ANDHRA PRADESH   PUBLIC SERVICE COMMISSION: HYDERABAD
NOTIFICATION NO.28/2016, Dt.27/12/2016

ASSISTANT DIRECTOR IN A.P. ECONOMICS AND STATISTICAL SERVICE
(General Recruitment)

PARA-2: EDUCATIONAL QUALIFICATIONS:

Applicants must possess the qualifications from a recognized University as detailed below or equivalent thereto, subject to various specifications in the relevant service rules and as per the indent received from the Department as on the date of notification.

Sl. No	Name of the Post	Educational Qualifications
01	Assistant Director in A.P. Economics and Statistical Service	Must possess Post Graduate Degree in one of the Subjects of Mathematics, Pure Mathematics, Statistics, Economics with Statistics, Pure Economics, Applied Economics, Applied Statistics, Applied Mathematics, Econometrics or Computer Science from a recognized University or Institution recognized by the University Grants Commission or any other recognized equivalent qualification.

SCHEME AND SYLLABUS FOR RECRUITMENT TO THE POST OF ASSISTANT DIRECTOR IN ANDHRA PRADESH ECONOMICS & STATISTICS SERVICE
SCHEME

WRITTEN EXAMINATION (Objective Type) (P. G. Degree standard)		MAXIMUM MARKS	No. of Questions	Duration
PAPER-1	General Studies and Mental Ability	150 Marks	150 Qns.	150 Minutes
PAPER-2	Concerned Subject	300 Marks	150 Qns.	150 Minutes.
TOTAL		450 Marks		
NEGATIVE MARKS: As per G.O.Ms. No.235, Finance (HR-I, Plg & Policy) Dept., Dt. 06/12/2016, for each wrong answer will be penalized with 1/3rd of the marks prescribed for the question.				

The candidates have to choose one subject from the following subjects for Paper-2

01. Economics	02. Statistics
03. Mathematics	04. Computer Science

SYLLABUS
PAPER -I
GENERAL STUDIES AND MENTAL ABILITY

1. Events of national and international importance.
2. Current affairs- international, national and regional.
3. General Science and it applications to the day to day life Contemporary developments in Science & Technology and Information Technology
4. Social- economic and political history of modern India with emphases on Indian national movement.

5. Indian polity and governance: constitutional issues, public policy, reforms and e-governance initiatives.
6. Economic development in India since independence.
7. Geography of India with focus on Andhra Pradesh.
8. Disaster management: vulnerability profile, prevention and mitigation strategies, Application of Remote Sensing and GIS in the assessment of Disaster
9. Sustainable Development and Environmental Protection
10. Logical reasoning, analytical ability and data interpretation.
11. Data Analysis:
    Tabulation of data
    Visual representation of data
    Basic data analysis (Summary Statistics such as mean and variance coefficient of variation etc.,) and Interpretation
12. Bifurcation of Andhra Pradesh and its Administrative, Economic, Social, Cultural, Political, and legal implications/problems, including
    a). Loss of capital city, challenges in building new capital and it's financial implications.
    b). Division and rebuilding of common Institutions.
    c). Division of employees, their relocation and nativity issues.
    d). Effect of bifurcation on commerce and entrepreneurs.
    e). Implications to financial resources of state government.
    f). Task of post-bifurcation infrastructure development and opportunities for investments.
    g). Socioeconomic, cultural and demographic impact of bifurcation.
    h). Impact of bifurcation on river water sharing and consequential issues.
    i). AP REORGANISATION ACT, 2014 on AP and the arbitrariness of certain provisions.

PAPER-II

1.MATHEMATICS

Real Analysis: Continuity and differentiability of real functions.; Uniform continuity, Sequences and series of functions. Uniform convergence. Functions of bounded variation. Riemann integration.
Complex "Analysis: Analytic functions. Cauchy's theorem Cauchy's integral formula. Laurent's series. Singularities. Theory of residues – Conformal mapping.
Abstract Algebra: Groups – Sub-groups – normal subgroups Quotient group Homomorphism – Fundamental theorem of Homomorphism, Permutation groups: Cayley's theorem – Rings – Sub rings – Ideals – Fields – Polynomial rings.
Linear Algebra: Vector spacers – Basis and dimension – Linear transformations – Matrices – Characteristic roots and characteristic vectors – systems of linear equations – Canonical forms – Cayley – Hamilton theorem.
Differential Equations: First order ordinary differential equations (O.D.E) and their solutions – Singular solutions. Initial value problems for first order O.D.E. General theory of homogeneous and non-homogeneous linear differential equations, variation of parameters. Elements of first order partial differential equations (PDE) Co-ordinate Geometry of Three Dimensions: The Plane – The straight-line – Sphere and cone.
2. STATISTICS

01. PROBABILITY AND STATISTICS:

Sample space, events: Classical, Axiomatic and statistical definition of probability of an event. Addition and multiplication theorems of probability; conditional probability and Bayres theorem.

Random variables: Distribution function and its properties marginal and conditional distributions. Mathematical expectations, mathematical expectation of sum and product of random variables, Moments, variance and covariance. Characteristic function and its simple properties.

Binomial, Poisson, Geometric and Negative binomial distributions and their simple properties (such as mean, variance, characteristic function inter-relationship if any)

Normal, exponential, gamma and beta distributions and sampling distributions, Chi-square, T & F distributions; their inter-relationships and their simple properties.

Collection, classification and analysis of statistical data. Measures of location and dispersion, moments-raw and central. Correlation and regression; regression lines.

Curve fitting by the method of least squares, for the types:
(i) $Y = a + bx^2$; (ii) $Y = a + bx + cx^2$; (iii) $Yx = ab$; and (iv) $Yb = ax^b$

02. INFERENCE:

Conceptual introduction to sufficient statistics unbiased estimators and consistent estimators, Maximum likelihood estimators. Estimation of parameters in Binomial, Poisson normal distributions.

Test of significance, statistical hypothesis, types of errors, level of significance, power of a test, large sample tests for means and proportions (one sample and two sample case). Small sample tests (t-test for one and two sample case). Chi-square tests-testing of goodness of fit, testing independence of attributes.

Run test for randomness, Sign test for location, Wilcoxin-Mamn Whitney test and Kolmogorov-Smirnov test.

References: 1) Hogg & Graig: (1972) Introduction to Mathematical statistics 3rd edition, Amerind Publishing Co. Pvt. Ltd., New Delhi, Bombay, Calcutta,; 2) Saxena and Surendran (1973) Statistical Inference, S. Chand & Company, New Delhi; 3) Fisz M. Probability theory and Mathematical Statistics (3rd edition) John Wiley; 4) Kendall and Stuart. The advanced theory of Statistics (Vol. I Charles Griffin & Co., Ltd., London); 5) Gupta and Kapur Fundamental of Mathematical Statistics (1971) S. Chand & Sons.

03. SAMPLING TECHNIQUES

Simple Random Sampling: Estimates of population mean and population total; Variance of the estimates; estimation of standard error, confidence limits. Sampling for proportions and percentages variances of estimates. Estimation of sample size.

Stratified Random Sampling: Estimates of population mean and population total. Vacancies of the estimates. Confidence limits. Optimum allocation. Relative precision of stratified Random sampling and Simple Random Sampling. Estimation of sample size. Stratified, sampling for proportion.

Regression Estimators: Regression estimates with Preassigned value of b.estimates when b. is computed from sample estimate of variance. Linear regression estimator under a linear regression model.

Regression estimates in stratified sampling Regression coefficient estimated from sample.

Text: William G. Cochran. Sampling Techniques (3rd edition) Willey Estern Ltd., New Delhi, Bombay, Calcutta (1977)

        Sections: Ch. 2:2.1 to 2.8
                     Ch. 3:3.1 to 3.2
                     Ch. 4:4.4 to 4.6
                     Ch. 5:5.1 to 5.12
                     Ch. 7:7.1 to 7.4
                     Ch. 7:8 to 7.10

04. EXPERIMENTAL DESIGNS:

Advantages, disadvantage; layout of the design analysis of the design and missing experimental unit analysis (where applicable) in case of the following design:

Completely Randomised design, Randomised Block design, Latin square design and the Factorial design (22 and 23 factorial designs only)
Text: Walter T. Federer (1974) Experimental Design Theory and Application, Oxford & IBH publishing Co., New Delhi, Bombay, Calcutta.
Chapter IV   :   IV-1-1 to IV-1-5
Chapter V   :   V-1-1 to V-1-4, V-1-6-1
Chapter VI   :   VI-1-1 to VI-6, VI-1-9-1
Chapter VII   :   4-1, VII-1-2

3. ECONOMICS

I. 1. National Economic Accounting, National Income Analysis Generation and Distribution of Income and related aggregates: Gross National Product, Net National Product, Gross Domestic Product & Net Domestic Product (at market prices and factor costs): at constant and current prices.

2. Price Theory: Law of Demand: Utility analysis and Indifference Curve techniques, Consumer equilibrium, Cost curves and their relationships; equilibrium of a firm under different market structures; pricing of factors of Production.

3. Money and Banking: Definitions and functions of money (M1, M2 M3): Credit creation; Credit; Sources, Costs and availability; theories of the Demand for money.

4. International Trade: The theory of comparative costs; Recardian Hockseher Ohlin; the balance of payments and the adjustment mechanism. Trade theory and economic growth and development.

5. Economic growth and development; Meaning and measurement; characteristics of under development; rate and pattern, Modern Growth; Sources of growth distribution and growth-problems of growth of developing economics.

II. Indian Economy-India's economy since Independence; trends in population growth since 1951, Population and poverty; general trends in National Income and related aggregates; Planning in India Objectives, Strategy and rate and pattern of growth; problems of Industrialization strategy; Agricultural growth since Independence with special reference to food-grains; unemployment; nature of the problem and possible solution, Public Finance and Economic Policy.

III. Identification of backward regions and the problems of regional development with special reference to Andhra Pradesh.

4. COMPUTER SCIENCE

Computer Organization: Memory Organizations, CPU Organisation, Assembly Language, Microprogramming, Input-Output Organization, Intel 8086 Computer.
Programming: Programming in C, Object oriented programming concepts including classes, Polymorphism, Inheritance, and Programming in C++ and Java.
Data Structures: Arrays, Records, Linked Lists, Trees, Binary Tree Traversal, Binary Search Trees, and Graphs.
Design and Analysis of Algorithms: Algorithm complexity, Algorithms Design Techniques – Divide and Conquer, Greedy Method, Dynamic Programming, Backtracking, Branch and Bound, NP-Hard and NP-Complete Problems.
Principles of Programming Languages: BNF, Variables, Data Types, Control Structures, Scope and Extent, Data Abstraction, Concurrency concepts, Exception Handling, Functional Programming, and Logic Programming.
Compiler Design: Types of grammar, Phases of compiler, Lexical Analysis, Parsing Techniques, Code generation and Optimization.
Operating Systems: Introduction, Process and CPU Scheduling, Process Synchronization, Deadlocks, Disk and Memory Management, Virtual Memory, File System Interface and Implementation, Protection and Security.

Database Management Systems: Introduction, Relational Model and Languages, Data Modelling, Database Design Theory and Methodology, SQL, Transaction Processing & Concurrency control and Database Recovery & Security.

Computer Graphics: Line Drawing, Graphic Primitives and Polygons, 2D Transformations, Windows and Clipping, 3-D Graphics, Curves and Surfaces.

Computer Networks: Introduction, Seven Layers in OSI Model, Internetworking, and TCP/IP Model.

Distributed Operating Systems: Goals, Client-Server Model, Synchronization in distributed systems, Distributed Process Management and File Systems, Distributed Shared Memory.

Software Engineering: Software Characteristics, Software Process Models, Analysis, Design, Coding, Testing, and Software Quality Assurance.

Object oriented Analysis and Design: Introduction to UML, Basic Structural Modelling, Classes and Object Diagrams, Behaviour Modelling and Architecture Modelling.

Network Security: Data Encryption and Decryption, Symmetric Key algorithms like DES, IDEA and AES, Public Key Cryptography, RSA algorithm, Digital Signatures & Authentication, Firewalls and VPN.

Sd/-
SECRETARY