DSE-2(A)/Paper-6(A): Applied Statistics-II

[4 HPW :: 4 Credits :: 100 Marks (External : 80, Internal : 20)]

Unit-I

Analysis of Variance and Design of Experiments : Concept of Gauss-Markoff linear model with examples, statement of Cochran's theorem, ANOVA, one-way, two-way classifications with one observation per cell Expectation of various sums of squares, Statistical analysis, Importance and applications of design of experiments.

Unit-II

Principles of experimentation, Analysis of Completely randomized Design (C.R.D), Randomized Block Design (R.B.D) and Latin Square Design (L.S.D) including one missing observation, expectation of various sum of squares. Comparison of the efficiencies for above designs.

Unit-III

Vital statistics : Introduction, definition and uses of vital statistics. Sources of vital statistics, registration method and census method. Rates and ratios, Crude death rates, age specific death rate, standardized death rates, crude birth rate, age specific fertility rate, general fertility rate, total fertility rate. Measurement of population growth, crude rate of natural increase- Pearl's vital index. Gross reproductive rate sand Net reproductive rate, Life tables, construction and uses of life tables and Abridged life tables.

Unit-IV

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

Index Numbers : Concept, construction, uses and limitations of simple and weighted index numbers. Laspeyer's, Paasche's and Fisher's index numbers, criterion of a good index numbers, problems involved in the construction of index numbers. Fisher's index as an ideal index number. Fixed and chain base index numbers. Cost of living index numbers and wholesale price index numbers. Base shifting, splicing and deflation of index numbers.

References:

1. V.K. Kapoor and S.C. Gupta : Fundamentals of Applied Statistics. Sultan Chand
2. A. M. Goon, M. K. Gupta, B. Das Gupta : Fundamentals of Statistics,Vol - II
   World Press Private Ltd, Calcutta
3. A. M. Goon, M. K. Gupta, B. Das Gupta : An outline of Statistical Theory, Vol- II,
   World Press Private Ltd,Calcutta-17.

***

Practical-6(A): Applied Statistics - II

[with 3 HPW, Credits 1 and Marks 25]

Practical (using R-Software and MS-Excel)

1. Generation Random Samples from the Uniform, Binomial, Poisson, Normal and Exponential distributions using R.

2. Fitting of straight line, parabola and power curves of the type $y= ax^b$, $y=ab^x$ and $y=a\, e^{bx}$ using R.

3. Large sample tests : Testing population means, proportions, variances based on single and two samples using R.

4. Parametric Tests : Testing means, variances based on single and two samples using R.

5. Tests based on χ^2 distribution using R.

6. Nonparametric Tests : one sample run test, Sign test and Wilcoxon signed rank test for one and two samples using R.

7. Nonparametric Tests : Median test, Wilcoxon-Mann Whitney U-test, Wald-wolfowitz's runs test using R.

8. Analysis of Variance for CRD and RBD data using R and MS - Excel.

9. Analysis of Variance for RBD without and with one missing observation using R and MS - Excel.

10. Analysis of Variance for LSD without and with one missing observation using R and MS - Excel.

11. Computation of Morality rates, Fertility rates and Reproduction rates using MS-Excel.

12. Construction of life tables using MS-Excel.

***

DSE-2(B)/Paper-6 (B) : Analytical Statistics-II

[4 HPW:: 4 Credits :: 100 Marks (External : 80, Internal : 20)]

Unit-I

Multivariate distributions: Introduction, concept of Multivariate, Definitions and Statements of properties of Multinomial and Multivariate Normal Distributions.

Regression Analysis: Definition, procedure of Least square estimation, methods of analysis and interpretation, Simple Linear Regression and Multiple Linear Regression for 'n' variables : estimation of parameters, Lack of fit, Mean Square Error, R^2 and adjusted R^2 values, Testing Regression coefficients.

Logistic regression: Definition and model assumptions, estimation of parameters, statements of properties for simple and Multiple Logistic regression. Interpretation of the same.

Unit-II

Multivariate Data Analysis Techniques : Definitions, Statements of properties of Principal Component Analysis, Factor Analysis, Cluster analysis and Linear Discriminant Analysis (Bayesian and Fisher's approaches), Multi-dimensional Scaling, Applications and interpretation of above techniques to Image processing / pattern recognition.

(In first two Units emphasis will be on concepts and applications of techniques only.)

Unit-III

Vital statistics : Introduction, definition and uses of vital statistics. Sources of vital statistics, registration method and census method. Rates and ratios, Crude death rates, age specific death rate, standardized death rates, crude birth rate, age specific fertility rate, general fertility rate, total fertility rate. Measurement of population growth, crude rate of natural increase- Pearl's vital index. Gross reproductive rate sand Net reproductive rate, Life tables, construction and uses of life tables and Abridged life tables.

Unit-IV

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

Index Numbers : Concept, construction, uses and limitations of simple and weighted index numbers. Laspeyer's, Paasche's and Fisher's index numbers, criterion of a good index numbers, problems involved in the construction of index numbers. Fisher's index as an ideal index number. Fixed and chain base index numbers. Cost of living index numbers and wholesale price index numbers. Base shifting, splicing and deflation of index numbers.

References:

1. E-Book : https://onlinelibrary.wiley.com/doi/book/10.1002/9781118391686

2. V.K.Kapoor and S.C.Gupta : Fundamentals of Applied Statistics. Sultan Chand

3. Johnson and Wrichon : Multivariate Analysis.

4. Pratirupa Sidhanthamulu , Telugu Academy,

5. Prayoga Rachana and Visleshana, Telugu Academy.

***

Practical-6 (B): Analytical Statistics - II

[with 3 HPW, Credits 1 and Marks 25]

Practical (using R-Software)

1. Generation Random Samples from the Uniform, Binomial, Poisson, Normal and Exponential distributions using R.

2. Fitting of straight line, parabola and power curves of the type $y= a x^b$, $y=a b^x$ and $y=a e^{bx}$ using R.

3. Large sample tests : Testing population means, proportions, variances based on single and two samples and tests based on χ^2 distribution using R.

4. Parametric Tests : Testing means, variances based on single and two samples using R.

5. Nonparametric Tests : one sample run test, Sign test and Wilcoxon sign rank test for one and two samples, Median test, Wilcoxon Mann Whitney - U test, Wald - Wolfowitz's runs test using R.

6. Principal Component Analysis using R.

7. Factor Analysis using R.

8. Cluster analysis and Linear Discriminant analysis using R.

9. Model fitting by Simple and Multiple Linear Regression methods using R.

10. Model fitting by simple Logistic regression using R.

11. Computation of Morality rates, Fertility rates and Reproduction rates using R.

12. Construction of life tables using R.

***

Question Papers Pattern

(A) Final Examination: KAKATIYA UNIVERSITY

B.Sc. (STATISTICS)

Theory Question Paper Pattern

Academic Years: 2019-2022

Time: 3 hours] [Max. Marks: 80

Section - A

Answer ALL questions. All questions carry equal marks. (4Qx12m=48)

Q1. (a)
[OR] From Unit-I
Q1. (b)

Q2. (a)
[OR] From Unit-II
Q2. (b)

Q3. (a)
[OR] From Unit-III
Q3. (b)

Q4. (a)
[OR] From Unit-IV
Q4. (b)

Section - B

Answer any EIGHT questions. All questions carry equal marks. (8Qx4m=32)

Q5, Q6, Q7 — From Unit-I

Q8, Q9, Q10 — From Unit-II

Q11, Q12, Q13 — From Unit-III

Q14, Q15, Q16 — From Unit-IV

***

KAKATIYA UNIVERSITY

B.Sc. (STATISTICS)

Practical Question Paper Pattern

Academic Years: 2019-2022

Time: 2 hours] **[Max. Marks: 25**

[Practical:15, Record:5, Viva:5]

Note: Solve any THREE problems choosing at least one from each Section

Section-A (Solve Using Calculator)

Problem. 1
Problem. 2
Problem. 3
} From Part-I of Question Bank

Section - B (Solve Using Computer Programs)

Problem. 4
Problem. 5
} From Part-2 of Question Bank

***

(B) Internal Examinations:

1 Two Internal exams are to be conducted and best of two internal marks is considered.
2 First internal exam is to be conducted after completion of Unit-I &II.
3 Second internal exam is to be conducted after completion of Unit-III & IV.
4 Internal Examination duration: 1 hr 30 min.
5 Internal Theory QP consists of 20 marks.
6 10 Short questions are to be given (5Q from each of 2 Completed units).
7 All TEN questions are to be answered (10QX2m=20m).

Prof A Rajendra Prasad
Chairperson, BOS in Statistics, KU