ODISHA STAFF SELECTION COMMISSION
Barrack No.1, Unit – V, Bhubaneswar – 751054

No.IIE-161/2015- 1155 /OSSC., Date: 10.3.2017.

ADDENDUM

(Syllabus for the post of Senior Economic Investigator)

In continuation to the Advertisement No.5466/OSSC dtd.23.12.2015, the syllabus of Main(written) Examination for recruitment to the post of Senior Economic Investigator is as follows:-

Secretary 10/3/17

Annexure-a(i)

SYLLABI FOR SENIOR ECONOMIC INVESTIGATOR (SEI) IN (GROUP-C) OF ODISHA SUBORDINATE PLANNING SERVICE CADRE

ECONOMICS

Microeconomics

Theory of consumer behaviour, indifference curve approach; consumer's equilibrium; income, substitution and price effects; production function; law of variable proportions; isoquants: factor substitution; equilibrium of the firm with respect to input use; price determination under perfect competition, monopoly and monopolistic competition, Pareto's welfare criteria.

Macroeconomics

Say's law, the Keynesian theory of income determination, investment multiplier, Keynesian theory of interest, IS-LM approach to the determination of interest.

Money, Banking and International Trade

Inflation-causes and effects; demand pull and cost push inflation, control of inflation, commercial banking; credit creation, investment policy, recent reforms in Commercial Banking; functions of a Central Bank.

International Trade: Ricardian and Heckscher-Ohlin theories, free trade Vs. Protection; balance of trade and balance of payments, Disequilibrium in balance of payments, causes and methods of its correction.

Indian Economy

Land reforms, new agricultural strategy and green revolution, agricultural marketing and pricing, rural credit system, new economic policy, industrial policies, industrial licensing policy – MRTP ACT, FERA and FEMA, Role of public sector and private sector in industrial development.

Public finance

Public good and private goods, externalities and the role of Government, effects of tax on production, distribution and economic activities; principles of taxation: benefit theory, ability to pay theory, direct and indirect taxes, balanced and unbalance budget; deficit financing.

Development and Environmental Economics

Indicators of economic development, Marxain theory of development, Schumpeter and capitalist development, Harrod-Domar theory of steady growth, WTO and developing Countries, Environment and Economic linkage, market failure for environment goods, concept of sustainable development, obstacles to sustainable development.

Role of foreign capital and technology in growth. The significance of multinationals.

Welfare indicators and measures of Growth-Human development indices-The basic needs approach.

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Concept of sustainable development; convergence of levels of living of developed and developing Countries; meaning of self-reliance in growth and development.

I. Indian economics in post-independent Era-contributions of Vakil, Gadgil and Rao. National and per capita income; patterns, trends, aggregate and sectoral composition and changes therein. Broad factors determining national income and its distribution; measures of poverty. Trends in below poverty-line proportion.

II. Employment: Factors dreaming employment in short and long periods. Role of Capital, wage-goods, wage-rate and technology. Measures unemployment. Relation between income, poverty and employment, and issues of distribution and social justice. Agriculture-institutional set-up of land system, size of land holdings and efficiency –green revolution and technological changes- agricultural prices and terms of trade- role of public distribution and farm subsidies on agricultural prices and production. Employment and poverty in agriculture-rural wages-employment schemes growth experience-land reforms. Regional disparities in agricultural growth. Role of agricultural in expert.

III. Industry: Industrial system of India: Trends in composition and growth. Role of public and private sectors, role of small and cottage industries. Indian industrial strategy-Capital versus consumer goods, wage-goods versus luxuries, capital-intensive versus labour-intensive techniques, sickness and high-cost industrial policies and their effects. Recent moves for liberalisation and their effects on Indian industry.

IV. Money and Banking: The monetary institutions of India: Sources of reserve money, techniques of money supply regulation under open economy. Functioning of money market in India. Budget deficit and money supply. Issues in reform of monetary and Banking Systems.

V. Index numbers of price levels-course of price level in post-independence periodsources and causes of inflation-role of monetary and supply factors in price level determination – policies towards control of inflation. Effects of inflation under open economy.

VI. Trade; Balance of payments and exchange: Foreign trade of India; composition and direction shifts in trade policy, form import submission to export promotion. Impact of liberalisation on pattern of trade. India's external borrowings-the debt problem. Exchange rate of the rupee; devaluations, depreciations and their effects on balance of payments-convertibility on current and capital accounts-rupee in an open economy. Integration of Indian economy with World economy-India and the WTO.

VII. Public Finance and Fiscal Policy: Composition of and trends in India's public Revenue and expenditure-role of taxes (direct and indirect) and subsidies-fiscal deficits-public expenditures and their significance-public finance and inflation – debt trap and limiting Government's debt-recent fiscal policies and their effects.

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Annexure-a(ii)

APPLIED ECONOMICS

Module I

Functions in Economics: Utility, Revenue, Cost, Demand, Supply, Production functions; Differentiation- Partial and Total: Rules and uses in economics Utility, Revenue, Cost, Demand, Supply, Production functions; Concept of elasticity: demand and supply; Homogeneous production function; Features and uses of Cobb-Douglas production and CES production function; Integration – Rules and application in economics; Consumer's surplus and producer's surplus.

Module II

Matrix- Types of matrices, Algebra and matrices- Transposition, Inversion, Rank of a matrix; Determinants – Their properties and types; Solution of a system of equations; Classical optimization: uses in economics – consumer behaviour, producer's bahavior, maximization of profit in perfect and imperfect product and factor markets; Constrained optimization in economics; Linear optimization techniques: game theory, input-output analysis, and linear programming and their uses in Indian Planning and Economy; Manpower Planning for Economy.

Module III

Uses of measures of central tendency and dispersion in economics; Measurement of income inequalities and regional disparities; Growth accounting; Uses of correlation and regression in economics; Hypotheses testing and drawing inference about population variances and tests of goodness of fit and Independence; Demand forecasting; Project appraisal: financial, economic and social; Uses of Index Number for change in prices and standard of livings.

Module IV

Overall and sectoral composition and growth pattern of Indian economy since independence; Performance of agricultural, industrial and service sector in India since independence, Review of India's five year plans (targets, achievements and causes thereby) and Indian Plan Modules; Feldman-Mahalanobis Model, Nehruvian Model; Gandhian Model, and Rao-Singh Model; Composition and trend of Indian tax system, Centre-State financial relationship; Finance Commissions and Planning Commission; Monetary and fiscal police of India.

Module V

Traditional System of National Accounts (SNA) and Green accounting; SNA in India; measurement and growth of GDP, disaggregated accounts; Economic Growth theories; classical, neoclassical, endogenous, and cumulative causation theory convergence hypothesis and World economy; Growth trajectory of India; Composition, direction, and trends of India's export and import; Economic reforms and Indian economy.

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Annexure-a(iii)

AGRICULTURE ECONOMICS

Agriculture Economics, Scope and Importance, Demand and Elasticity of demand, price determination under different market structures, National Income, Public Expenditure, Public Revenue, Inflation, Institutional Agencies in Agricultural Credit, Commercial Banks, Regional Rural Bank, NABARD, Economic feasibility tests of credit, tools of farm financial analysis, Agricultural Price Policy, WTO and its agreements, land reforms, agriculture in five year plans, Agricultural marketing and its classifications, Marketing efficiency, Speculation, Hedging, Role of Government in Agricultural Marketing like NAFED, NCDS, Public Distribution System (PDS), Bureau of Indian Standards (BIS), Role of agriculture in Indian Economy.

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Annexure-a(iv)

RESOURCE ECONOMICS

Farm Resource Management like land, labour and capital, Principles applied to farm Management, Factor-product relationship, Factor-factor relationship, Product-product relationship, Resource use efficiency and returns to scale, Farm Inventory, Farm Accountancy and records, Farm efficiency measures, Farm Planning and Budgeting measurement and measurement of risk and uncertainty in agriculture, Government programmes for conservation and development of natural resources, Agro-based Industries, project, Definition, Project cycle identification, Formulation, Appraisal Implementation, Monitoring and Evaluation, Appraisal and evaluation technique, NPW BCR, IRR, Preparation of project feasibility reports in agriculture and allied sector.

COMMERCE

FINANCIAL ACCOUNTING: Definition, Branches of Accounting, Functions, advantages and Limitations of Accounting, Basic Accounting concepts and Accounting standards: Indian Accounting standards, Financial Accounting Principles concepts and conventions, Accounting process; recording of business transactions in journals and ledgers, preparation of trail balance, Final Accounts, Capital and Revenue expenditure and incomes.

CORRELATION AND REGRESSION, INDEX NUMBER

TIME SERIES: Meaning, causes of variations in time series data. Components of a time series, Decomposition – additive and multiplicative model. Determination of trend moving average method. Least square (including linear, second degree and parabolic trend), Computation of seasonal indices by simple averages, ratio-to-trend, ratio-to-moving average and link relative methods. Business Forecasting – Concept, types and importance, Forecasting-Concept, types, and importance, forecasting theories and methods of forecasting.

THEORY OF PROBABILITY: Probability concept, definition, Addition and multiplication, theorem, conditional probability, Baye's theorem mathematical expectation. Probability distribution – Binomial, Poisson and Normal distribution, their properties, parameters and application to business.

GLOBALIZATION, WTO AND MNC: Globalization – stages and methods, advantages and disadvantages of globalization, essential conditions for globalization, WTO: Evolution and development, Organization structure.

MNC: Growth of MNC, advantages and disadvantages of MNC, design and structure of MNC, MNCs in India.

QUANTITATIVE TECHNIQUES: An introduction, Meaning and characteristics of Quantitative Techniques; Classification of Quantitative Techniques; Statistical Techniques; Programming or Operations Research Techniques; role of quantitative Techniques in Business and Industry; Quantitative Techniques and Business Management; Benefits and Limitations of Quantitative Techniques.

OPERATION RESEARCH FOR DECISION MAKING: Historical background and development, Operation Research Approach, Models in Operation Research, Stages of Operation Research Projects, Classification of decision Models, and scope of Operation Research in Management.

LINEAR PROGRAMMING: Meaning of Linear Programming, Fields where linear programming can be used; Basic concepts and notations; General form of the linear programming model; solution to a Linear programming model; graphical solution; simplex solution; rules for Ties; interpretation of the simple solution; Graphical solution; Simplex solution; degeneracy; Sensitive Analysis and Limitation of Linear programming .

CORPORATE GOVERNANCE AND ITS PRACTICES IN INDIA: Meaning and origin of corporate Governance, Theories of corporate Governance – agency theory sources and costs of agency conflict, stakeholders theory, corporate Governance mechanisms internal and external, corporate governance models US-UK Model, European model and Japanese model, linkage between corporate Governance and economic development, Governance models in India – managing agency model, business house model and Anglo American model, progress of Governance in India.

BUSINESS ETHICS AND CORPORATE SOCIAL RESPONSIBILITY: Business ethics - Meaning, need, values, Nature and goals of business ethics, Business ethics and the law, Ethics and ethos- morality, virtue and social ethics, ethical perspective of managers, Ethical theory – Ethical relativism and reasoning in ethics – Psychological egoism-modern ethical theory, utilitarian ethics – Deontological ethics – Virtue ethics, corporate social responsibility – The classical model of corporate social responsibility, critical assessment of the classical model.

INVESTMENT DECISION: Capital Budgeting, Estimation of cash flows for new projects, Investment evaluation techniques, payback period, Accounting Rate of Return, Net Present Value, Internal Rate of Return and Profitability Index, Conflicts between NPV and IPR.

COST OF CAPITAL: Assumptions cost of individual sources of Capital weighted average cost of capital, factors affecting dividend policy and forms of dividend.

COMMERCIAL BANKING: Functions of Commercial Banks, Balance sheet of a Commercial Bank, Credit Creation, Investment Policy, Role of Commercial Banks.

CENTRAL BANKING: Functions of Central Bank, credit control – quantitative and selective measures, Reserve Bank of India – functions and its monetary policy.

DEVELOPMENT OF MANAGEMENT THOUGHTS: Clasical or traditional theories of management, Max Weber Bureaucratic model, scientific management theory of F.W. Taylor, Administrative Management approach by Henry Fayol, Neo classical theories (Elton Mayo, Abraham Maslow, McGregor, Renis Likert, Chester I Bernard).

MODERN MANAGEMENT THEORIES: Quantitative, system and contingency approach. Planning, nature of planning, importance of planning, principles of planning, types of planning and planning process.

BUSINESS ENVIRONMENT: Internal & External environmental factors, strategy formulation, decision making, types of decisions, techniques of decision making, MBO, features of MBO, process of MBO, Benefits of MBO.

JOINT STOCK COMPANY: Introduction, incorporation, types of securities issued by companies, underwriting of issue of securities, SEBI guidelines on Issue of Shares, Issue, forfeiture and Re-issue of forfeited shares, issue of rights and bonus shares, sweat equity shares, Employees stock option scheme.

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Annexure-a(vi)

MATHEMATICS

CALCULUS- I AND ORDINARY DIFFERENTIAL EQUATIONS

Limit, Continuity & Differentiability for function of one variable with special emphasis on Rolle's Theorem, Mean Value Theorem, Taylor's Theorem, Maclaurin's Theorem. (Statements only).

Derivatives of arc, Curvature, Asymptotes & tracing of Curves

Rectification, Quadrature, Volume and Surface area of Solids of revolution

Basic concepts of Differential Equations, Ordinary Differential Equation of First Order and first degree, Equations of First Order but of higher degree.

Linear differential equations with constant coefficients, Linear differential equations with variable coefficients.

CALCULUS- II AND NUMERICAL ANALYSIS

Functions of several variables, Repeated limit and simultaneous limit, continuity, partial derivatives of first and higher orders, Definition, Functions of functions, Derivative of composite functions,

Vector differentiation, Gradient, divergence and curl

(a) Line and Surface and Volume Integrals.

(b) Polynomial Interpolations: Existence and uniqueness of interpolating polynomial, Lagrange's interpolating polynomial, Divided difference interpolation formula, Properties of Divided difference, Newton's forward and backward difference interpolation.

Numerical solution of non-linear equation: Method of Bisectin, Regula Falsi Method, Secant method, Newton-Raphson Method.

Numerical Integration: Some simple Quadrature rules, Newton-Cotes rules, Trapezoidal rule, Simpson's 13rd rule, compound quadrature rules. Numerical solution of differential Equations, Picad's method, Euler's Method.

ABSTRACT ALGEBRA AND ANALYSIS

Groups, subgroup, counting principle, Normal Subgroups, Quotient groups

Homomorphisms of Groups, Rings, Some special types of Rings

(c) Homomorphism of Rings, Ideals and Quotient Rings

(d) Algebra of real numbers, lub and glb, order completeness, Density

Convergence of sequences, limit theorems, Weierstrass completeness principle, Cantor's Completeness principle, subsequences and Bolzano-Weierstrass theorem. Convergence of series, series of positive terms.

Analytic properties of R and C.

LINEAR ALGEBRA AND OPERATIONAL RESEARCH

Vector spaces, sub-spaces, Span of a set, Linear Dependence and Independence, dimension and basis. Linear Transformation, definition and examples of range, kernel, rank & Nullity.

Inverse of Linear Transformation, Elementary row operations. System of linear equations, Inverse of Matrix, Determinant, Minors and rank of a Matrix.

(a) Product of determinants, application to linear equations, Eigen vectors

(b) Linear Programming Problem, Formulation and graphical solution

Convex sets and their properties, slack variables, surplus variables, Fundamental theorem of Linear programming.

Simplex Methods, Artificial Variables Technique:— Two Phase Method, Big-M Method.

Complex Analysis and Programming in C

Function of complex variable, limits and theorems on limit. Continuous function, differentiability. The Cauchy-Riemann equations, Analytic functions. Definite integral.

Cauchy's Theorem (statement only), Cauchy's integral formula, Higher order derivative (statement of theorem only 6.12 & 6.13). Taylor's series, Maclaurin's series, Laurent's series, Zero's of an Analytic function.

(a) Singularities (only definition and type of singularity with simple example and only statements of the Theorem). Residues, Cauchy's Residue Theorem.

(b) Functions and Processing character strings

Simple Computer Programs, Numeric Constants and variables, Arithmetic Expressions, Input and Output in C Programmes, Conditional Statements.

Implementing Loops in Programs, Defining and Manipulating Arrays. Logical Expressions and more Control Statements.

Analysis-II and Discrete Mathematics

Absolute convergence. conditionally convergent series. power series. Uniform continuity Multiplication series.

Riemann's integral and properties, continuity and integrability fundamental theorem of integral Calculus.

(a) Cauchy's Principle of convergence, lim sup and lim inf.

(b) Logic, Propositional equivalences, Predicates and quantifiers, Nested Quantifiers and Methods of proof.

The Basics of counting, the pigeonhole principle, Generalized permutations and combinations. Recurrence Relations, Solving Recurrence Relations.

Introduction to Graphs, Graph Terminology, Representing Graphs and Graph Isomorphism. Connectivity and Euler and Harmilton Paths.

Probability & Partial Differential Equations

Random variables and Probability Distribution. Combinational Analysis and Probability

Mean and Variance, Poisson Distribution and Normal Distribution

Simultaneous linear first order equations in three variables, Method of Solution, Paffian differential equation, Condition of integrability, Methods of obtaining the Primitive solution, homogenous equations.

Partial differential equation of 1st order, Introduction, formation of 1st order Partial differential equations. Linear and non linear partial differential equation of 1st order, Special type of 1st order equation.

Linear Partial differential equations with constant co-efficient and variable co-efficients. Non Linear equations of 2nd order (Monge's method of integration Rr + Ss + Tt= v).

Differential Geometry and Number Theory

Divisibility, Theory in Integers, Primes and their distribution

The theory of Congruencies, Fermat's theorem

Euler's Generalization of Fermat's theorem

Introduction, Curvesed with torsion, Envelopes and developable surface

Curvilinear coordinates on a surface, Fundamental magnitudes

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Annexure-a(v)

SOCIOLOGY WITH STATISTICS AS ONE OF THE PAPER

SOCIOLOGY

Basic sociological concepts: Society, Community, Culture, Group, Norms and Values, Status and Role, Institution, Power and Authority. Social Interaction and Process: Cooperation, Completion, Conflict, Accommodation and Assimilation.

Sociological Perspectives on Change and Development: Evolutionary, Functionalist, Conflict, Innovation and diffusion perspective.

Development: Concept, Indicators and Approaches. Growth and GDP, Basic Needs, Quality of Life, Wellbeing, Human Development Index, Gender Development Index. The Capability approach. The Social Capital approach. Bottom-up approach: Participative Development and Empowerment. Sustainable Development. Models of Development: Capitalist, Socialist and Gandhian.

Indian Social System: Unity and Diversity. Social stratification and inequality in India: Caste, Class and Gender. Dominant Castes, Caste and Politics in India. Social Change in India: Urbanization, Industrialization, Secularization, Sanskritization and Modernization.

Rural community and Urban community: Nature of rural and urban lives. Rural-Urban Continuum. Migration. Programmes for Urban Development and Rural Development in India.

Social Problems and development policy, in India: Poverty, Inequality, and Exclusion. Problems of the underprivileged: Scheduled Castes and Scheduled Tribes and their development. Development and Displacement. Decentralized planning and development: Role of PRIs and Community Based Organizations.

The concept of Social Planning. Objectives of social planning. Planning and Development. Social determinants and consequences of economic development. Role of Social analysis in Planning. Applied Sociology and its importance in planning and policy. Ethics in planning.

Gender and Development: Culture, Socialization and Gender: Gender Roles and Theories of Gender Relations: Liberal feminism, Radical feminism, Marxist feminism, Ecofeminism. Women, Labour and the Economy. Women, Law and Human Rights. Gender, Power relations and empowerment. Gender Analysis in Development planning. Approaches to Gender and Development- Welfarist and Rights-Based approach. Mainstreaming Gender policies and Programmes in India.

Globalization: Economic and Cultural; Social Impacts of Globalization. Globalization, Development and Environment problems. Climate Change, Loss of Biodiveristy, Global warming.

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STATISTICS

Probability, Probability distribution (binomial, poison & normal distribution)

Compilation, classification, tabulation of statistical data, graphical presentation of data.

Measure of central tendency, measure of dispersion, measure of association and contingency, scatter diagram, correlation, rank correlation coefficient and linear regression analysis for two variables.

Concept of population, sample, parameter, statistic, sampling distribution and principle of sampling, simple random sampling, stratified sampling, sampling and non-sampling error.

Concept of hypothesis: null and alternative hypothesis, type-1 & type-2 error, testing of hypothesis for large sample and as well as small sample including chi-square, t, f test.

Time series analysis, component of variation, index number, demographic method
Official statistics, CSO, NSSO.

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Part-B (Human, Economic and Regional Geography)

4. Human and Settlement Geography

Racial Division of Mankind and their spatial distribution, Cultural Realms of the World, World Distribution of population-physical, economic and social factors influencing spatial distribution; World Population Growth and Urbanisation, Migration-internal and international. Definition of urban and rural settlements, Classification of Urban Settlements, Structure and Morphology of Rural and Urban settlements.

5. Geography of India

Physiography, Drainage, Climate, Natural Vegetation, Climatic regions of India. Soil types of India-their distribution and characteristics; Vegetation types and their distribution. Spatial distribution of population, population explosion; urbanization, Agricultural growth during the plan period; Green Revolution *vis-à-vis* traditional farming; Agricultural regions, Distribution of major mineral resources and industries; iron ore, Chromite, Alluminium, Copper, Coal, Oil, Natural Gas, Industrial development and Industrial regions of India, globalization and its impact on development.

6. Economic Geography

Classification of economies, Sectors of economy-primary, secondary and tertiary; Natural resources, classification- renewable and non-renewable- biotic and abiotic, Conservation of resources, Agricultural-physical, social, cultural environmental influences on crop production; Spatial distribution of major food and cash crops, Agricultural types and classification, Minerals and Industries-classification of minerals: World distribution, energy minerals and resources. Industries: factors of localisation, Major industries-iron and steel, textile, chemicals, ship buildings, small scale and cottage industries. Transport: geographical factors in their development, Major water, land and air transport; World Trade Organization (WTO), globalization and their effect on developing Countries of the World. Concept of sustainable development.

REGIONAL PLANNING

1. Concept of Region and Regional Planning.
2. Types of Regional Planning.
3. Delineation of Region.
4. Utility of Regions in Regional Planning.
5. Planning Problems, short term and long term perspective.
6. Developmental strategies for planning a region.
7. Role of Secondary Cities and decentralized Regional Development.
8. Regional imbalance and Regional Disparities in India.
9. Planning Regions of India.
10. Measurement of level of Development
11. Regional Disputes
12. Regional Planning efforts in India through plan periods.
13. Concept of Multi-level Planning
14. Integrated Rural Development Planning
15. Block-level Planning
16. Watershed management Plan

Annexure-a(viii)

GEOGRAPHY WITH REGIONAL PLANNING AS ONE OF THE PAPER

GEOGRAPHY

Part-A (Physical Geography)

1. Geomorphology

The nature and scope of Physical Geography; Geological time Scale, Earth's Interior, Wegner's theory of Continental Drift, Theories of Mountain Building; Plate Tectonics. Isostasy, Earthquakes and Volcanoes, Weathering; Mass wasting, Geomorphic agents and processes: erosion, transportation and deposition; Evolution of landscape; Concept of cycle of erosion, Fluvial, Arid, Glacial, Karst and Coastal landforms.

2. Climatology

Weather and climate; Elements of weather and climate; Composition and structure of the atmosphere, Insolation and global energy budget, vertical and horizontal distribution of temperature. Atmospheric pressure and winds: horizontal distribution of pressure; planetary, periodic and local winds, Atmospheric moisture: humidity and forms of condensation; types precipitation, Air masses and fronts: concept, classification and Modification. Tropical and temperate cyclones; thunderstorms and tornadoes, global warming- causes and consequences.

3. Oceanography & Biogeography

Configuration of the ocean floor, continental shelf, continental slope, abyssal plain, mid-oceanic ridges and trenches, Relief of Atlantic, Pacifica and Indian Oceans. Distribution of salinity of oceans and seas., Circulation of oceanic waters: waves, tides and currents: currents of the Atlantic, Pacific and Indian Oceans. Marine deposits and their types, coral reefs and their origin., Environment and eco-system, Food Chain, Food Web and energy recycling, Concept of Biome, Major Biomes of the World.

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Annexure-a(ix)

STATISTICS WITH ECONOMETRICS AS ONE OF THE PAPER

STATISTICS

Probability, Probability distribution (binomial, poison & normal distribution)

Compilation, classification, tabulation of statistical data, graphical presentation of data.

Measure of central tendency, measure of dispersion, measure of association and contingency, scatter diagram, correlation, rank correlation coefficient and linear regression analysis for two variables.

Concept of population, sample, parameter, statistic, sampling distribution and principle of sampling, simple random sampling, stratified sampling, sampling and non-sampling error.

Concept of hypothesis: null and alternative hypothesis, type-1 & type- 2 error, testing of hypothesis for large sample and as well as small sample including chi-square, t, f test.

Time series analysis, component of variation, index number, demographic method

Official statistics, CSO, NSSO.

ECONOMETRICS

Meaning and scope of econometrics; two variable linear regression model – its assumptions, ordinary least square method of estimation of parameters and properties of estimators; Gauss Markov Theorem; Coefficient of determination; Normally assumption and statistical inference; Prediction in two variable linear regression mode.; Analysis of Variance of tow variable LRM.

K - Variable LRM: Estimation of Parameters and properties of estimators, Gauss – Markov theorem; Testing of significance of single co-efficient and subject of coefficients; ANOVA; Adjusted coefficient of determination.

Problems in Regression Analysis: Multicollinearity – sources, effects, detection and solution; Specification Errors and Measurement errors.

Problems in Regression Analysis: Heteroscedasicity – Consequences, detection and remedy; Generalized Least square and weighted least square estimation; Auto-correlation: Detection, Consequences and remedy.

Regression with Dummy Variables: Dummy independent variables – dummy variable trap, Testing structural stability regression models comparing two regressions, interaction effects, estimating seasonal effects, ANOVA vs. ANCOVA, piecewise linear regressions.

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Annexure-a(x)

STATISTICS WITH REGIONAL PLANNING AS ONE OF THE PAPER

STATISTICS

Probability, Probability distribution (binomial, poison & normal distribution)

Compilation, classification, tabulation of statistical data, graphical presentation of data.

Measure of central tendency, measure of dispersion, measure of association and contingency, scatter diagram, correlation, rank correlation coefficient and linear regression analysis for two variables.

Concept of population, sample, parameter, statistic, sampling distribution and principle of sampling, simple random sampling, stratified sampling, sampling and non-sampling error.

Concept of hypothesis: null and alternative hypothesis, type-1 & type- 2 error, testing of hypothesis for large sample and as well as small sample including chi-square, t, f test.

Time series analysis, component of variation, index number, demographic method

Official statistics, CSO, NSSO.

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REGIONAL PLANNING

1. Concept of Region and Regional Planning.
2. Types of Regional Planning.
3. Delineation of Region.
4. Utility of Regions in Regional Planning.
5. Planning Problems, short term and long term perspective.
6. Developmental strategies for planning a region.
7. Role of Secondary Cities and decentralized Regional Development.
8. Regional imbalance and Regional Disparities in India.
9. Planning Regions of India.
10. Measurement of level of Development
11. Regional Disputes
12. Regional Planning efforts in India through plan periods.
13. Concept of Multi-level Planning
14. Integrated Rural Development Planning
15. Block-level Planning
16. Watershed management Plan

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Annexure-a(xi)

BUSINESS ADMINISTRATION

1. Business Communication
2. Organisational Structure and System
3. Micro Economics
4. Business Statistics
5. Business Law
6. Marketing Management
7. Financial Accounting
8. Computer for Management
9. Principle of Management
10. Management Information System
11. Computerized Accounting and Auditing
12. Quantitative Methods
13. Organizational Behaviour and Business Ethics
14. Production and Operation Management
15. Human Resources Management, Financial Management
16. Cost and Management Accounting
17. Banking, International Trade and Finance
18. Advertising Management
19. Sales and Distribution Management
20. Rural Marketing Management
21. Service Marketing Management
22. Expert Management
23. Consumer Behavior and Market Research
24. Investment Management
25. Indian Financial System
26. Principles of Banking
27. Principles of Insurance & Risk Management
28. Corporate Accounting
29. Tax Management

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Annexure-a(xii)

COMPUTER SCIENCE

Computer Architecture

Number System and Codes

Binary Number base Conversations, Octal and Hexadecimal numbers, Complements, Signed Binary Numbers. Binary Codes-BCD Codes. Gray Code, ASCII Character Code, Codes for serial data transmission and storage. Boolean Algebra and Logic Gates. Axiomatic definition of Boolean algebra. Basic theorems and properties of Boolean algebra, Boolean functions; Canonical and Standard forms: minterms and maxterms standard forms; minterms and maxterms, standard forms digital Logic Gates, multiple inputs. Gate Level Minimization. The Map Method, K Maps, input five variables, Product of Sums Simplification, Don't care conditions. Nand and NOR implementation.

Combinational Logic

Combinational Circuits, Analysis and Design Procedure; Binary Adder-Subtractor, Decoders, Encoders. Synchronous Sequential Logic. Sequential Circuit, Latches, Flip-flop, Analysis of Clocked Sequential Circuits, Registers and Counters Shift Register, Ripple Counters, Synchronous Counters Asynchronous Counter.

Basic Structures of Computers

Functional units, operational Concepts, Bus structures, Software, Performance, Multiprocessors and multicomputers. Machine Instruction and Programms: Memory location and addresses, Memory Operations, Instructions and instruction Sequencing, Addressing modes, Assembly Language, Basic Input/ Output operations, sub routine, additional instructions.

Basic Processing Units

Fundamental concepts, execution of complete instructions, Multibus organization, Hardwired control, micro programmed control. Memory System: Basic Concepts, cache Memory, performance consideration, Virtual memories, Memory Management requirement, secondary storage.

8085 Microprocessor Architecture

Instruction Sets, Addressing modes, Memory Interfacing, Assembly Language Programming. 8086 Microprocessor Architecture: Instruction Sets, Addressing modes, Memory Interfacing, Assembly Language Programme.

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Operating System

Introduction:

What is Operating System, Simple Batch Systems, Multiprogramming and Time sharing System, Personal Computer System, Parallel and distributed System, Real time system. Operating System Structures: System Components, Operating System Services, System Calls. Process Management: Process concept, Process Scheduling, Operation on Process, Cooperating Process, Threads.

CPU Scheduling

Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Dead locks: System model, Dead lock characterization, methods of handling dead locks, Dead lock prevention, Dead lock avoidance, Dead lock detection, Recovery from dead lock.

Memory Management

Backgrounds, Logical versus physical address space, swapping, Contiguous Allocation, Paging and segmentation.

Virtual Memory

Backgrounds, Demand paging, Performance of Demand paging, Page replacement, Page replacement algorithms. Allocation of frames, Thrashing.

File System Interface

File Concept, Access Method, Directory Structure, I/O Hardware, Karnel I/O System, Secondary Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap Space management, Disk Reliability.

Programming in C and Data Structure

Over View of C

Problem solving Technique, Flowchart, Sample C program and Basic Structure of C Program. Constants, Variables and Datatypes, Operators and Expression, Managing Input and Output Operators, Decision Making and Branching and looping.

Arrays, Handling of Characters and Strings, User Defined function

Structures and Union, Pointers

Data Structure

Abstract Data type, Notion of an Algorithm, O notations, Implementation of arrays, the stacks and queues and its operations.

Linked list

Single, Double linked list and its operators. Trees: Binary Tree and the traversing algorithm

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Relational Database Management System (RDBMS)

Database and Database users, Database system concepts and architecture:

Data models, scheme and instance, three scheme architecture and data independence, database language, classification of Database Management System. Entity Relationship (ER) model, Enhanced Entity Relationship model.

Relational Data Model, Mapping of ER-model to Relational model, Relational algebra, Tuple relational calculus, Domain relational Calculus, SQL

Functional Dependency, Inference rules for functional dependency, minimal set of functional dependency. Normal forms, Dependency preservation loss less design

Transaction processing:

Introduction to transaction processing, transaction and system concept, serializability and recoverability.

Concurrency control technique: Two phase locking for concurrency control technique, concurrency control based on timestamp ordering.

Introduction to object oriented database:

Overview object orient concept, object identity, object structure, type constructors, encapsulation of operation, methods and persistence, inheritance. Database security and authorization.

Object Oriented Programming (OOPS) Using C++ and Java

C++ Programming Language

Programming paradigm, Declaration and Constants, Expression and statement, function and files, Linkage, how to make a library Functions, support for Object oriented Programming Object Oriented System Modularization through Procedures Versus Objects. Classes and Objects, definition of Classes, features of classes. Class declaration: Data members, member function, Private and Public members Default labels, Arrays within a class, Class Member Function definition inside the class declaration and Accessing Class data members, Accessing Member functions. Outside the class declarations, scope resolutions operator (::), Private and Public member function. Nesting of Member functions. Creating Objects, Destroying Objects.

Inheritance through Extending Classes

Concept of inheritance, Base class, Derived class, Defining derived classes, Visibility modes, Private, Public, Protected, Single inheritance, Privately derived, Protected derived, Publicly derived Making a protected member inheritable, Access control to private and protected members by member functions of a derived class, Multilevel inheritance, Multiple

inheritance, Hierarchical inheritance, hybrid inheritance, Virtual Base Class. Nesting of classes.

Polymorphism, Operators and Typecasting

Friend Function and Friend Class. A string class, Polymorphism: function overloading Operator overloading, Rules for Overloading Operator function, Unary and Binary Operator Overloading. Runtime Polymorphism through Virtual function Pure Virtual Function. Data Conversion: System defined to User defined type, User defined to System defined and User defined to user Defined type conversion.

Formatting I/O Streams and File I/O Streams

C++ streams classes, Unformatted I/O operation, formatted I/O Operation, managing output with manipulators. Classes and File Streams Operation. Opening and closing a file. Detecting end of file. I/O operation. Updating a file (Insertion. Deletion and Modification).

Including Java Program

Elements of Java, Java history, Basic Java features, introduction to Java Environment, how java is different from C++ Simple Java program structure, package statements, class definition, interface, I/O operation in Java, Error & Exception, Applet programming.

Software Engineering

Introduction

The problem domain, software engineering challenges. Software process models: Water fall model, Prototypes, spiral and reuse oriented development, Comparison of models, Project management process, Risk Management.

Software requirement analysis and specification

Needs for SRS, requirements engineering, requirement elicitation and analysis, characteristics of a SRS, components of an SRS, Structure of a requirement document. Function specification with use cases requirement validation.

Software design

What is a good design, software design principles- cohesion and coupling and their types. Software design approaches-function oriented software design,; Structured analysis and structure design, DFD, structure chart, detailed design. Object model using UML: Basic mechanism, key concepts, related technical term and advantages. UMI diagrams: Use case diagram, class diagram, interaction diagram, activity diagram, State chart diagram.

Coding and Testing

Programming principles and guidelines, coding process, code review and verification: Code Inspections, static analysis, proving correctness, unit testing, combining different

chniques. Size measures memcs. Black box testing White box testing. cyclomatic complexity, integration testing, system testing

Software reliability and quality management

Hardware vs. Software reliability, reliability metrics, software quality and its management system – ISO 9000, SEI, CMM, Six Sigma, CASE and its environments and its benefits. Software re-engineering and reverse engineering Maintenance process models

Simple C++ Program

Stream based I/O Use of Scope Resolution Operator, Variable aliases Reference variable, parameter passing by reference, Inline function, Default arguments in function.

Class and Object

Class specification, Class object definition, accessing class members, Defining class member function inside class body and outside class body, pointers within class, Friend function and friend classes, constant parameters and member function, Static data and member function. Constructor, parameterized constructor, Constructor overloading, Destructor, Order of Construction and destruction, Dynamic constructor, Copy Constructor, Constructor for two dimensional array, Nested classes, Empty classes, Mameless object. Pointers to object Dynamic object, use of 'this' pointer

Operator Overloading

Binary operator overloading. Unary operator overloading, Operator overloading with friend function, Inheritance & Polymorphism

Base class and derived class specification, Different type of inheritance, constructors and destructors in inheritance. Constructor invocation and data member initialization. Virtual base class, object composition and delegation. Virtual function definition, Pointer to derived class object. Pure virtual function Abstract classes, Dynamic binding (Dynamic polymorphism). Virtual Destructor.

Stream computation and File handling

Unformatted I/O operation, Formatted console I/O operation. Manipulators, File opening and closing, File I/O with stream classes, ASCII & Binary File operation Random access file.

Generic programming with template

Function templates, overloaded function templates, Multiple arguments function templets.

Class templates

Exception Handling

Exception Handling constructors (try, Catch, throw blocks) catch all exception, Handling uncaught exception throwing specified list of exception.

ASP, VB Scripts and Java Scripts

Computer Networks

Overview of Data Communications and Networking

Physical Layer Analog and Digital, Analog signals, Digital Signals, Analog versus Digital, Data Rate Limits, Transmission Impairment, More about signals. Digital Transmission: Line coding, Block coding, Sampling, Transmission mode. Analog Transmission: Modulation of Digital Data. Telephone modems, modulation of Analog signals.

Multiplexing

FDM, WDM, TOM. Transmission Media: Guided Media, Unguided media (wireless) Circuit Switching and Telephone Network, Circuit Switching, Telephone network. Data Link Layer, Error Detection and correction: Types of Errors, Detection, Error Correction Data Link Control and Protocols. Flow and error Control, S op-and-wait ARQ. Go-Back- N ARQ, Selective Repeat ARQ, HDLC.

Point-to-Point Access: PPP

Multiple Access. Random Access, Controlled Access, Chanel, Jlization, Local area Network Ethernet. Traditional Ethernet: Fast Ethernet Gigabit Ethernet.

Network Layer

Host to Host Delivery: Internetworking, addressing and Routing. Network Layer Protocols ARP, IPV4, ICMP, IPV6 and ICMPV6. Transport Layer: Process to Process Delivery: UDP TCP congestion control and Quality of Service.

Application Layer

Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Ma (SMTP) and file transfer (FTP) HTIP and WWW.Security. Cryptography: Message security User Authentication.

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INFORMATION TECHNOLOGY

1. **Communication English(CE):**
   Principles of Letter Writing, Writing Letters, Report Writing, Comprehension and Précis Writing.
2. **Computer Mathematics (CM):**
   Objective, Number Bases, Probability & Statistic, Logic, Set & Relations, Order Relation & Structure, Tree.
3. **Computer Fundamental (CF):**
   Introduction to Computers, Input & Output Devices, Memory & Storage Devices, Number System, Computer Networks & the Internet.
4. **Programming in 'C' Language (PCL):**
   Introduction, Managing Input and Output Operators, Arrays, Function and Structure, Pointers and File Management .
5. **Managerial function (MF):**
   Management Concept, Planning and Organizing, Directing and Controlling, Designing Control System, HRIS(Human Resource Information System).
6. **Operating System (OS):**
   Introduction, CPU Scheduling, Memory Management, Virtual Memory, File System Interface.
7. **Computer Architecture (CA):**
   Number System, Combinational Logic, Basic Structures of Computers, Basic Processing Units, 8085 Microprocessor Architecture, language Programming.
8. **Data Communication and Computer Network (DCCN):**
   Overview of Data Communication & Networking Physical Layer, Data Link Layer, Network Layer, Transport Layer, Application Layer.
9. **Data Structure (DS):**
   Introduction & Overview, Linked Lists, Stacks, Queues, Recursion, Trees, Sorting & Searching.
10. **Relational Database Management System (RDBMS):**
    Database and Database Users, Database System Concepts and Architecture, Relational Data Model, Functional Dependency, Transaction Processing, Concurrency Control Technique, Introduction to Object Oriented Database.
11. **Quantitative Technique (QT):**
    Objective, Matrices & Transform Actions, Calculus, Statistics & Probability Distribution, Inventory Control & Investment Appraisal, Investment Appraisal, Network Analysis, Graph Theory.
12. **Organizational Behavior (OB):**
    Organization Behavior, Perception, Personality, Motivation & Leadership, Organizational Conflict Change & Development.

13. Object Oriented Programming (OOPs):

Fundamentals, Object Initialization, Function and Operator Overloading, Inheritance, Arrays, Pointers & References, Virtual Functions and Polymorphism.

14. Software Engineering (SE):

Introduction, Software Requirement Analysis & Specification, Software Design, Object model using UML, Coding and Testing, Software Reliability and Quality Management.

15. System Programming (SP):

Introduction, Machine Structure, Machine Language, Programming Languages, Formal Systems, Compliers.

16. Managerial Economics (ME):

Introduction, Demand Analysis & Forecasting – I, Demand Analysis & Forecasting – II, Pricing, Capital Budgeting.

17. OOPs in Java:

Introduction to Java Programming, Class Objects & Strings, Inheritance, Interfaces & Packages, Exception Handling & Multi Threading, Working with Streams- File & I/O Handling, Applets & AWT.

18. ASP. Net:

Introduction, Server Control, Database Access, Client Server Communication, Advance ASP.Net.

19. Compiler Design (CD) :

20. Internet Working and TCP/IP:

Internet Fundamentals, TCP/IP, Internet Application & Services, E-Commerce

21. Operation Research (OR):

Operation Research, Linear Programming, Combinatorial & Sequential Decisions, Queuing Simulation & Decision Theory Queuing, Risk Analysis, Value Analysis & Statistical Quality Control.

22. Internet and Web Technology (IWT):

Understanding HTML, HTML Forms, Bringing pages to life with DHTML, Understanding and using web servers, Intro/getting started, constructing code objective Types, Automated Tasks, Working with databases, more work with Database.

23. Computer Graphics (CG):

Geometrical Transformations, Parametric Cubic Curves

24. Management Information System (MIS):

Foundation of information system, Information systems: Components, Information system for business operations..