YOGI VEMANA UNIVERSITY: KADAPA

B.A/B.Sc., STATISTICS (WM) CBCS SYLLABUS

Year	Semester	Paper	Subject	Hrs.	Credits	IA	EA	Total
1	I	I	Descriptive Statistics and Probability	6	5	25	75	100
	II	II	Mathematical Expectation and Probability Distributions	6	5	25	75	100
2	III	III	Statistical Methods and Sampling Distributions	6	5	25	75	100
	IV	IV	Statistical Inference	6	5	25	75	100
3	V	V	SAMPLING THEORY and DESIGN OF EXPERIMENTS	5	5	25	75	100
		VI	Statistical Quality Control and Reliability	5	5	25	75	100
	VI	VII	ECONOMIC STATISTICS	5	5	25	75	100
		VIII	Cluster Elective: VIII-A1: OR and Applications of Linear Programming Problem	5	5	25	75	100
				5	5	25	75	100
			VIII-A2: Numerical Methods VIII-A3: Econometric Methods	5	5	25	75	100

YOGI VEMANA UNIVERSITY: KADAPA

STATISTICS CBCS SYLLABUS

Semester – I (CBCS With Maths Combination Common to BA/BSc)

Paper - I: Descriptive Statistics and Probability

No. of Hours/week : 04 credits 3

UNIT-I

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. Diagrammatic and graphical representation of data. Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean.

UNIT-II

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

UNIT-III

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

UNIT-IV

Probability theorems: Addition and multiplication theorems of probability for 2 and for n events. Boole's inequality and Baye's theorem and problems.

UNIT-V

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.

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. 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.
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 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 - Paper – I

1. Basics of Excel- data entry, editing and saving, establishing and copying a formulae, built in functions in excel, copy and paste and exporting to MS word document.(Not for The Examination).
2. Graphical presentation of data (Histogram, frequency polygon, Ogives).
3. Graphical presentation of data (Histogram, frequency polygon, Ogives) using MS Excel
4. Diagrammatic presentation of data (Bar and Pie).
5. Diagrammatic presentation of data (Bar and Pie) using MS Excel
6. Computation of measures of central tendency(Mean, Median and Mode)
7. Computation of measures of dispersion(Q.D, M.D and S.D)
8. Computation of non-central, central moments, $\beta 1$ and $\beta 2$ for ungrouped data.
9. Computation of non-central, central moments, $\beta 1$ and $\beta 2$ for grouped data.
10. Computation of central moments – Sheppard's corrections for grouped data.
11. Computation of Karl Pearson's coefficients of Skewness and Bowley's coefficients of Skewness.
12. Computation of measures of central tendency, dispersion and coefficients of Skew -ness, Kurtosis using MS Excel.

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – I (CBCS With Maths Combination Common to BA/BSc)

Paper - I: Descriptive Statistics and Probability

(Scientific calculators are allowed)

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

PART-A

Answer any **FIVE** questions. Each question carry **FIVE** marks 5X5 = 25

1. Distinguish between Primary and Secondary data.
2. Draw the Ogives and hence estimate the median.

Class:	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Frequency:	08	32	142	216	240	206	143	13

3. Explain various measures of Dispersions.
4. Explain the concept of Kurtosis and give the measure of kurtosis.
5. Show that for any descrete distribution $\beta_2 > 1$.
6. Define Mathematical and Axiomatic approach to probability.
7. If A and B are independent events then show that

   (a) A and are also independent events.

   (b) and are also independent events.
8. Define Joint, marginal and conditional distributions.

PART-B

Answer all questions and each question carries 10 marks 5 x 10 =50

9. Explain the steps involved in preparing a Questionnaire and Schedule

(OR)

10. Explain Primary data. Give various methods of collecting Primary data. Also mention merits and demerits.

11. What is meant by central tendency? Explain various measures of central tendency. Give their merits and demerits.

(OR)

12. Explain the concept of Skewness. Give various measures of Skewness.

13. Define the following terms with an example

    (a) Random experiment (b) Sample space (c) Equally likely events (d) Mutually Exclusive events

(OR)

14. (a) Define conditional probability.

    (b) Out of (2n + 1) tickets consecutively numbered, three are drawn at random. Find the chance that the numbers on them are in A.P.

15. State and prove addition theorem of probability for 'n' events.

(OR)

16. (a) State and prove Baye's theorem.

    (b) Three Urns containing white, red and black balls as follows
    Urn I : 2 White, 4 Red and 3 Black balls
    Urn II : 3 White, 2 Red and 1 Black balls
    Urn III : 4 White, 5 Red and 2 Black balls
    One urn is chosen at random and drawn two balls at random from selected urn. What is the probability that the drawn two balls are white? If the balls are white what is the probability that they come from urn II.

17. Define distribution function and also explain its properties.

(OR)

18. Let X be a continuous random variable with the following probability density function

    = 0 otherwise

    Find the constant K. Also compute mean and variance of the random variable X.

YOGI VEMANA UNIVERSITY: KADAPA

STATISTICS SYLLABUS

Semester – II (CBCS With Maths Combination Common to BA/BSc)

Paper - II :Mathematical Expectation and Probability Distributions

(Scientific calculators are allowed)

No. of Hours/week : 04 credits 3

UNIT-I

Mathematical expectation : Mathematical expectation of a 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 and their properties. Chebyshev and Cauchy - Schwartz inequalities.

UNIT-II

Discrete Distributions : Binomial and Poisson distributions, their definitions, first four central moments, β_1 and β_2. M.G.F, C.F, C.G.F, P.G.F, mean, variance, additive property if exists. Possion approximation to Binomial distribution.

UNIT-III

Negative Binomial, Geometric, 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

Continuous Distributions : Rectangular, Exponential, Gamma, Beta Distributions of first and second kind. Other properties such as mean , variance, M.G.F, C.G.F, C.F, and reproductive property if exist.

UNIT - V

Normal Distribution: Definition, Importance, Properties, M.G.F, CF, additive property, Normal distribution as a limiting case of Binomial and Poisson distribution. Cauchy Distribution definition, CF and reproductive property.

Text Books:

1. V.K.Kapoor and S.C.Gupta: Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
2. 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
3. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

Reference books:

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

Practicals Paper – II

1. Fitting of Binomial distribution – Direct method.
2. Fitting of Binomial distribution – Direct method using MS Excel.
3. Fitting of binomial distribution – Recurrence relation Method.
4. Fitting of Poisson distribution – Direct method.
5. Fitting of Poisson distribution – Direct method using MS Excel.
6. Fitting of Poisson distribution - Recurrence relation Method.
7. Fitting of Negative Binomial distribution.
8. Fitting of Geometric distribution.
9. Fitting of Normal distribution – Areas method.
10. Fitting of Normal distribution – Ordinates method.
11. Fitting of Exponential distribution.
12. Fitting of Exponential distribution using MS Excel
13. Fitting of a Cauchy distribution.
14. Fitting of a Cauchy distribution using MS Excel

Note: Training shall be on establishing formulae in Excel cells and derive the results. The excel output shall be exported to MS word for writing inference.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – II (CBCS With Maths Combination Common to BA/BSc)

Paper – II : Mathematical Expectation and Probability Distributions

(Scientific calculators are allowed)

PART-A

Answer any **FIVE** questions. Each question carry **FIVE** marks 5X5 = 25

1. State and prove addition theorem on Expectations.
2. Define characteristic function and also write its properties
3. Define Binomial distribution and also find mean and Variance.
4. State and prove additive property of independent Poisson variates.
5. Define geometric distribution. Obtain moment generating function of geometric distribution and also find mean and variance.
6. Obtain moment generating function of gamma distribution also find mean and variance.
7. Define Uniform distribution and also find mean and variance.
8. Define normal distribution and explain its importance.

PART-B

Answer all questions and each question carries 10 marks 5 x 10 = 50

9. State and prove Cauchy-Schwartz inequality.

(OR)

10. Let X be a random variable with the following probability distribution

X :	-3	6	9
P(X=x):	1/6	1/2	1/3

Find E(X) and E(X^2) and using the laws of expectation evaluate E$(2X + 1)^2$

11. Obtain the recurrence relation for the moments in Binomial distribution

(OR)

12. Obtain mode of the Poisson distribution.

13. Show that poisson distribution as a limiting case of negative binomial distribution.

(OR)

14. Define Hyper geometric distribution and find mean and variance.

15. Explain lack of memory property of Exponential distribution.

(OR)

16. Explain the Beta distribution of first and second kind.

17. Obtain moment generating function of normal distribution.

(OR)

18. Obtain the characteristic function of Cauchy distribution.

YOGI VEMANA UNIVERSITY: KADAPA

STATISTICS SYLLABUS

Semester – III (CBCS With Maths Combination Common to BA/BSc)

Paper - III : Statistical Methods and Sampling Distributions

No. of Hours/week : 04 credits 3

UNIT – I

Curve fitting: Bi- variate data, Principle of least squares, fitting of degree polynomial. Fitting of straight line (), Fitting of Second degree polynomial or parabola (), Fitting of power curve () and exponential curves of type i) and ii) with problems.

UNIT – II

Correlation : Meaning, Types of Correlation, Measures of Correlation : Scatter diagram, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient (with and without ties), Bi-variate frequency distribution, correlation coefficient for bi-variate data and simple problems. Correlation ratio, concept of multiple and partial correlation coefficients (three variables only) and properties

UNIT – III

Regression : Concept of Regression, Linear Regression: Regression lines, Regression coefficients and it's properties, Regressions lines for bi-variate data and simple problems. Correlation vs regression. concept of multiple linear regression and partial regression.

UNIT – IV

Attributes : Notations, Class, Order of class frequencies, Ultimate class frequencies, Consistency ofdata, Conditions for consistency of data for 2 and 3 attributes only , Independence of attributes , Association of attributes and its measures, Relationship between association and colligation of attributes, Contingency table: Square contingency**(),** Mean square contingency(2 **)**, Coefficient of mean square contingency (C), Tschuprow's coefficient of contingency (

UNIT – V

Exact Sampling distributions: Population, Sample, Parameter, statistic, Sampling distribution, Standard error. Definition and properties of Student's t- distribution, F – Distribution, - Distribution and their applications, the relationship between t and F – distribution and the relationship between F and distribution.

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:

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

Practicals - Paper –III

1. Fitting of straight line by the method of least squares
2. Fitting of parabola by the method of least squares
3. Fitting of straight line and parabola by the method of least squares using MS Excel.
4. Fitting of power curve of the type by the method of least squares.
5. Fitting of exponential curve of the type and by the method of least squares.
6. Fitting of power curve and exponential curve of the type , and by the method of least squares using MS Excel
7. Computation of Yule's coefficient of association
8. Computation of Pearson's, Tcherprows coefficient of contingency
9. Computation of correlation coefficient and regression lines for ungrouped data

10. Computation of correlation coefficient, forming regression lines for ungrouped data
11. Computation of correlation coefficient, forming regression lines for grouped data
12. Computation of correlation coefficient, forming regression lines using MS Excel
13. Computation of multiple and partial correlation coefficients
14. Computation of multiple and partial correlation coefficients using MS Excel
15. Computation of correlation ratio

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writing inferences.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – III (CBCS With Maths Combination Common to BA/BSc)

Paper – III : Statistical Methods and Exact Sampling Distributions

(Scientific calculators are allowed)

PART-A

Answer any **FIVE** questions. Each question carry **FIVE** marks 5X5 = 25

1. Describe the method of fitting a power curve of the type $y=ax^b$.
2. Define correlation between two variables. Discuss the types of correlation.
3. Show that correlation coefficient lies between – 1 and +1.
4. Write the properties of regression coefficients with at least two proofs.
5. The data is given below is marks in two subjects mathematics and statistics of B.Sc students.

	mathematics	Statistics
Average marks	39.5	49.5
Standard deviation	10.8	16.8

The correlation coefficient between marks in two subjects is 0.42

(a) Estimate the marks in statistics if the marks in mathematics is 52.
(b) Find angle between two regression lines.

6. Define consistency of the data. Discuss the conditions for consistency of the data for three attributes.
7. Define the terms (i) Population (ii) Sample (iii) Parameter (iv) Statistic (v) Sampling distribution
8. Define t- distribution and write down its applications.

PART-B

Answer all questions and each question carries 10 marks 5 x 10 =50

9. Explain the method of least squares of fitting a second degree polynomial to the given data?

OR

10. Fit a straight line of the given data

X : 149 157 142 140 138 142 145 142 144 140 146 144

Y : 129 110 126 130 141 129 127 127 119 118 119 131

11. The following table gives the soil temperature and germination time at various places calculate the coefficient of correlation?

Soil temperature c^0	49	57	42	40	38	42	45	42	44	40	46	44
Germination time (hours)	29	10	26	30	41	29	27	27	19	18	19	31

OR

12. Obtain Spearman's rank correlation formula

13. Derive the regression lines of y on x and x on y?

OR

14. Explain partial and multiple regression

15. Show that for n attributes $(A_1A_2 \ldots A_n) \geq (A_1) + (A_2) + \ldots + (A_n) - (n-1)N$. where N is the total number of observations.

OR

16. Prove that in the usual notation Q =

17. Define chi – square variate. Write its probability density function. Mention the properties and applications of chi – square distribution.

OR

18. Obtain the relationship between t and F.

YOGI VEMANA UNIVERSITY: KADAPA

STATISTICS SYLLABUS

Semester – IV (CBCS With Maths Combination Common to BA/BSc)

Paper - IV: Statistical Inference

(Scientific calculators are allowed)

No. of Hours/week : 04 credits 3

UNIT-I

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

UNIT-II

Testing of Hypothesis: Concepts of statistical hypotheses, null and alternative hypothesis, critical region, two types of errors, level of significance and power of a test. One and two tailed tests. Neyman-Pearson's lemma. Examples in case of Binomial, Poisson, Exponential and Normal distributions.

UNIT – III

Large sample Tests: large sample test for single mean and difference of two means, confidence intervals for mean(s). Large sample test for single proportion, difference of proportions. standard deviation(s) and correlation coefficient(s**).**

UNIT – IV

Small Sample tests: t-test for single mean, difference of means and paired t-test. χ2-test for goodness of fit and independence of attributes. F-test for equality of variances.

UNIT – V

Non-parametric tests- their advantages and disadvantages, comparison with parametric tests. Measurement scale- nominal, ordinal, interval and ratio. One sample runs test, sign test and Wilcoxon-signed rank tests (single and paired samples). Two independent sample tests: Median test, Wilcoxon – Mann-Whitney U test, Wald Wolfowitz's runs test**.**

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 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.

Practicals - Paper –IV

1. Large sample test for single mean
2. Large sample test for difference of means
3. Large sample test for single proportion
4. Large sample test for difference of proportions
5. Large sample test for difference of standard deviations
6. Large sample test for correlation coefficient
7. Large sample tests for mean(s), propotion(s), standard deviations and correlation coefficient using MS excel.
8. Small sample test for single mean
9. Small sample test for difference of means
10. Small sample test for correlation coefficient
11. Paired t-test(paired samples).
12. Small sample tests for means(s), paired t-test and correlation coefficient using MS Excel
13. Small sample test for single variance(χ 2 - test)
14. Small sample test for difference of variances(F-test)
15. Small sample test for single and difference of variances using MS Excel
16. χ 2 - test for goodness of fit and independence of attributes
17. χ 2 - test for goodness of fit and independence of attributes using MS Excel.
18. Nonparametric tests for single sample(run test, sign test and Wilcoxon signed rank test)
19. Nonparametric tests for related samples (sign test and Wilcoxon signed rank test)
20. Nonparametric tests for two independent samples (Median test, Wilcoxon –Mann- Whitney - U test, Wald - Wolfowitz' s runs test)

Note: Training shall be on establishing formulae in Excel cells and deriving the results. The excel output shall be exported to MS Word for writing inferences.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – IV (CBCS With Maths Combination Common to BA/BSc)

Paper – IV : Statistical Inference

(Scientific calculators are allowed)

PART-A

Answer any **FIVE** questions. Each question carry **FIVE** marks 5X5 = 25

1. What do you mean by point estimation? What are the properties of a good estimator?
2. A random sample of size 'n' is drawn from a normal population N (μ, ø ^{2}). Show that sample mean is an unbiased estimator for μ.
3. Define the following terms
   (a) Hypothesis (b) level of significance (c) Power of the test
4. Let P be the probability that a coin will be fall head in a single toss in order to test H_0: P = against H_1: P = . The coin is tossed 5 times and H_0 is rejected if more than 3 heads are obtained. Find the probability of type-I error and power of the test.
5. Explain the general procedure for tests of significance?
6. A random sample of 12 boys had the following I.Q's: 105,73,102,101,88,93,98,108,104,78,110 and 116. Do the data support the assumption that the I.Q. of the population is 100?
7. Write advantages and disadvantages of non-parametric methods over parametric methods.
8. Explain one sample Run test for Randomness

PART-B

Answer all questions, each question carries 10 marks. 5X10=50 Marks

9. Explain maximum likelihood method of estimation and state the properties of M.L. estimation

OR

10. Discuss the concept of "Interval Estimation" and give a suitable illustration?

11. State and Prove Neyman – Pearson Lemma?

OR

12. For the Poisson distribution with parameter , find best critical region with size α for testing H_0 : against H_1 : ( )

13. Derive the test procedure for testing the equality of two population proportions in the case of large samples.

OR

14. Random samples drawn from metro cities gave the following data relating to heights of adult males:

	City A	City B
Mean height	67.42	67.25
Standard Deviation	2.58	2.5
Number of samples	1000	1200

(a) Is there any significant difference between means?

(b) Is there any significant difference between Standard deviations?

15. Describe the F-test procedure for the equality of variances of two populations.

OR

16. Explain $\chi 2$ test for goodness of fit.

17. Explain Sign test for paired samples.

OR

18. Describe Median Test for independent samples.

YOGI VEMANA UNIVERSITY: KADAPA

STATISTICS SYLLABUS

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper - V: SAMPLING THEORY and DESIGN OF EXPERIMENTS

No. of Hours/week : 04 credits 3

UNIT –I

Sampling Theory: Principal steps in sample surveys - census versus sample survey, sampling and non- sampling errors, advantages of sampling over census and limitations of sampling. Types of sampling: Subjective, probability and mixed sampling methods.

UNIT– II

Simple Random Sampling: Simple random sampling , selection procedure of simple random sampling, Advantages and Disadvantages of simple random sampling. Estimation of population mean, population total and variance of these estimates by Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR.

UNIT – III

Stratified random sampling: Stratified random sampling, Advantages and Disadvantages of Stratified Random sampling, Estimation of population mean, and its variance. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.

Systematic sampling : Systematic sampling definition when N = nk and merits and sdemerits of systematic sampling - estimate of mean and its variance. Comparison of systematic sampling with Stratified and SRSWOR.

UNIT – IV

Analysis of variance : Analysis of variance(ANOVA) –Definition and assumptions. One-way with equal and unequal classification, Two way classification.

Design of Experiments: Definition, Principles of design of experiments, CRD: Layout, advantages and disadvantage and Statistical analysis of Completely Randomized Design (C.R.D).

UNIT –V

Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) with their layouts and Analysis, Missing plot technique in RBD and LSD. Efficiency RBD over CRD, Efficiency of LSD over RBD and CRD. Factorial experiments – Main effects and interaction effects of 2^2 and 2^3 factorial experiments and their Statistical analysis. Yates procedure to find factorial effect totals.

Text Books:

1. Telugu AcademyBA/BSc 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. K.V.S. Sarma: Statistics Made Simple: Do it yourself on PC. PHI.

Reference Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. Indian Official statistics - MR Saluja.
3. Anuvarthita Sankyaka Sastram - Telugu Academy.

Practicals - Paper –V

Sampling Techniques:

Estimation of population mean and its variance by

1. Simple random sampling with and without replacement. Comparison between SRSWR and SRSWOR.
2. Stratified random sampling with proportional and optimum allocations. Comparison between proportional and optimum allocations with SRSWOR.
3. Systematic sampling with N=nk. Comparison of systematic sampling with Stratified and SRSWOR.

Design of Experiments:

4. ANOVA - one - way classification with equal and unequal number of observations
5. ANOVA - one-way classification with equal and unequal number of observations using MS Excel.
6. ANOVA Two-way classification with equal number of observations.
7. ANOVA Two-way classification with equal number of observations using MS Excel
8. Analysis of CRD.
9. Analysis of RBD Comparison of relative efficiency of CRD with RBD
10. Estimation of single missing observation in RBD and its analysis
11. Analysis of CRD, analysis of RBD with and without missing observation using MS Excel
12. Analysis of LSD and efficiency of LSD over CRD and RBD
13. Estimation of single missing observation in LSD and its analysis
14. Analysis of LSD with and without missing observation using MS Excel.
15. Analysis of 2^2 and 2^3 with RBD layout.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper – V: SAMPLING THEORY and DESIGN OF EXPERIMENTS

(Scientific calculators are allowed)

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

PART-A

Answer any **FIVE** questions. Each question carries **FIVE** marks. 5x5 = 25

1. What is a sample survey? In what respects is it superior to a census survey?
2. What is simple random sample? Mention the one the method of drawing a random sample.
3. Show that in SRSWOR E(=
4. Explain the method of stratified random sampling. Show that ( )(the estimate of population sample mean) is an unbiased estimate of population mean.
5. Define systematic sampling write its advantages and disadvantages.
6. What is "analysis of variance" and where it is used? And also give its assumption.
7. Explain the statistical analysis of CRD.
8. Derive the expression to estimate the single missing plot in R.B.D.

PART-B

Answer all questions. Each question carries **TEN** marks. 5x10 = 50

9. Explain the different sources of sampling and non-sampling errors.

OR

10. Explain different steps involved in sample surveys.

11. In SRSWOR show that) =

OR

12. Show that the sample mean is an unbiased estimate of population mean and find its variance in SRSWR.

13. Explain the proportional and optimum allocation in Stratified random sampling.

OR

14. If the population consists of linear trend show that V( ) ≤ V( ) ≤ V( )

15. Explain the principles of experimentation with suitable examples.

OR

16. Explain two way classification.

17. Explain the statistical analysis of Latin square design.

OR

18. Explain statistical analysis of 2^2 factorial design.

YOGI VEMANA UNIVERSITY: KADAPA

STATISTICS SYLLABUS

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper – VI : Statistical Quality Control and Reliability

No. of Hours/week :04 credits 3

UNIT – I

Statistical Quality Control : Definition, Importance of SQC in industry. Causes of variation-chance and assignable causes, Process and Product control, Importance of Normal distribution and 3σ control limits, specification limits and Natural tolerance limits.

UNIT– II

Shewart control charts – Variable Control Charts- and R-chart, and S- chart. Attribute type of charts - np- chart(No.of defectives), p- chart(Proportion of defectives) with fixed and variable sample size and C-Chart(No. of defects per unit), its applications.

UNIT – III

Acceptance sampling plans: Definition, Types of Accepting sampling plans, Merits and demerits of Acceptance sampling plans, applications, Concept of, AQL and LTPD, Producers risk and Consumer's risk. AOQ and AOQL curves, OC , ASN, and ATI curves.

UNIT – IV

Single and Double sampling plans for attributes and derivation of their OC and ASN functions. Design of single and double sampling plans for attributes.

UNIT – V

Reliability: Meaning and concept of reliability**,** Reliability measures –Failure Density, Failure Rate or Hazard function, Probability of Failure, Mean Time to Failure(MITF), Mean Time Between Failures(MTBF), Exponential distribution as life model, its memory- less property.

List of reference books :

1. Fundamentals of Applied Statistics. By V.K.Kapoor and S.C.Gupta , Sultan Chand.
2. Reliability and life testing by S.K.Sinha, Wiley Eastern
3. Statistical Quality Control by R.C.Gupta:
4. B.A/B.Sc III Year Paper-IV Statistics- applied Sttistics- Telugu Academic by Prof.K.Srinivasa RAo, Dr.D. Giri, Dr.A.Anand, Dr. V.Papaiah Sastry
5. B.A/B.Sc Statistics Paper-IV Statistics, Quality, Reliability and OR by DVLN Jogiraju, C.Srikala, Palnati Sudarsan.

Practicals Paper - VI

Statistical Quality Control:

1. Construction of mean( )and range(R) charts.
2. Construction of mean( ), range(R) charts using MS Excel
3. Construction of p-chart with fixed sample size
4. Construction of p-chart with varying sample size.
5. Construction of np-chart with fixed sample size
6. Construction of np-chart with varying sample size.
7. Construction of c-chart with fixed sample size.
8. Construction of p, np and c- charts with fixed and varying sample sizes using MS Excel.

Acceptance sampling plans:

9. Designing of Single sampling plan for attributes and construction of their OC and ASN curves.
10. Designing of Double sampling plan for attributes and construction of their OC and ASN curves
11. Designing of Single sampling plan and Double sampling plan for attributes and construction of their OC and ASN curves using MS Excel.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – V (CBCS With Maths Combination Common to BA/BSc)

Paper – VI: Statistical Quality Control and Reliability

(Scientific calculators are allowed)

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

PART - A

Answer any **FIVE** questions. Each question carries **FIVE** marks. 5X5 = 25 Marks

1. Explain the Chance and assignable Causes of Variation.
2. Explain the importance of 3σ control limits in SQC.
3. Draw C-Chart for the following data and comment on the state of control of the proces.
   No. of missing rivets in Aircraft:7,15,13,18,10,14,13,10,20,11,22,15
4. Explain the need for sampling inspection.
5. Explain Producer's risk and Consumer's risk in acceptance sampling.
6. Derive the OC Curve of a Single Sampling Plan.
7. Compare Single Sampling Plan and Double Sampling Plan.

8. Define reliability and failure time distribution.

PART-B

Answer **FIVE** questions. Each question carries **TEN** marks. 5x10 = 50 Marks

9. What do you understand by Statistical quality control? Discuss briefly its need and utility in industry.

OR

10. Distinguish between Process control and Product control
11. Explain the Procedure of constructing ( ) and R Charts.

OR

12. Each day a sample of 50 items from a production process was examined. The number of dectives found in each sample was as follows: 6,2,5,1,2,2,3,5,3,4,12,4,4,1,3,5,4,1,4,3,5,4,2,3. Draw a suitable control chart a comment on it.
13. Define and explain the following terms.
    a. Acceptance Quality Level (AQL)
    b. Lot Tolerance Percent Defective (LTPD)
    c. Average Out going Quality (AOQ)
    d. Average Out going Quality Level (AOQL)
    e. Average Sample Number (ASN)

OR

14. Explain the objective and construction procedure of operating characteristic curve.

15. Suppose that N=2000, Sample single=50, Acceptance number C=2 and rejection number=3, Construct a single Sampling Plan for the data.

OR

16. Explain Double sampling plan and its OC curve.
17. Explain various measures of reliability

OR

18. Define exponential distribution and its use in reliability. Show that exponential distribution possess lacks memory in the light of reliability.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – VI (CBCS With Maths Combination Common to BA/BSc)

Paper – VII: ECONOMIC STATISTICS

No. of Hours/week : 04 credits 3

UNIT-I

Time Series: Time Series and its components with illustrations, additive, multiplicative models. Determination of trend by least squares (Linear trend, parabolic trend only), moving averages method. Determination of seasonal indices by simple averages method, ratio to moving average, Ratio to trend and Link relative methods.

UNIT-II

Growth curves: Modified exponential curve, Logistic curve and Grompertz curve, fitting of growth curves by the method of three selected points and partial sums.

UNIT-III

Index numbers: Concept, construction, problems involved in the construction of index numbers, uses and limitations. Simple and weighted index numbers. Laspayer's, Paasche's and Fisher's index numbers, Criterion of a good index number, Fisher's ideal index numbers. Fixed and chain base index

numbers. Cost of living index number and wholesale price index number. Base shifting, splicing and deflation of index numbers.

UNIT-IV

Official Statistics: Functions and organization of CSO and NSSO. Agricultural Statistics, area and yield statistics. National income and computation, utility and difficulties in estimation of national income.

UNIT-V

Vital Statistics: Introduction, definition and uses of vital statistics, sources of vital statistics. Mortality rates: Crude death rate(CDR), Specific death rate(SDR), standardized death rate(STDR). Fertility rates: crude birth rate(CBR), age specific fertility rate(ASFR), general fertility rate(GFR), total fertility rate(TFR). Measurement of population growth: crude rate of natural increase and pearl's vital index, Gross reproduction rate(GRR) and net reproduction rate(NRR). Life tables: construction and uses of life tables and abridged life tables.

Text Books:

1. Fundamentals of applied statistics : VK Kapoor and SC Gupta.
2. BA/BSc III year paper - III Statistics - applied statistics - Telugu academy by prof.K.Srinivasa Rao, Dr D.Giri. Dr A.Anand, Dr V.Papaiah Sastry.

Reference Books:

3. Indian Official statistics - MR Saluja.
4. Anuvarthita Sankyaka Sastram - Telugu Academy.

Practical Paper -VII

Time Series Analysis:

1. Measurement of trend by method of moving averages(odd and even period)
2. Measurement of trend by method of Least squares(linear and parabola)
3. Measurement of trend by method s of Least squares and moving averages using MS Excel.
4. Determination of seasonal indices by method simple averages
5. Determination of seasonal indices by method of Ratio to moving averages
6. Determination of seasonal indices by method of Ratio to trend
7. Determination of seasonal indices by method of Link relatives
8. Determination of seasonal indices by methods of Ratio to moving averages, Ratio to trend and Link relatives using MS Excel.

Index Numbers:

9. Computation of simple index numbers.

10. Computation of all weighted index numbers.
11. Computation of reversal tests.
12. Construction of cost of living index number and whole sale index number.
13. Construction of fixed base and chain base index numbers.
14. Computation of all weighted indices, cost of living index number, using MS Excel.

Vital Statistics:

15. Computation of various Mortality rates
16. Computation of various Fertility rates
17. Computation of various Reproduction rates.
18. Construction of Life Tables
19. Construction of various rates and life tables using MS Excel

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – VI (CBCS With Maths Combination Common to BA/BSc)

Paper-VII: Economic Statistics

(Scientific calculators are allowed)

Time:3 Hours **Max.Marks:75**

PART - A

Answer any **FIVE** of the following questions. Each question carries 5 Marks 5X5=25M

1. Define Time Series. Also write its Uses.
2. Explain the method of simple averages to determine seasonal variations.
3. Explain the fitting of Modified exponential curve by the method of three selected points.

4. Explain various simple index numbers
5. Explain the Procedure to construct the cost of living index number.
6. What are the main functions of Central Statistical organization (CSO).
7. Define Vital Statistics and write its Uses.
8. Define central mortality rate and Prove that

PART-B

Answer **ALL** questions. Each question carries 10 Marks. 5X10=50M

9. Explain the method of fitting parabolic trend in time series analysis.

OR

10. Describe the measurement of seasonal variations by ratio-to-moving average method.

11. Explain the fitting of logistic curve by the method of three selected points.

OR

12. Explain the fitting of Grompertz curve by the method of partial sums.

13. Explain the Problems involved in the construction of Index numbers

OR

14. Define Index Numbers. Explain various Weighted index numbers.

15. Explain (a) Agricultural Statistics and (b) Yield Statistics (C) NSSO

OR

16. Explain the computational procedure of National income.

17. Explain various rates of fertility.

OR

18. Explain the construction and Uses of life table.

YOGI VEMANA UNIVERSITY: KADAPA
STATISTICS SYLLABUS
Semester – VI (CBCS With Maths Combination Common to BA/BSc)
Paper – VIII(A1): OR and Applications of Linear Programming Problem

No. of Hours/week : 04 Credits: 3

UNIT-I

Basics of OR and Linear Programming Problem: Introduction of OR, Definition, characteristics, scope, applications and limitations of OR. Formulation of linear programming of problems (LPP), Convex sets, Basic feasible solutions, Graphical solution of linear programming problems. Alternative solutions, Unbounded solutions, Non existing feasible solutions by Graphical method.

UNIT-II

Simplex Method : General formulation of LP Problems and Matrix form of LP problems, Slack variable, Surplus variable, unrestricted Variable, Standard form of LPP, Canonical form of LPP. Introduction to simplex method, Definitions and notations, Computational procedure of simplex algorithm. Artificial variable technique, Big-M method and Two-phase simplex method, Degeneracy in LPP and method to resolve degeneracy. Alternative solutions, Unbounded solutions, Non existing feasible solutions and Solution of simultaneous equations by Simplex method.

UNIT-III

Duality in Linear Programming and Dual Simplex Method : Introduction, Definition of Dual Problems, General rules for converting any primal into its Dual, Economic interpretation of duality, Relation between the solution of Primal and Dual problem, Using duality to solve primal problem. Dual Simplex Method.

UNIT-IV

Transportation problem : Introduction, Mathematical formulation of Transportation problem, Tabular representation, Definitions, Initial Basic feasible solution of Transportation problem- North-west corner rule, Lowest cost entry method, Vogel's approximation method. Method of finding optimal solution-Modi method(U-V method). Degeneracy in transportation problems, Resolution of degeneracy, Unbalanced transportation problem.

Assignment problem: Introduction, Mathematical formulation of Assignment problem, Reduction theorem(statement only), Hungarian Method for solving Assignment problem, Unbalanced Assignment problem. The Traveling salesman problem, Formulation of Traveling salesman problem as an Assignment problem and Solution procedure.

UNIT-V

Sequencing problem: Introduction, assumptions of sequencing problem, Johnson's algorithm for n jobs on two machines problem- problems with n-jobs on two machines, algorithm for n jobs on three machines problem- problems with n- jobs on three machines, algorithm for n jobs on k machines problem, problems with n-jobs on k-machines. Graphical method for two jobs on k– machines.

Reference Books:

1. S.D. Sharma, Operations Research, Kedar Nath Ram Nath & Co, Meerut.
2. Kanti Swarup, P.K.Gupta, Manmohn, Operations Research, Sultan Chand and sons, New Delhi.
3. J.K. Sharma, Operations Research and Application, Mc.Millan and Company, New Delhi.
4. Gass: Linear Programming. Mc Graw Hill.
5. Hadly : Linrar programming. Addison-Wesley.
6. Taha : Operations Research: An Introduction : Mac Millan.
7. Parikriya Parishodhana - Telugu Academy.

Practical Paper –VIII(A1)

1. Solution of LPP by Graphical Method(using different inequality type constraints)
2. Solution of LPP by simplex method.
3. Solution of LPP by simplex method using TORA

4. Solution of LPP using Big-M and
5. Solution of LPP using two phase simplex method
6. Solution of LPP using Big-M method and two phase simplex method using TORA
7. Solution of LPP using principal of duality
8. Solution of LPP using dual simplex method.
9. Solution of LPP using principal of duality and dual simplex methods using TORA.
10. IBFS of transportation problem by using North- West corner rule, Matrix
11. minimum method and VAM
12. Optimum solution to balanced and unbalanced transportation problems by MODI method (both maximization and minimization cases)
13. Solution of transportation problem using North- West corner rule, Matrix minimum methods and VAM and to test their optimality using TORA
14. Formulation and solution of Assignment problem using Hungarian method (both maximization and minimization cases),
15. Solution of Assignment problem using Hungarian method (both maximization and minimization cases using TORA
16. Solution of sequencing problem—processing of n jobs through two machines
17. Solution of sequencing problem processing of n jobs through three machines

YOGI VEMANA UNIVERSITY : KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – VI (CBCS With Maths Combination Common to BA/BSc)

Paper-VIII(A1): OR and Applications of Linear Programming

(Scientific calculators are allowed)

Time:3 Hours **Max.Marks:75**

PART -A

Answer any FIVE of the following questions. Each question carries 5 Marks 5X5=25M

1. Explain the definition and scope of OR.
2. Solve the following LPP by graphical method

$$\text{Max } Z = 6X_1+X_2$$
$$\text{Subject to: } 2X_1+X_2 \geq 3$$
$$X_1-X_2 \geq 0$$
$$X_1, X_2 \geq 0$$

3. Explain the following terms.

   (1) Slack Variable (2) Surplus Variable (3) Standard form of LPP.
4. Show that dual of the dual is primal.
5. Find IBFS by Vogel's approximation method.

	D1	D2	D3	D4	Supply
S1	3	7	6	4	5
S2	2	4	3	2	2
S3	4	3	8	5	3
Demand	3	3	2	2	

6. What is an assignment Problem? Explain mathematical representation of Assignment problem.
7. Define the Problem of Sequencing and Explain its assumptions.
8. We have five jobs each of which must go through the two machines A and B in the order AB. Processing times in hours are given in the table below.

Job	:	1	2	3	4	5
Machine A	:	5	1	9	3	10
Machine B	:	2	6	7	8	4

Determine the optional sequence that will minimize the elapsed Time.

PART-B

Answer **ALL** questions. Each question carries 10 Marks. 5X10=50M

9. A firm can produce 3 types of cloth, A, B and C. Three kinds of wool are required Red, Green and Blue.1 unit of length of type A cloth needs 2 meters of red wool and 3 meters of blue wool. 1 unit of length of type B cloth needs 3 meters of red wool, 2 meters of green wool and 2 meters of blue wool.1 unit type of C cloth needs 5 meters of green wool and 4 meters of blue wool. The firm has a stock of 8 meters of red, 10 meters of green and 15 meters of blue. It is assumed that the income obtained from 1 unit of type A is Rs.3, from B is Rs.5 and from C is Rs.4. Formulate this as an LPP.

(OR)

10. Solve the following LPP by using graphical method.

Maximize $Z=2X_1+X_2$

Subject to $X_1+2X_2 \leq 10$

$X_1+X_2 \leq 6$

$X_1-X_2 \leq 2$

$X_1-2X_2 \leq 1$

And $X_1, X_2 \geq 0$

11. Describe the Computational Procedure of the Simplex method for the solution of a maximization LPP.

(OR)

12. Use two Phase Simplex method to solve the following LPP.

Maximize $Z=3X_1+2X_2$

Subject to: $2X_1+X_2 \leq 2$

$3X_1+4X_2 \geq 12$

$X_1, X_2 \geq 0$

13. Use duality solve the following primal problem

Minimize $Z = 3X_1 + X_2$

Subject to the Constraints:

$2X_1 + X_2 \geq 3$

$4X_1 + 3X_2 \geq 6$

$2X_1 + 2X_2 \geq 3$

$X_1, X_2 \geq 0$

(OR)

14. Explain the dual simplex method .

15. Solve the following T.P.

Origins	Destinations				Supply/ Available
	D	E	F	G	
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand/ requirement	200	225	275	250	

(OR)

16. Solve the following Assignment Problem.

Jobs	Persons				
	P_1	P_2	P_3	P_4	P_5
J_1	3	8	2	10	3
J_2	8	7	2	9	7
J_3	6	4	2	7	5

J_4	8	4	2	3	5
J_5	9	10	6	9	10

17. Describe the method of Processing n 'jobs through three machines.

(OR)

18. Determine the optional sequence of jobs that minimize the total elapsed time based on the following information Processing time on machines is given in hours and passing is not allowed.

Job :	A	B	C	D	E	F	G
M_1 :	3	8	7	4	9	8	7
M_2 :	4	3	2	5	1	4	3
M_3 :	6	7	5	11	5	6	12

YOGI VEMANA UNIVERSITY: KADAPA
STATISTICS SYLLABUS
Semester – VI (CBCS With Maths Combination Common to BA/BSc)
Paper – VIII(A2) : Numerical Methods

No. of Hours/week : 04 Credits 3

UNIT-I

Definitions of Forward difference operator(Δ), Backward difference operator(), Shift or Extension(displacement) operator (E), Central Differences operator(μ), Differentiation operator(D), Mean value operator (Symbolic relations between operators, properties of difference and shift operators, fundamental theorem on finite differences and simple problems.

UNIT-II

Interpolation with equal intervals: Concept of interpolation and extrapolation, assumptions and uses of interpolation, difference tables, methods of interpolation with equal intervals - Newton's formula for forward and backward interpolation, Central differences, Gauss forward and backward, Sterling, Bessel's and Lalace-Everett's Formulae,

UNIT-III

Interpolation with unequal intervals: Divided differences and their properties. Methods of interpolation with unequal intervals – Newton's Divided difference formula and Lagrange's formula. Inverse interpolation- Lagrange's formula.

UNIT-IV

Numerical Differentiation: Introduction to Numerical differentiation. Determination of First and Second order derivatives for the given data using Newton's forward and backward, Gauss forward and backward, Sterling, Bessel's and Newton's Divided difference formula.

UNIT-V

Numerical Integration: Introduction to numerical integration, General Quadrature formula for equidistant ordinates, Trapezoidal rule, Simpson's 1/3 rd, Simpson's 3/8 th rule and Weddle's rule.

Books Recommended:

1. H.C. Saxena, Finite Differences and Numerical Analysis, S. Chand and Company, NewDelhi.
2. P.P.Gupta, G.S.Malik and Sanjay Gupta, Calculus of Finite Differences and Numerical Analysis, Krishna Prakashan Media(P) Ltd., Meerut(UP), India.
3. S.Ranganatham, M.V.S.S.N Prasad, V.Ramesh Babu, S.Chand& Company Ltd.
4. S. S. Sastry, Introductory Methods Numerical Analysis, Prentice- Hall of India.
5. C.F. Gerald and P. O. Wheatley, Applied Numerical Analysis, Addison- Wesley, 1998.

Practical Paper –VIII(A2)

Interpolation with equal intervals:

1. Interpolation by using Newton-Gregory forward difference formula
2. Interpolation by using Newton-Gregory backward difference formula
3. Interpolation by using Gauss forward difference formula
4. Interpolation by using Gauss backward difference formula
5. Interpolation by using Sterling formula
6. Interpolation by using Bessel's formula
7. Interpolation by using Laplace-Everett's Formula

Interpolation with unequal intervals:

8. Interpolation by using Newton's divided difference formula
9. Interpolation by using Lagrange's formula
10. Inverse interpolation by using Lagrange's formula

Numerical differentiation:

11. Determination of first and second order derivatives by using Newton-Gregory forward difference formula
12. Determination of first and second order derivatives by using Newton-Gregory backward difference formula
13. Determination of first and second order derivatives by using Gauss forward difference formula
14. Determination of first and second order derivatives by using Gauss backward difference formula
15. Determination of first and second order derivatives by using Newton's divided difference formula

Numerical Integration:

16. Numerical integration by using Trapezoidal rule, Simpson's 1/3 rd, Simpson's 3/8 th rule and Weddle's rule.

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – VI (CBCS With Maths Combination Common to BA/BSc)

Paper – VIII(A2) : Numerical Methods

(Scientific calculators are allowed)

Time:3 Hours **Max.Marks:75**

PART- A

Answer any **FIVE** questions. Each question carries **FIVE** marks 5 X 5 = 25

1. Define (a) Forward difference operator (b) Backward difference operator (c) Shift operator and also obtain the relations between them

2. (i) Prove that

   (ii) Evaluate the interval of differencing being unity.

3. Explain interpolation and Extrapolation. Also discuss the assumptions of interpolation.

4. The value of x and y are given below

X	:	5	6	9	11
Y	:	12	13	14	16

   Find the value of x when y = 15

5. Obtain the relation between divided differences and ordinary differences.

6. Find the first derivative of the function $f(\theta) = \tan\theta$ tabulated below at the point $\theta = 4^0$

θ	:	0^0	5^0	10^0	15^0
$\tan\theta$	:	0.0000	0.0875	0.1763	0.2679

7. Derive the formula for Simpson's th rule.

8. Evaluate by using Weddle's rule and also compare with the exact value.

PART -B

Answer **ALL** questions. Each question carries **TEN** marks 5 X 10 = 50

9. Show that if f(x) be a polynomial of n^{th} degree in x then the n^{th} difference of f(x) is constant and $(n+1)^{th}$ and the higher order difference of f(x) are zero.

(OR)

10. Estimate the missing values in the following table

x	:	1	2	3	4	5	6	7
f(x)	:	2	--	8	---	32	64	128

Explain why result differs from 4 and16.

11. Derive the Newton-Gregory backward difference interpolation formula.

(OR)

12. Use Gauss's forward formula to find the value of y when x = 3.75 from the following table

X	:	2.5	3.0	3.5	4.0	4.5	5.0
Y	:	24.145	22.043	20.225	18.644	17.262	16.047

13. Derive the Newton's divided difference formula.

(OR)

14. The following table gives the normal weights of babies during the first 12 months of life

Age in months	:	0	2	5	8	10	12
Weights in lbs	:	7.5	10.25	15	16	18	21

Estimate the weight of the baby at the age of 7 months by using Lagrange's interpolation formula.

15. Find the first and second derivatives of the function tabulated below at the point x = 1.1

x	:	1.0	1.2	1.4	1.6	1.8	2.0
f(x)	:	0	0.128	0.544	1.296	2.432	4.00

(OR)

16. Find f ´(5) and f ´(5) from the following table

x	:	0	2	3	4	7	9
f(x)	:	4	26	58	112	466	922

17. Derive general Quadrature formula for equidistant ordinates.

(OR)

18. Calculate by Simpson's rd rule an appropriate value of dx by taking seven distant ordinates. Compare it with the exact value and the value obtained by using the trapezoidal rule.

YOGI VEMANA UNIVERSITY: KADAPA
STATISTICS SYLLABUS
Semester – VI (CBCS With Maths Combination Common to BA/BSc)
Paper – VIII(A3) : Econometric Methods

No. of Hours/week : 04 Credits :3

UNIT-I

Basic Econometrics: Nature of econometrics and economic data, concept of econometrics, steps in empirical economic analysis, econometric model, importance of measurement in economics, the structure of econometric data, cross section, pooled cross section, time series and paired data, simple regression models, two variable linear regression model, assumptions estimations of parameters.

UNIT-II

Models and Estimations: Gauss marcoff theorem, OLS estimations, partial and multiple correlations coefficients. The general linear model assumptions, estimation and properties of estimators, BLUEs, and tests of significance of estimators, R square and ANOVA.

UNIT-III

Problems in OLS Estimators: Nature, test, consequences and remedial steps of problems of heteroscedasticity; Multicollinearity and Auto-correlation; Problems of specification error; Errors of measurement.

UNIT-IV

Regressions with Qualitative Independent Variables: Dummy variable technique — Testing structural stability of regression models comparing two regressions, interaction effects, seasonal analysis.

UNIT-V

Regressions with Qualitative Independent Variables: Piecewise linear regression, use of dummy variables, regression with dummy dependent variables; The LPM, Logit, Probit and Tobit models — Applications.

BASIC READING LIST

1. Amemiya, T. (1985), Advanced Econometrics, Harvard University Press, Cambridge, Mass.
2. Baltagi, B.H. (1998), Econometrics, Springer, New York.
3. Dongherty, C. (1992), Introduction to Econometrics, Oxford University Press, New York.
4. Goldberger, A.S. (1998), Introductory Econometrics, Harvard University Press, Cambridge, Mass.
5. Gujarati, D.N. (1995), Basic Econometrics (6th Edition), McGraw Hill, New Delhi.
6. Hill R. C., E.G. William and G.G. Judge (1997), Undergraduate Econometrics, Wiley, New York.
7. Kennedy. P. (1998), A Guide to Econometrics (4th Edition), MIT Press, New York.
8. Kmenta, J. (1997), Elements of Econometrics (Reprint Edition), University of Michigan Press, New York.
9. Koutsoyiannis, A. (1977), Theory of Econometrics (2nd ed.), The Macmillan Press Ltd., London.
10. Krishna, K.L. (Ed.) (1997), Econometric Applications in India, Oxford University Press, New Delhi.

Practical Paper –VIII-A3

1. Two-Variable Linear Regression Model
2. Three-Variable Linear Regression Model
3. Coefficient of Multiple Determination(R^2) and ANOVA for validity of Complete Linear Regression
4. Goldfild and QUANDT Test for Heteroscadasticity
5. Glesier Test for Heteroscadasticity
6. Spearman's Rank Correlation Test for Heteroscadasticity
7. Test for Multicollinearity using coefficient of correlation
8. Farrar-Glauber test for Multicollinearity
9. First order Auto Correlation Coefficient

10. Durbin-Watson Test for Auto Correlation

11. Chow test for structural stability or structural change by comparing two linear regression models

12. Dummy variables approach for testing structural stability of two linear regression models

YOGI VEMANA University: KADAPA

STATISTICS MODEL QUESTION PAPER

Semester – VI (CBCS With Maths Combination Common to BA/BSc)

Paper – VIII-A3 : Econometric Methods

(Scientific calculators are allowed)

Time:3 Hours **Max.Marks:75**

PART- A

Answer any **FIVE** questions. Each question carries **FIVE** marks 5 X 5 = 25

1. What are the steps involved in Econometric model building or in empirical economic analysis.
2. Specify a two variable linear model and give the assumptions on it.
3. State the Gauss- Marcoff theorem and give its use.
4. Explain the test for the significance of R^2.
5. Explain the problem of heteroscedasticity .
6. Explain the problem of autocorrelation.
7. What are dummy variables? Give their uses.
8. Explain the concept of piecewise linear regression.

PART -B

Answer **ALL** questions. Each question carries **TEN** marks 5 X 10 = 50

9. Explain the structure of econometric data.

(OR)

10. Specify a two-variable linear model. Obtain the OLS estimators of the parameters of two-variable linear model.
11. Specify the standard General linear modal. Obtain the mean and variance of the BLUEs of the parameters of the general linear model.

(OR)

12. What are the multiple and partial correlation coefficients? Give their properties.
13. Describe a test for the detection of multicollinearity.

(OR)

14. Describe the Durbin-Watson test for Autocorrelation.

15. Describe the Chow test for testing structural stability of regressions comparing two linear regression models.

(OR)

16. Describe the dummy variables technique for testing the structural stability of regressions comparing two linear regression models.

17. Explain the use of dummy variables in regression with qualitative dependent variables linear model.

(OR)

18. What are LPM, Logit and Probit Modals?