LSD) , efficiency of these designs. Concept of Factorial experiments.

Text Books:

1. Telugu Academy B.A / B.Sc III year paper – III Statistics – applied statistics – Telugu Academy by Prof . K Srinivasa Rao, Dr D Giri, Dr A Anand, Dr V Papaiah Sastry.
2. KVS Sarma : Statistics Made Simple : Do it yourself in PC. PHI

Reference books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
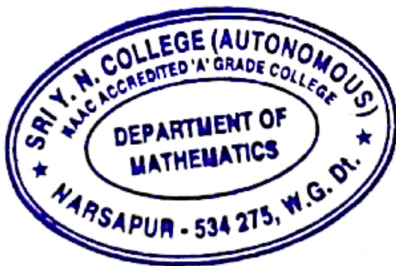2. Anuvarthita Sankyaka Sastram – Telugu Academy.

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Practicals

1. Estimation of Population mean, variance by SRSWOR
2. Estimation of Population mean, variance by SRSWR
3. ANOVA one – way classification
4. ANOVA – CRD
5. ANOVA – RBD
6. ANOVA – LSD
7. Ms – Excel methods for the about serial numbers 4,5,6 (any one)

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D.S.N

Time: 3Hrs.   Max. Marks:75

PART-I(5 x 5 = 25 M)
Answer any FIVE Questions, each question carries FIVE marks.

Unit - 1	: 2 questions
Unit - II	: 1 question
Unit - III	: 2 questions
Unit - IV	: 1 question
Unit - V	: 2 questions

PART-II(5 x 10 M= 50 M)
Answer any FIVE questions. Choosing atleast TWO questions from each section.
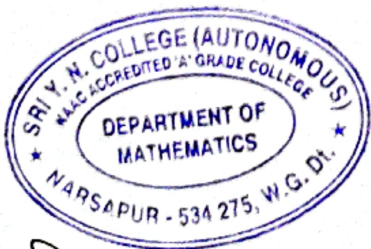
Each question carries 10 marks.
Note : Under Section –A (Q. No: 13) and Section – B (Q. No: 14) will be given from UNIT-III
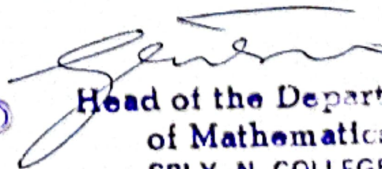
SECTION-A

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit – III	: 1 question

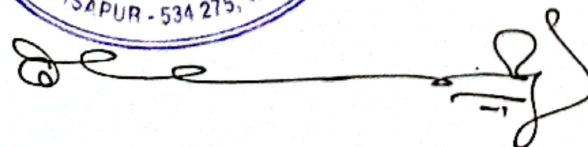### SECTION-B
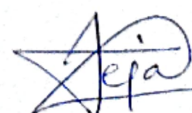
Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

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SAMPLING TECHNIQUES & DESIGN OF EXPERIMENTS

Model Question Paper (Theory) (for 2017-20 batch w. e. f 2019-2020)

Time: 3Hrs

Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks.   5x5M =25M

1. Explain the advantages of Sampling over census.
2. Show that the Sample Mean is an Unbiased estimate of the population mean in SRSWOR.
3. Explain the proportional allocation method in Stratified Random Sampling.
4. Explain ANOVA and its assumptions.
5. Explain about C.R.D.
6. Explain the Systematic Random Sampling.
7. Explain the concept of Factorial Experiments.
8. Explain Sampling and Non – Sampling errors.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.   5x10M = 50M
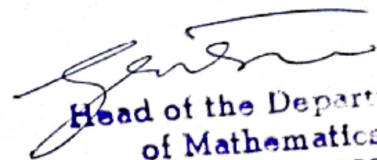
SECTION – A

9. What are the principal steps in a Sample Survey. Discuss them briefly.
10. What is the difference between Census Survey and Sample Survey.
11. Derive the Variance of the Sample mean in SRSWOR.
12. Show that the Sample mean square is an unbiased estimate of population mean square.
13. Define and explain Stratified Random Sampling. What are the advantages and disadvantages of Stratified Random Sampling.
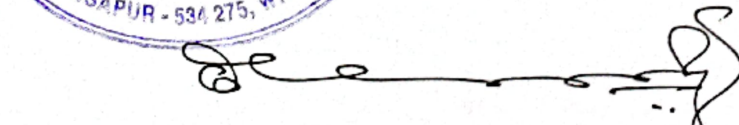
SECTION-B

14. Define Systematic Sampling and also give the advantages and disadvantages of Systematic Sampling.
15. Explain the analysis of variance of Two –Way classification and also give ANOVA 2 – way table.
16. What is meant by ANOVA 1 – way classification. Give layout and analysis for one – way classification.
17. What is Latin Square Design (L.S.D). Give the layout and analysis of a L.S.D. Discuss its merits and demerits.
18. Explain the analysis of Randomized Block Design (R.B.D).

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III B.Sc Statistics (for 2017-2020 batch, w.e.f 2019-20)
Paper VI, Syllabus for V semester

Quality and Reliability

Unit-I (10 Marks-2,5 Marks-2)

Importance of SQC in industry, statistical basis of shewart control charts, uses of control charts, control limits, natural tolerance limits and specification limits, concept of six – sigma.

Unit-II (10 Marks-2,5 Marks-2)

Variable Control Chart : Construction of mean, R, S.D, charts for variables, interpretation of control charts.

Attribute control charts – np, p charts, C chart, Interpretation of control charts.

Unit-III (10 Marks-2,5 Marks-1)

Acceptance Sampling Plans –Scope, Producer's risk and consumer's risk concepts of AQL and LTPD.

Unit-IV (10 Marks-2,5 Marks-1)

Sampling Plans: Single and double sampling plans, OC and ASN functions, Double and single Sampling plans for attributes using Binomial.

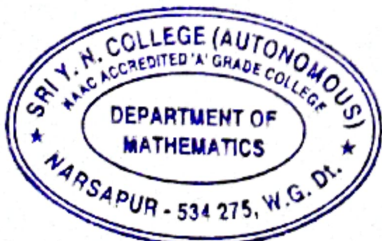### Unit-V(10 Marks-2,5 Marks-2)

Reliability : Introduction, failure rates, Hazard function, estimation of reliability, exponential distribution as life model, its memory less property
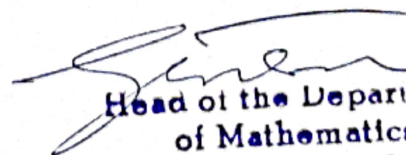
Text Books:

1. B.A / B.Sc III year paper – IV Statistics – applied statistics – Telugu Academy by Prof . K Srinivasa Rao, Dr D Giri, Dr A Anand, Dr V Papaiah Sastry

2. Fundamental of Applied Statistics : V.K.Kapoor and S.C.Gupta:

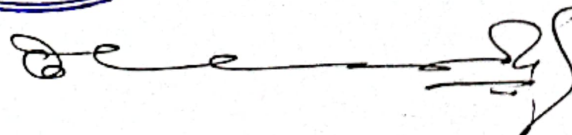3. S K Sinha : Reliability and life testing . Wiley Eastern

Reference books:

1. R C Gupta : Statistical Quality Control.

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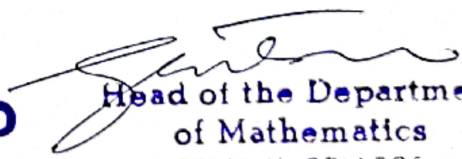SRI Y. N. COLLEGE
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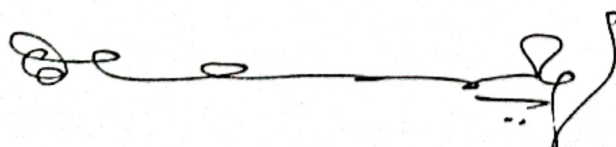## Practicals

1. Construction of $\bar{X}$, R – Charts
2. Construction of P – Charts
3. Construction of P – Chart – Variable Sample Size
4. Construction of np – Chart
5. Construction of C – Chart
6. Ms – Excel methods for the serial numbers 1.
7. Ms – Excel methods for the serial numbers 2 to 4 (any one)

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Time: 3Hrs.

Max. Marks:75

PART-I(5 x 5 = 25 M)
Answer any FIVE Questions, each question carries FIVE marks.

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit - III	: 1 question
Unit - IV	: 1 question
Unit - V	: 2 questions

PART-II(5 x 10 M= 50 M)
Answer any FIVE questions. Choosing atleast TWO questions from each section.

Each question carries 10 marks.

Note : Under Section –A (Q. No: 13) and Section – B (Q. No: 14) will be given from UNIT-III

SECTION-A

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit – III	: 1 question

SECTION-B

Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

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III B.Sc. Statistics – Paper VI

MATHEMATICAL EXPECTATION AND PROBABILITY DISTRIBUTIONS
Model Question Paper (Theory) (for 2017-20 batch w. e. f 2019-2020)

Time: 3Hrs   Max Marks: 75

PART-I
Answer any FIVE Questions, each question carries FIVE marks.   5x5M =25M
1. Explain the Process Control and Product Control.
2. Explain Standard Deviation Chart.
3. Explain need for Sampling Inspection Plan.
4. Explain Single Sampling Plan.
5. Explain Hazard Function.
6. Explain the Concept of Six – Sigma.
7. Explain Reliability Function.
8. What are the types of Control Charts.

PART-II
Answer any FIVE questions. Choosing atleast TWO questions from each section.   5x10M = 50M
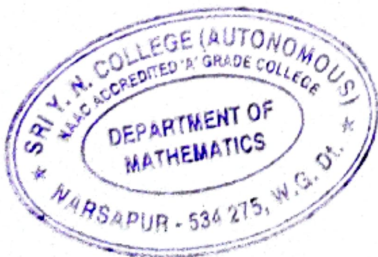**Each question carries 10 marks.**

SECTION – A

9. Discuss the importance of Statistical Quality Control in industry.
10. Explain Construction of Mean & Range Charts.
11. What are the charts for attributes. Explain np, p – charts?
12. Explain the Double Sampling Plan.
13. Define and explain AQL & LTPD.

SECTION-B

14. Explain (i) Producer's Risk (ii) Consumer's Risk
15. Explain the memory less property of Exponential Distribution.
16. Explain Reliability function and give its estimation.
17. Write the O.C and A.S.N. function for Single Sampling Plan.
18. Explain Natural tolerance limits and Specification limits.

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III B.Sc Statistics (for 2017-2020 batch, w.e.f 2019-20)
Paper VII, Syllabus for VI semester

Optimization Techniques

Unit-I (10 Marks-2,5 Marks-2)

Operations Research: Origin and development of OR., Nature and features of O.R., Scientific method and Modeling in O.R., Advantages and limitations of models, General solution methods for O.R. models.

Unit-II (10 Marks-2,5 Marks-1)

Linear Programming Problem : Definition, components, basic assumptions, Mathematical formulation of the problem, Illustrations on mathematical formulation of LPP, LPP – Graphical solution method, some exceptional cases in graphical method – alternative optima , unbounded solution and infeasible solutions.

Unit-III (10 Marks-2,5 Marks-1)

Linear Programming Problem – Simplex Method - I –General LPP – Objective function, constraints, non negative restrictions, Solution of LPP, feasible solution and optimum solution, Canonical and standard forms of LPP., Basic solution – definition, degenerate solution, basic feasible solution, associated cost vector, improved basic feasible solution, optimum basic feasible solution and net evaluation, Fundamental theorem of LPP., the computational procedure – Simplex algorithm, Simple linear programming problems.

Unit-IV (10 Marks-2,5 Marks-2)

Linear Programming Problem Simplex method – II: Artificial variable technique, The Big M method or method of Penalties, Degeneracy, Alternative optima, Unbounded solutions, Non existing or infeasible solutions
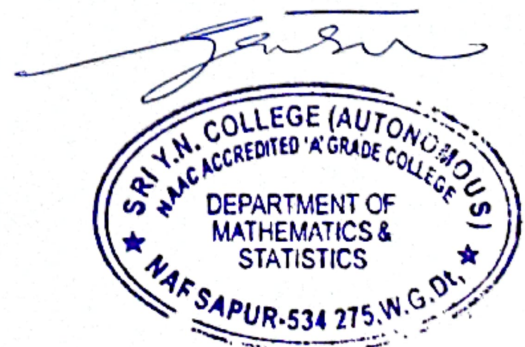
Unit-V(10 Marks-2,5 Marks-2)

Duality in Linear Programming: General Primal – Dual pair, Formulation a dual problem, Primal – Dual pair in Matrix form, Duality.

Reference books:

1. Operations Research, Kanthi Swaroop.
2. Operations Research Theory, Methods and Applications, SD Sharma.
3. Krishna's Operations Research, Dr RK Gupta.
4. Operations research : Theory and Applications, JK Sharma.
5. Operations Research : An Introduction, Hamdy A Taha.

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Practicals

1. Formulation of LPP
2. Formulation of LPP by Graphical Method (Maximization)
3. Formulation of LPP by Graphical Method (Minimization)
4. Solutions of LPP by Simplex method
5. Solutions of LPP by Big – M method
6. Solutions of LPP by using principal of duality
7. MS Excel is compulsory for serial number 2,4,6

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SEMESTER-VI
BLUE PRINT

Time: 3Hrs.

PART-I(5 x 5 = 25 M)

Max. Marks:75

Answer any FIVE Questions, each question carries FIVE marks.

Unit - I	: 2 questions
Unit - II	: 1 question
Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

PART-II(5 x 10 M= 50 M)

Answer any FIVE questions. Choosing atleast TWO questions from each section.
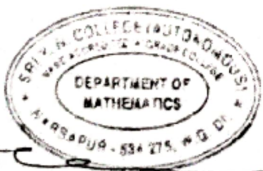Each question carries 10 marks.
Note : Under Section –A (Q. No: 13) and Section – B (Q. No: 14) will be given from UNIT-III

SECTION-A

Unit - I	: 2 questions
Unit - II	: 2 questions
Unit – III	: 1 question

SECTION-B

Unit - III	: 1 question
Unit - IV	: 2 questions
Unit - V	: 2 questions

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III B.Sc. Statistics – Paper VII
OPTIMIZATION TECHNIQUES
Model Question Paper (Theory) (for 2017-20 batch w. e. f 2019-2020)

Time: 3Hrs　　　　　　　　　　　　　　　　　　　　　　　　Max Marks: 75

PART-I

Answer any FIVE Questions, each question carries FIVE marks.　　　5x5M =25M

1. Define OR and explain the features of OR.
2. Explain the different models in OR.
3. Explain the Mathematical formulation of LPP.
4. Explain an Optimum basic feasible solution.
5. Explain degeneracy in LPP
6. Explain an unbiased solution.
7. Explain the concept of duality.
8. Explain an economic interpretation of duality problem.

PART-II

Answer any FIVE questions. Choosing atleast TWO questions from each section.
Each question carries 10 marks.　　　　　　　　　　5x10M = 50M

SECTION – A

9. Define OR and discuss the significance and scope of OR.
10. Explain the advantages and limitations of OR.
11. A company produces 3 products P.Q & R from three raw materials A,B & C. one unit of product P required 2 units of A & 3 units of B. One unit of product Q requires 2 units of B & 5 units of C. One unit of product R required 3 units of A, 2 units of B and 4 units of C. The company has 8 units of material A, 10 units of material B and 15 units of material C. Profits as per unit of products P,Q,R are Rs.3/-, Rs.5/- and Rs.4/- respectively. Formulate the given problem as LPP.
12. Explain the Graphical method of LPP.
13. State and prove Fundamental Theorem of LPP.

SECTION-B

14. Use Simplex method to solve the following LPP
    Max $Z = 7x_1 + 5x_2$
    Subject to the constraints
    $x_1 + 2x_2 \le 6$
    $4x_1 + 3x_2 \le 12$
    and $x_1, x_2 \ge 0$

15. Use Charnes Penalty method and Big – M method to solve the following LPP.

$$\text{Min } Z = 2x_1 + x_2$$

Subject to the constraints

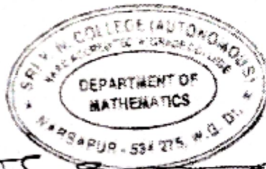$$3x_1 + x_2 = 3$$
$$4x_1 + 3x_2 \geq 6$$
$$x_1 + 2x_2 \leq 3$$
$$\text{and } x_1, x_2 \geq 0$$

16. Explain Artificial variable technique or Big – M method.

17. Write the rules for converting the primary into its dual with suitable example.

18. Show that Dual of dual of the primal is primal.