GOVERNMENT COLLEGE (A) : RAJAHMUNDRY
B.A I Year: Statistics Syllabus
(For Non-Mathematics Combination)
Semester-II CBCS
Descriptive Statistics
(Without Mathematical Derivations)

Total Hrs per week: 04 **Total Credits: 03**

Unit-1

Introduction to Statistics: Statistics, Definition, application, scope, limitation, primary and secondary data, methods of collecting primary and secondary data. Statistical enquiry, questionnaire and schedule, Editing of data.

Unit-II

Classification and tabulation: Classification of data, frequency distribution, rules of tabulation, simple and complex tables, single, double and manifold tables.

Unit-III

Diagrammatic Representation: Bar diagrams, square, rectangle, pie-charts, Histogram, frequency polygon, ogives.

Unit-IV

Measures of Central Tendency: Mean, Median, Mode, G.M & H.M, merits and demerits, finding median by graphic method, quartiles, deciles & percentiles.

Unit-V:

Measures of Dispersion: Range, Q.D, S.D, M.D, Coefficient of variation, Lorenz curve.

Text Books:

1. Statistical Methods-S.P.Gupta
2. Fundamentals of Mathematical Statistics- SC Gupta and V.K.Kapoor
3. Moulika Ganithamu Sambavyata - Telugu Academy.

Reference Books:

4. **Quantitative Techniques I-Sultan Chand Publication**

Practical's- Semester-II

Conduct any 6 Practical's.

1. Arithmetic Mean, Median, Mode, GM, HM.
2. Calculation of CV and its comparisons.
3. Bar diagrams
4. Pie diagrams
5. Histogram
6. Frequency and Polygon.
7. Ogive curves.

GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAMAHENDRAVARAM

FIRST SEMESTER END EXAMINATION
I BA – STATISTICS (SEMESTER-II)
DESCRIPTIVE STATISTICS

Time: 3hrs **MODEL PAPER** **Max Marks-60**

SECTION-A

Answer any five of the following. All questions carry equal marks. 5 x 4 = 20M

□□□□□□□ □□□□□□□□□□ □□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□.

1. Explain secondary data
   □□□□□□□ □□□□□□□□□□□□ □□□□□□□□□□
2. What are the applications of statistics to various disciplines
   □□□□□ □□□□□□□□ □□□□□□□ □□□□□□□□□ □□□□□ □□□□□□□□□□□□□ □□□□□□□□
3. What are the rules of tabulation
   □□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□
4. Describe Pie charts
   □□ □□□□□□□□□□□□ □□□□□□□□□□
5. Explain coefficient of variation
   □□□□□□□□□□□□□□□ □□□□□□□□□□
6. Write the uses of geometric mean
   □□□□□□□□ □□□□□□□□□ □□□□□ □□□□□□□□□ □□□□□□□□
7. Define Lorenz curve
   □□□□□□□ □□□□□□□□□ □□□□□□□□□□□□□
8. Define frequency polygon
   □□□□□□□□□ □□□□□□□ □□ □□□□□□□□□□□□□

SECTION-B

Answer ALL the questions. All questions carry equal marks. 4 x8 = 32M

□□□□□ □□□□□□□□□ □□□□□□□□□□□□□□□□□

9a**)** Explain various methods of collecting primary data.

□□□□□□□□ □□□□□□□□□□□□ □□□□□□□□□□□ □□□□□ □□□□□□□□□ □□□□□□□□□□

(OR)

b) Distinguish between a questionnaire and a schedule. How do you prepare a Questionnaire and a schedule.

□□□□□□□□□□□□ □□□□□ □□□□□□□□ □□□□ □□ □□□□□□ □□□□□□□□.
□□□□□□□□□□□□ □□□□□

□□□□□□□□ □□ □□□ □□□□□□ □□□□□□□.

10a) Define classification of data and explain various ways of classification.

□□□□□□□□□□□□□□□ □□□□□□□□□□□□ □□□□□□□□□□□□□□ □□□□□ □□□□□ □□□□ □□□□□□□□□□□□□

□□□□□□□□□□

(OR)

b) Discuss the importance of classification in statistics

□□□□□□ □□□□□□□□□□□□ □□□□□□□□□□□ □□□□□ □□□□□□□□□□□□□□ □□□□□□□□□□□

11a) Explain the rules for construction of Bar diagrams and Histogram.

□□□□ □□□□□□□□ □□□□□ □□□□□ □□□□□□□□□□□□ □□□□□□□□□□□□□ □□ □□□□□□□□□□ □□□□□□□□□□□.

(OR)

b) Explain the usefulness of diagrams. Construct Histogram and frequency polygon for the following data

Class Interval	0-10	10-20	20-30	30-50	50-60	60-70
Frequency	12	15	20	10	14	9

□□□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□□□. □□ □□□□□□□□□□□□□□

□□□□□ □□□□□, □□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□.

12 a) Explain any two measures of central tendency

□□□□□□ □□□□□□ □□□□□ □□□□□□□ □□□□ □□□□□□□□□□ □□□□□□□□□□

(OR)

b) Explain various measures of dispersion.

□□□□□□□□ □□□□□ □□□□□ □□□□□□□□ □□□□□□□□□□□.

SECTION-C

Answer ALL the questions. All questions carry equal marks. 4x2=8M

□□□□□ □□□□□□□□□□ □□□□□□□□□□□ □□□□□□□□.

13) Define Simple and complex tables.

□□□□□□ □□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□□□.

14) Define ogives

□□□□□□□□□ □□□□□□□□□□□□□□□

15) What are deciles and percentiles?

Deciles □□□□□ □□□□□□□□□ □□□□ □□□□□.

16) Find A.M of the numbers 2, 5, 5, 6, 7.

□□□□□□ □□□□□□□□□ □□□□□□□□□□□□□□□□ □□□□□□□□□□.

IIB.A. IV SEMESTER:
(For Non-Mathematics Combination)
Statistical Methods-II
(Without mathematical derivations)

Total hrs per week: 04 **Total no. of credits: 03**

Unit-I

Discrete distributions: Binomial, Poisson, Geometric distributions-definitions, means, variances and applications of these distributions. Additive property if exists. Simple problems.

Unit-II

Continuous distributions: Rectangular, Normal, exponential distributions-definitions and their properties. Simple problems.

Unit-III

Curve fitting: principle of least squares-fitting of straight line, Parabola, exponential and power curves.

Unit-IV:

Correlation and Regression: Meaning, types, scatter diagrams, correlation coefficient, Spearman's rank correlation, Regression lines, Regression coefficients and their properties.

Unit-V

Interpolation: Need and meaning of Interpolation, Graphical method. Newton's and Lagrange's formula for Interpolation .

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics.
2. Statistical methods- S.P.Gupta.

.**Reference Books:**

1. Saha Sambandham Vibhajana Siddhantamu Vol.- I & Vol. – II .Telugu Academy
2. Sambavyata - Telugu Academy
3. Sankyka Vislashanamu – Telugu Academy
4. Goon, Gupta and Das Gupta: Fundamentals of Statistics. Volume I .World Press.

Practical's- Semester-IV

Conduct any 6 practicals

1. Fitting of Binomial by direct method
2. Fitting of Poisson distribution by Direct method
3. Fitting of Normal distribution by Ordinates method
4. Fitting of Straight line
5. Fitting of Parabola
6. Fitting of $Y = a X^b$
7. Fitting of $Y = a b^x$
8. Fitting of $Y = a e^{bx}$
9. Correlation coefficient for ungrouped data
10. Regression lines.

II B.A. SEMESTER: IV
(For Non-Mathematics Combination)
Statistical Methods-II
(Without mathematical derivations)

Time; 3hrs **MODEL PAPER** **Max Marks: 75**

SECTION-A

Answer any FIVE of the following questions. **5 x 4 = 20M**

□□□□□□□ □□□□□□□□□ □□□□□ □□□□□□□□□□
□□□□□□□□□□ □□□□□.

1. Define Poisson distribution and obtain its mean and variance
   □□□□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□ □□□□□ □□□□ □□□□□ □□□□□□□□□□□□
   □□□□□□□□□□.
2. Explain Rectangular distribution and state its properties
   □□□□□ □□□□□□□ □□□□□□□□□□□ □□□□□□□□□□ □□□□ □□□□□ □□□□□□□□ □□□□□□□□□□.
3. Explain principle of least squares
   □□□□□□ □□□□□□ □□□□□□□□□ □□□□□□□□□□.
4. Explain Scatter diagram
   □□□□□□□ □□□□□□□ □□□□□□□□□□.
5. Write the properties of regression coefficients
   □□□□□□□□□ □□□□□□ □□□□□□□□ □□□□□□□□.
6. Explain the need of interpolation
   □□□□□□□□□ □□□□□ □□□□□□□□ □□□□□□□□□□.
7. Explain Graphical Method
   □□□□□□ □□□□□□□□ □□□□□□□□□□.
8. Explain the importance of normal distribution.
   □□□□□□□ □□□□□□□ □□□□□ □□□□□□□□□□□□ □□□□□□□□□□.

SECTION-B

Answer all the questions: All questions carry equal marks. **4 x8=32M**

□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□.

9 a) Define Binomial distribution and discuss its properties.
□□□□□□ □□□□ □□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□ □□□□□□□□□□.

(OR)

b) Define Geometric distribution. Obtain its mean and variance.
□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□ □□□□ □□□□□ □□□□□□□□□□□□□□□□□
□□□□□ □□□□□□□□□□□
□□□□□□□□□□.

10 a) Define Normal distribution. Explain its frequency curve? Mention its properties.
□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□, □□□□ □□□□□ □□□□ □□□□□
□□□□□□□□□ □□□□□□□□□□. □□□□
□□□□□□□□ □□□□□□□□□□

(OR)

b) Define and Explain Exponential distribution. Discuss about its importance
□□□ □□□□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□. □□□□ □□□□□□□□□□□□□
□□□□□□□□□□.

11 a) How do you fit a curve $y = a e^{bx}$ to the given data using the method of least squares

□□□□□□ □□□□□□□□□□□□ □□□□□□ □□□□ □□□□□□ □□□□□□ $y = a e^{bx}$ □□□ □□□□□□□□□□ □□□ □□□□□□□□

□□□□□□□□.

(OR)

b) Fit a straight line Y = a + bx to the following data by the method of least squares.

□□□□□□□□ □□□□□□□□□□□□ □□□□□□ □□□□ □□□□□□ □□□□□□ Y = a + bx □□□ □□□ □□□□□

□□□□□□□□□□.

X	4	6	8	10	12
Y	14	15	17	20	22

12 a) In the following data, we are given the sales of a business of a company in thousands of rupees. Using Newton's interpolation formula find out the sales in the year 1997.

□□□□□□□□ □□□□□□□□□□□□ □□ □□□□□□□□ □□□□□ □□□□□ □□□□□□□□ □□□ □□□□□□□□ □□□□□□□□□□□.

1997 □ □□□□□□□□□□ □□□□□□ □□□ □□□□□□□□ □□□□□□□□ □□□□□□□□□□ □□□□□□□□ □□□□□

□□□□ □□□□□□

Year (□□□□□□□□□)	1996	1998	2000	2001	2004
Sales(in thou □□□□□□ (□□□□□)	40	19	48	50	57

(OR)

b) Following are the marks of 10 students in two subjects Mathematics and Statistics. Calculate rank correlation coefficient.

□□□□□□□□ □□□□□□□□□□□□10 □□□□ □□□□□□□□□□□□□□□ , □□□□□□□, □□□□□□□□ □□□□□□□□□□□□□□□□□□□□

□□□□□□□□□ □□□□□□□□□□. □□□□□□□□□□□□ □□□□□□□□□□□ □□□□ □□□ □□□□□ □□□□□□□□□

□□□□□□□□□□.

Student	1	2	3	4	5	6	7	8	9	10
MarksinMath	75	90	80	59	54	64	87	93	84	97
Marks in Stat	60	50	78	58	45	42	75	82	95	88

SECTION-C

Answer all the questions: All questions carry equal marks. 4x2=8M

□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□.

13. State additive property of Poisson distribution
□□□□□□□□ □□□□□□□ □□□□□ □□□□□ □□□□□□□□□ □□□□□□□□□□.
14. Write the mean and variance of Rectangular distribution
□□□□□ □□□□□□□ □□□□□□□ □□□□□ □□□□ □□□□□ □□□□□□□□□□□
□□□□□□□□.
15. Define Correlation and Regression
□□□□□□□□ □□□□□ □□□□□□□□□□ □□ □□□□□□□□□□□□.
16. Define Lagrange's formula of interpolation
□□□□□□□□ □□□□□□□□□ □□□□□□□□□ □□□□□□□□□□□□

Government College (A) Rajamahendravaram
B.A III Year: Statistics Syllabus
(For Non-Mathematics Combination)
(Examination at the end of VI semester)
Statistical Applications-II
(Without mathematical derivations)

Total hrs per week: 03 **Total credits: 03**

Unit-I

Vital Statistics: Meaning, definition, uses, source of vital statistics – registration method, census method Death rates-, crude death rates – age specific death rate, standardized death rates Birth rates- – crude birth rate, age specific fertility rate, general fertility rate, total fertility rate.

Unit-II

Reproductive rates: Gross reproductive rate and net reproductive rate – life tables and abridged life tables.

Unit-III

Time series: Meaning components, trend- graphical, semi-averages, straight line, parabola, moving average methods. Seasonal indices methods- simple averages-ration to trend, ratio to moving average, link relative's methods.

Unit-IV

(SQC): Importance of SQC in industry – Concept of chance and assignable causes of variation, Natural tolerance and specification limits

Unit-V

Control Charts for variables (Mean, Range, charts) and attribute (p, np and C) Charts for fixed sample size only.

Text Books:

1. Statistical methods-S.P.Gupta
2. Fundamentals of statistics-Goon Gupta and Das Gupta Vol I and Vol II

Reference Books:

1. Anuvarthitha Sankyaka Sastramu – Telugu Academy book.
2. Applied Statistics-V.K.Kapoor & S.C.Gupta
3. Applied Statistics-Parimal Mukhopadhyay.

Practical's-Semester-V

Conduct any 6 Practical's

1. Birth rates
2. Death rates
3. Trend-Straight line
4. Seasonal indices-Simple Average
5. X, R charts
6. Attribute control chart p chart
7. Attribute control chart np chart

GOVERNMENT COLLEGE (A) , RAJAMAHENDRAVARAM

IIIB.A. SEMESTER:VI

(For Non-Mathematics Combination)

Statistical Applications-II

(Without mathematical derivations)

Time; 3hrs **MODEL PAPER** **Max Marks: 75**

SECTION-A

Answer all the questions: All questions carry equal marks. **5 x10=50M**

□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□.

1 a) Explain Vital statistics. What are the sources of vital statistics? Explain □□□ □□□□□□□□□□□ □□□□□□□□□□. □□□ □□□□□□□□□ □□□□□ □□□□□□□ □□□□□□? □□□□□□□□□□

(OR)

b) What are mortality rates? Explain them □□□□□ □□□□□□□ □□□□□□ □□□□□□□□□□.

2 a) Explain Reproductive rates □□□□□□□□□□□ □□□□□□□ □□□□□□□□□□

(OR)

b) Explain the construction of life tables □□□□□ □□□□□□□ □□□□□ □□□□□□□□□□□ □□□□□□□□□□

3 a) Explain the various components of time series. □□□□□□□□□□□ □□□□□ □□□□□□□ □□□□□□□□□□

(OR)

b) Explain the method of moving average in measuring trend □□□□□□□□□□□ □□□□□□□□□□ □□□□ □□□□□□□□ □□□□□□□□ □□□□□□□□□□

4 a) Explain the importance of SQC in industry □□□□□□□□□□ □□□□□□□ □□□ □□□□□□□□ □□□□□ □□□□□□□□□□□□ □□□□□□□□□□

(OR)

b) Explain the following:

(i) Chance causes □□□□□□□□□ □□□□□□□□

(ii) Assignable cause's □□□□□□□□ □□□□□□□□

(iii) Natural tolerance limits □□□ □□□□□ □□□□□□

5 a) Explain the construction of X , R charts □□□□□□□□□ □□□□□ □□□□□□□□ □□□□□ □□□□ □□□□□□□□□□□ □□□□□□□□□□.

(OR)

b) Distinguish between variable control charts and attribute control charts. □□□□□□ □□□□□□□□ □□□□□□ □□□□□ □□□ □□□□□□□□ □□□□□□ □□□□□□□□□□□

SECTION-B

Answer any FIVE of the following questions. **5 x 3 = 15M**

6 Explain fertility rate and age specific fertility rate □□□□□□□□ □□□□□ □□□□□ □□□ □□□□□□□□ □□□□□□ □□□□□□□□□□.

7 Explain abridged life tables □□□□□□□□□ □□□□□ □□□□□□□□□ □□□□□□□□□□

8 Explain the determination of trend by semi averages method

□□□□□□□□□□□ □□□□ □□□□□ □□□□□□□□ □□□□□□□ □□□□□□□□□
□□□□□□□□□□
9 Explain link relative's method
□□□□□ □□□□□□□ □□□□□□□□ □□□□□□□□□□
10 Write the uses of SQC
□□□□□□□ □□□ □□□□□□□□ □□□□□ □□□□□□□□□ □□□□□□□□
11 Explain specification limits
□□□□□□□□□□□□□□□□ □□□□□□□□□□.
12 Explain C Chart
C □□□□□□□□ □□□□□□□□□□
13 Describe a life table
□□□□□ □□□□□□□□ □□□□□□□□□□.

SECTION-C

Answer all the questions: All questions carry equal marks. 10x1=10M

□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□.

14. Define Vital statistics
□□□ □□□□□□□□□□□ □□□□□□□□□□□□
15. Define Gross reproduction rate
□□□□□ □□□□□□□□□□□ □□□□□□ □□□□□□□□□□□□
16. Write about the force of mortality
□□□□□□□ □□□□□□□□ □□□□□□ □□□□□□□□.
17. Define crude death rate
□□□□ □□□ □□□□□□ □□□□□□□□□□□□
18. Define trend
□□□□□□□□□□□ □□□□□□□□□□□□
19. Write the normal equations in fitting a straight line
□□□ □□□□□ □□□□□□□ □□□□□□□ □□□□□□□ □□□□□□□□□□ □□□□□□□□
20. Give an example for irregular variations
□□□□ □□□□ □□□□□□□□□□□ □□ □□□□□□□□□□ □□□□□
21. Define defective item
□□□ □□□□□□□□□ □□□□□□□□□□□□
22. Define time series
□□□□□□□□□□□ □□□□□□□□□□□□
23. What is SQC?
□□□□□□□ □□□ □□□□□□□□ □□□□ □□□?

Government College (A) Rajamahendravaram
B.Sc. III Year: Statistics Syllabus
(For Non-Mathematics Combination)
(Examination at the end of VI semester)
Elective-I
Design of Experiments and Official statistics

Total hrs per week: 03 **Total credits: 03**

Unit-I

Official Statistics: National income, methods to estimate national income, problems involved in estimating national income, agricultural statistics.

Unit-II

Area, yield of statistics, Functions and organization of CSO, NSSO

Unit-III

Analysis of variance: Meaning, definition, assumptions, one way and two way classifications.

Unit-IV

Principles of design of experiments: Principles of experiment, Completely Randomized design, Randomized block design and Latin square design.

Unit-V

Missing plot techniques: RBD, LSD, Concepts of Factorial experiments 2^2 , 2^3

Text Books:

1. Fundamentals of Statistics: Goon Gupta, Das Gupta
2. Applied Statistics-Parimal Mukhopadhyaya

Reference Books:

1. Design of Experiments by Gupta Kapoor.
2. Applied Statistics-V.K.Kapoor & S.C.Gupta.
3. Anuvarthitha Sankyaka Sastramu – Telugu Academy book.

Practical's-Semester-VI

1. ANOVA-equal one way classifications
2. ANOVA-unequal one way classifications
3. ANOVA-Two way classifications
4. CRD
5. RBD
6. LSD

GOVERNMENT COLLEGE (A), RAJAMAHENDRAVARAM

IIIB.A. SEMESTER: V (Elective-I)

(For Non-Mathematics Combination)

Design of Experiments and Official statistics

(Without mathematical derivations)

Time; 3hrs **MODEL PAPER** **Max Marks: 75**

SECTION-A

Answer all the questions: All questions carry equal marks. 5 x10=50M

□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□.

1a) Discuss the problems involved in measuring national income.

□□□□□□□□□ □□□□□□□□ □□□□□□□□ □□□□□□□□ □□□□□□□□□□.

(OR)

b) Discuss the various methods to estimate the National income

□□□□□□□□□□□□□□ □□□□ □□□□ □□□□□□□□□□ □□□□□□□□□□□.

2a) Explain the functions of C.S.O
C.S.O □□□□□□ □□□□□□□ □□□?

(OR)

b) Explain the functions of N.S.S.O
N.S.S.O □□□□□□ □□□□□□□ □□□?

3 a) Explain ANOVA one way classification
□□□□□□ □□□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□□.

(OR)

b) Define and Explain ANOVA? Write its assumptions
□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□□ □□□□□□ □□□□□ □□□□□□ □□□□□□□□□□□□
□□□□□□□□□.

4 a) Explain the basic principles of experimental design.
□□□□□□□ □□□□□ □□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□□□□□.

(OR)

b) Explain the layout and analysis of R.B.D
□□□□□□□□□□ □□□□ □□□□ □□□□□□ □□□□□ □□□□□□ □□□□□□□□□□□□ □□□□□□□□□□□.

5 a) Explain the missing plot technique of L.S.D
□□□□□□□□□ □□□□□□□□ □□□□□□□ □□□□□□□□□.

(OR)

b) Explain 2^2 factorial experiment.
2^2 □□□□□ □□□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□□.

Section-B

Answer any FIVE of the following questions. 5 x 3 = 15M

□□□□□□□ □□□□□□□□□□ □□□□□

□□□□□□□□□□□ □□□□□□□□□□□□ □□□□□.

6 Explain national income
□□□□□□□□□□□□□□□ □□□□□□□□□□□.

7 Explain agricultural statistics
□□□□□□□□ □□□□□□□□□□□ □□□□□□□□□□□.

8 Explain yield statistics
□□□□□□□□ □□□□□□□□□□□□ □□□□□□□□□□□

9 Distinguish between ANOVA one way and two way classifications
□□□□□□ □□□□□□□□□ □□□□□□□□□ □□□□□□ □□□□□□□□ □□□□□□□□□ □□□□□□□□□ □□□□□ □□□□□□□□□□□□ □□□□□□□□□

10 What is the purpose of ANOVA
□□□□□□□□□ □□□□□□□□□ □□□□□□ □□□□□□□□ □□□□□□

11 Define replication
□□□□□□□□□□□□ □□ □□□□□□□□□□□□□□

12 What is experiment?
□□□□□□□□□ □□□□□ □□□□□□

13. Define treatment
□□□□□□□□ □□□□□□□□□□□□□□

SECTION-C

Answer all the questions: All questions carry equal marks. 10x1=10M

14. Define official statistics
    □□□□□□□□ □□□□□□□ □□□□□□□□□□□ □□□□□□□□□□□□
15. What are the methods in estimating national income?
    □□□□□□□□□□□□□ □□□□ □□□□□□□ □□ □□□□□□□□ □□□□□
16. Define C.S.O
    C.S.O □□ □□□□□□□□□□□□
17. Define NSSO
    NSSO □□ □□□□□□□□□□□□
18. Define ANOVA
    □□□□□□□□ □□□□□□□□ □□ □□□□□□□□□□□□
19. What are the assumptions in ANOVA technique?
    □□□□□□□□ □□□□□□□□ □□□□□□□□□□ □□□□□□□□□□ □□□□□□□□
20. Give the layout of C.R.D
    C.R.D □□□□□ □□□□□□ □□□□□□□□
21. What are the basic principles involved in C.R.D
    C.R.D □□ □□□□□□□□□□ □□□□□□□□ □□□□□□□□□ □□□□□□□□.
22. Write advantages of R.B.D
    R.B.D □□□□□ □□□□□□□□□ □□□□□□□□.
23. Define factorial experiment □□□□ □□□□□□□□ □□ □□□□□□□□□□□□.

Government College (A) Rajamahendravarma
B.A III Year: Statistics Syllabus
(For Non-Mathematics Combination)
(Examination at the end of VI semester)
Elective-II
Operations Research

Total hrs per week: 03 **Total credits: 03**

Unit-I

Definition and scope of operations research, Phases and Models in OR . Linear programming problem , Formulation of LPP, Solving the LPP by graphical Method.

Unit-II

Transportation Problem: Definition of transportation problem, TPP as a special case of LPP, feasible solutions by North-West , Matrix minimum and VAM methods.

Unit-III

Game theory: Two person games, pure and mixed strategies , zero sum games finding solutions in 2x2 and 2xm games.

Unit-IV

Assignment problem: Formulation and description of Assignment problem and its variations. Assignment problem as special case of TP and LPP. Unbalanced assignment problem, traveling salesman problem. Optimal solution using Hungarian method.

Unit-V

Sequencing problem: Elements of Sequencing problem with jobs on two machines and their solution.

Text Books:

1. Kanti Swaroop, P.K.Gupta and Man Mohan: Operations Research. Sultan Chand.
2. Taha: Operations Research: An Introduction: Mac Millan.

Practicals-Semester-VI

1. Solving LPP by Graphical method
2. Soving the TP by NWCR, Matrix Minimum and VAM methods
3. Game theory-obtaining saddle point and pure, mixed strategies
4. Finding solution for 2x2 and 2xm games
5. Optimal solution for Assignment problem
6. Solving sequencing problem for jobs on two machines.

GOVERNMENT COLLEGE (AUTONOMOUS)
RAJAMAHENDRAVARAM
III B.A/B.Sc. Statistics (Semester-VI)
(With Mathematics Combination)
OPERATIONS RESEARCH (Elective-II)
MODEL QUESTION PAPER (THEORY)

Time: 3 hrs **Max Marks: 75**

SECTION-A

Answer ALL the questions. All questions carry equal marks. **5 x 10 = 50M**

□□□□□ □□□□□□□□□ □□□□□□□□□□ □□□□□□□.

1 a) Describe the definition and scope of Operation Research

□□□□□□□□ □□□□□□□ □□□□□ □□□□□□□□ □□□□□ □□□□□□□□ □□□□□□□□□□

(OR)

b) Solve the following LPP by using Graphical method

□□□□□□ □□□□□□□□ □□ □□□ □□□□□□□ □□□□□□□ □□□□□□ □□□□□□ □□□□□□ □□□□□□□□□.

Maximize $Z = 45X_1 + 80X_2$

Subject to const: $5X_1 + 20X_2 \leq 400$

$10X_1 + 15X_2 \leq 450$

$X_1, X_2 \geq 0$

2 a) Explain two person games and zero sum games with examples

□□□□□□ □□□□□□ □□□□□ □□□□□ □□□□□□ □□□□□ □□□□□ □□□□□□□□□ □□□□□□□□.

(OR)

b) Explain the method of solving 2xn game

2xn □□□□ □□□□□□□□□□ □□□□□□□□ □□□□□□□□□□.

3 a) Explain North-West Corner Rule and Least Cost Entry Methods for a given TP.
□□□□□ □□□□□□□ □□□□□-□□□□ □□□ □□□□□□□□ □□□□□ □□□□□□ □□□□□ □□□□□□□□□□
□□□□□□□□□□.

(OR)

b) Solve the following Transportation Problem by using VAM.
□□□□□□□ □□□□□ □□□□□□□ □□□□□□ □□□□□□□□□□ □□□□□□ □□□□□□ □□□□□□□□□□.

	D_1	D_2	D_3	Supply
O_1	50	30	220	1
O_2	90	45	170	3
O_3	250	200	50	5
Demand	5	2	2	9

4 a) Solve the following assignment problem by using Hungarian method
□□□□□□□ □□□□□□□□□ □□□□□□□ □□□□□□□□□ □□□□□□ □□□□□ □□□□□□□□□□.

	Machines			
	1	2	3	4
A	10	25	15	20
B	15	30	5	15
C	35	20	12	24
D	17	25	24	20

(OR)

b) Explain Hungarian method in obtaining optimal solution
□□□□□□□□ □□□□□□ □□□□□□□□□ □□□□□□□□ □□□□□□□□□□.

5 a) Give an algorithm for n job-2 machines problem.
n □□□□□□□□□□-2 □□□□□□□□ □□□□□□□□ □□□ □□□□□ (□□□□□□□□□□) □□ □□□□□□□□□.

(OR)

b) Explain the Sequencing problem
□□□□□□□□□□□□ □□□□□□□□ □□□□□□□□□□□.

SECTION-B

Answer any five questions. All questions carry equal marks. 5 x 3 = 15M

6. Explain the formulation of LPP
□□ □□□ □□□□□□□□ □□□□□□□□ □ □□□□□□□ □□□□□□□ □□□□□□□□

7. Explain general LPP
□□□□□□□□□□ □□ □□□ □□□□□□□ □□□□□□□ □□□□□□□□□□
8. Explain the standard form of LPP?
□□ □□□ □□□□□□□ □□□□□ □□□□□ □□□□□□□□□□ □□□□□□□□□□
9. Define feasible solution in a transportation problems
□□□□ □□□□□□□ □□□□□□ □□□□□□ □□□□□□□□□□□□
10. Define unbalanced assignment problem
□□□□□□□□ □□□□□□□□□ □□□□□□□ □□□□□□□□□□□□□.
11. How do you obtain a sequence?
□□□□□□□□□ □□□□□ □□□□□□□□□□
12. Explain assignment problem as a special case of TP
□□□□□□□□ □□□□□ □□□□□□□ □□□□□□□□□ □□□□□□□ □□□□□□□□□□
13. Explain travelling salesman problem
□□□□□□□□□□ □□□□□□□□ □□□□□□□ □□□□□□□□□□

SECTION-C

Answer ALL questions. All questions carry equal marks. 10 x 1 = 10M

□□□□□ □□□□□□□□□□ □□□□□□□□□□□ □□□□□□□.

14. Define OR
□□□□□□□□ □□□□□□□ □□ □□□□□□□□□□□□
15. Define LPP
□□ □□□ □□□□□□□ □□□□□□□ □□□□□□□□□□□□
16. Define basic feasible solution
□□□□ □□□□ □□□□□□ □□□□□□□□□□□□
17. Define transportation problem
□□□□□ □□□□□□□ □□□□□□□□□□□□
18. How many methods are there to obtain IBFS in a TP
□□□□□ □□□□□□□ □□□□ □□□□ □□□□□□ □□□□□□□□□□□□□□□ □□□□□
□□□□□□□□ □□□□□□□ □□□□□□□
19. Explain transportation table
□□□□□ □□□□□□□□ □□□□□□□□□□
20. What are the basic assumptions underlying in a sequencing problem
□□□□□□□□□□□ □□□□□□□ □□□□□□□□□ □□□□□□□□□ □□□□
21. Define total elapsed time in sequencing problem
□□□□□□□□□□□ □□□□□□□ □□□□□□ □□□□□□ □□□□□□□□
□□□□□□□□□□□□
22. Define assignment problem.
□□□□□□□□□ □□□□□□□ □□□□□□□□□□□□
