DETAILED SYLLABUS FOR THE POST OF CHIEF (PERSPECTIVE PLANNING DIVISION) (KERALA STATE PLANNING BOARD)

(CAT.NO.: 657/2022)

PAPER I – ECONOMIC PLANNING AND DEVELOPMENT (100 Marks)

I Meaning and Measurement of Growth and Development (10 Marks)

Concepts of Economic Growth and Development, Characteristics of developing economics, National Income Concepts (GNI, NNI, GDP, GVA, GSDP, GNP, NNP, Personal Income, Personal Disposable Income, Transfer Payments, Subsidies). National Income Estimation, Price Level and Inflation, CPI and WPI

II Indian Economic Planning since independence and Kerala development since 1956 (10 Marks)

Rationale for Planning, Features and objectives of Economic Planning, Mahalanobis Strategy, New Development Strategy (Resource Allocation 1951-85 and 1985-2017), Sectoral Allocations in Five Year Plans (India and Kerala), Financing Pattern of 11^{th} and 12^{th} Plan, New Initiatives and Policies – NITI Aayog, Black Economy, Demonetization, Regional Planning in India and Kerala.

III Government Planning Process, Project Formulation, Appraisal, Implementation and Monitoring (10 Marks)

State and Decentralized planning process of Kerala, Budget process in Kerala – Role of the state and market – Gender Budgeting, Resource Mobilization and Allocation of Funds in Kerala, Major Centrally Sponsored Schemes (CSS), Role and functions of NITI Aayog and State planning Commissions/Boards. Types of Planning - Indicative verses Perspective Planning. Project Management – Pre –

investment phase – Implementation Phase-Operational Phase-Aspects of Appraisal – Market, Technical and Financial Economic -Basic considerations of risk and return. Project Planning Techniques – Life cycle of a project- tools of project panning, preparation of DPR, Types of Budgeting, Project Monitoring and Evaluation – Outcome Budgeting.

IV Research Methodology and Statistical Approaches (10 Marks)

Objectives and Types of Research Methods vs Methodology, Identification and formulation of a Research Problem, Critical Research Gap, Review of literature, and Research design and methods, Methods of Sampling Techniques, Descriptive and Inferential statistics, Basic knowledge of statistical packages-SPSS, STATA, Data analyzing, R-Programming, E Views. Ethical Considerations. Extraction of Data from Robust Data Base. Concept of Data Base Management System.

V Industrial and Infrastructure Development (10 Marks)

Development of Industries in Kerala -Industrial structure - Traditional Industries, MSMEs – PSU, Industrial Policies

Nature and structure of Infrastructure development in Kerala including Transport, Communication, Science and Technology. Trends, patterns and growth of infrastructure in Kerala in the post liberalization period.

VI Labour, Employment and Migration in India and Kerala (10 Marks)

Occupational structure and Economic Development, Age structure of population and its demographic dividend in India and Kerala, Urbanization in India and Kerala, Socio-economic profile of Labourers in the Un-organized sectors in Kerala. Migration-Emigration and In migration – Dynamics of domestic labour market in Kerala, Entrepreneurialship – Micro enterprises -skill development – Incubation centres, Employment and Poverty, Innovation and Value additions, Rural wages, Employment Generation, Social Security initiatives in Kerala, poverty Alleviation schemes of India and Kerala

VII Service delivery and good governance – social audit – gender audit (10 Marks)

Emerging trends in governance, good governance practices, e- governance, use of information technology and communication technology in government business, role and impact of social media in governance, citizen's charter, transparency in governance including policies and initiatives of the government in furtherance of this objective viz., RTI, Lokpal, etc., quality of service delivery, policies and initiatives of the government for inclusive growth & women's empowerment, disaster management, utilization of public funds and such other knowledge of governance which a civil service officer is expected to possess., Governance initiatives through decentralized governance – inclusiveness in governance – Initiatives and Schemes, Administrative Reforms Committee Report, Right based Approach in Governance and Development, Service Led Growth.

VIII Sustainable Development and Inclusive Growth (10 Marks)

Millennium Development Goals to Sustainable Development Goals, Deprivation and vulnerability – capability approach, entitlements and empowerment, Dimensions of Deprivation and development, HDI – Head count Ratio – Intensity of Poverty – Multidimensional Poverty Index, India's vulnerability to 'Global Warming and Climate Change', Ecological Impact assessment of developmental projects, Integration of environmental costs in budgets and development programmes. Biodiversity and its Conservation and Sustainable Use of natural resources – Initiatives India and Kerala

IX Emerging Growth Drivers of Kerala Economy (10 Marks)

Tourism, knowledge economy, energy, Food Processing Industry, IT, S&T etc., HRD – Neighboring groups – Self Help groups and developmental challenges - gender violence – old age – rising dependency ratio – waste management – housing – sanitation – Infrastructure planning and development.

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X IT Information Technology (10 Marks)

Module I Computer Hardware

Technical specifications of desktops/laptops/servers.

Certifications – ROHS, BIS, EPEAT, BEE/Energy Star, UL, CE, FCC.

I/O devices – standard I/O interfaces (PCI Express, SCSI, USB, SATA).

Semiconductor RAMs –semiconductor ROMs –flash memory –cache memory.

Processing unit - microprocessor, microcontroller.

SMPS – UPS – Battery types.

Module II Operating Systems

Windows, Linux variants of operating systems.

Licensed software – free software.

Storage Management: disk structure – accessing disks - RAID.

File Concepts – attributes – operations – types – structure – access methods.

File sharing in Windows environment.

Module III Database Management Systems

Types of data and DBMS.

Relational Model – concepts and languages, SQL.

Concurrent transaction processing and recovery principles, logs, checkpoints.

Semantic web, RDF, GIS, NoSQL.

Module IV Data Communication

Guided transmission media: twisted pair, Coaxial cable, optical fiber.

Wireless transmission, terrestrial microwave, satellite microwave.

Digital carrier system, SONET/SDH.

Module V Computer Networks

LAN –MAN – WAN - PAN, high speed LANs, Wireless LANs - 802.11 standards.

Network hardware devices (Hub, Switch, Modem, Router, Bridge, Repeater)

Network layer – IPv4 – Ipv6 - IP Addressing – subnetting, supernetting.

Application layer –FTP, electronic mail, MIME, SNMP, streaming protocols.

Configuring network services - SSH, web/proxy server, DHCP, DNS, Active Directory.

Module VI Web Technologies

HTML - basic text markup, Cascading Style Sheets.

JavaScript, JSON, XML. Frameworks.

World Wide Web - Web browsers, Hypertext Transfer Protocol. Content Management System.

Full stack programming.

Module VII Cyber Security

Network Security fundamentals. Security policy. Risk analysis.

Firewalls - Types of firewalls, application layer firewalls, packet filtering firewalls, UTM.

Intrusion detection and prevention. Setting up and managing IPS.

Virtual Private Networks, managing VPNs.

End-point security. Cyberforensics.

Module VIII Cloud Computing

Cloud delivery models - Infrastructure-as-a-Service (IaaS), Platform-as-a-Service(PaaS), Software-as-a-Service (SaaS), XaaS (Anything-as-a-service).

Cloud deployment models- Public cloud, Community cloud, Private cloud, Hybrid cloud.

Virtualization – hardware / OS level virtualization, Hypervisors. Storage/Desktop Virtualization.

Internet Service Providers (ISP), Data center technology.

Amazon Web Services, Google Cloud, Microsoft Azure.

Module IX Machine Learning & Artificial Intelligence

Supervised leaning – linear regression, classification, Naive Bayes, Decision tree algorithm.

Neural Network - Multilayer feed forward network, Activation functions (Sigmoid, ReLU), Backpropagation algorithm.

Support Vector Machine.

Unsupervised learning – Clustering. Dimensionality reduction – Principal Component Analysis.

Tools, libraries and platforms for machine learning / deep learning.

Performance measures - Precision, Recall, Accuracy, F-Measure, Receiver Operating Characteristic Curve(ROC). Cross Validation.

Module X Emerging Technologies

Blockchain – concept, applications. Cryptocurrencies.

Payment gateways – Unified Payment Interface – Digital Rupee.

Internet of Things (IoT).

Mobile application development – tools, libraries and platforms.

Technology Management – digital strategy and leadership, forecasting, roadmap, project portfolio.

E-governance and M-governance.

Big data analytics – Apache Hadoop, MapReduce, Apache Spark.

PAPER II

Economics (34 Marks)

Module 1 : National Income and the Sectoral Composition (5 marks)
Basic concepts- GDP, GVA, GNP, NDP, NNP, Personal Income, Disposable income, Per capita income-Measurement of National Income- Indian statistical system for national income accounting

Recent trend and pattern of state domestic product of Kerala- Performance and problems faced by the social sector in Kerala- Education and health scenario of Kerala- Problem of educated unemployment- Specific problems of the state's agricultural and industrial sectors- Issues of Kerala's urbanisation process- IT and tourism sector of the state- Migration and remittance scenario of Kerala

Module 2: Economic Growth and Development (8 marks)

Basic concepts and terms in growth and development- Alternative measures of Development- Basic Needs Approach, PQLI, HDI, HPI, MPI, Sen's Capability theorem- Measures of income inequality- Sustainable Development Goals.

Theories of growth and development- Harod- Domar, Mahalanobis and Solow- Leontief Input Output Model- Dualistic theory of Fei- Ranis- Dependency Theories of Samir Amin, Gundar Frank

Development strategies in India- Centralised planning and five year plans- Structural Adjustment Reforms- Planning Commission and NITI Ayog- Major interventions in the agricultural and industrial sector- Financial sector reforms- External sector reforms since 1991 and the evolution of India's trade policies- Government Planning Process and Budgeting- Perspective Planning- Strategic Planning

Kerala Model of Development- Land Reforms, Social Security, Devolution of Power, Decentralized Planning, Housing, Tourism, Women Empowerment, Social Welfare Schemes, Disaster Management

Module 3 : Public Finance (8 marks)

Public Finance and Public Economics- Market Failure- Economic Rationale of Government- Principle of maximum social advantage- Public Goods, Merit Goods, Club goods

Public Revenue- Sources of Public revenue- Taxation-Principles of Taxation- Benefit and ability to pay approaches -Theory of Tax Incidence- Theory of optimal Taxation- Trade-off between equity and efficiency- Deadweight loss- Ramsay Rule- Indian tax system- Structure- Tax reforms – GST- Form of GST introduced in India, its limitations and criticisms

Public Expenditure- Pure Theories of Public Expenditure -Wagner and Wiseman Peacock Hypothesis -Criteria of public Investment- Social cost- benefit analysis- - Structure, Trends and Pattern of Public Expenditure in India

Public Debt- Classical and Compensatory aspect of public debt- Sources and burden of public debt- Principles of debt management and repayment- Ricardian Equivalence- Public debt in India- liabilities, growth and problems

Budget-Meaning and classification of budget- Performance budgeting, Zero based budgeting, Gender budgeting- Budgetary deficits and its implications- Budgetary procedure in India- Trends in the share of development finance in the central and state budget-

Fiscal Federalism-Principles of federal finance-Vertical and horizontal imbalances in federal finance- Central, State and Local finance in India- Fiscal federalism in India- Finance Commissions- Constraints and recommendations of 15th Finance Commission- Functions of State Finance Commissions- Fiscal Responsibility and Budget Management Act

Module 4 : Econometrics and the Simple and Multiple Regression Model (6 marks)

Meaning and scope of Econometrics. Methodology of Econometrics - The Structure of Economic Data- Cross-Sectional Data, Time Series Data, Pooled Cross Sections, Panel or Longitudinal Data.

Sample Regression Function and Population Regression Function - Simple linear Regression Model – Assumptions. Deriving the Ordinary Least Squares Estimates - Gauss Markov Theorem –

Goodness of fit- Multiple Regression Model - Testing the Significance of Regression – R2 and adjusted R2.

Violations of the assumptions of Classical Linear Regression Model- Auto Correlation, Heteroscedasticity and Multi-collinearity- Specification Errors- Measurement Errors.
Dummy Variables- Uses of Dummy Variables- Piecewise linear regression

Module 5: Consumption, Production, Cost and Welfare (4 marks)

Indifference Curve approach to consumer behaviour- Constant elasticity demand function – Nerlove's stock adjustment principle- Consumer's surplus

Homogenous and non-homogenous production function- Cobb Douglus and CES production Functions- Producer's surplus

Cost function-Derivation of cost function from production function

Welfare Economics- Parato optimality condition- Theory of Second Best-Rawl's theory of justice- A.K Sen's social welfare function

Module 6
Linear Programming and Game theory (3 marks)

Basic Concepts of Linear Programming- Formulation of a Linear Programming Problem- Simplex Method- Dual and Primal- Shadow Pricing
Game theory- Pure vs. mixed strategy – dominant strategy and Nash equilibrium - Prisoner's dilemma - Zero-sum game & non zero-sum game- Saddle Point Solutions

Statistics (33 marks)

Module 1: Survey Sampling Techniques and Design of Experiments (7marks)

Introduction to survey sampling techniques, Probability sampling methods: Simple random sampling, Stratified sampling, Systematic sampling, Cluster sampling,Non-probability sampling methods: Convenience sampling, Quota sampling, Snowball sampling, Sampling errors and biases,Sampling size determination and power analysis, Design of experiments: Basic principles, Completely randomized designs, Randomized block designs, Factorial designs, Fractional factorial designs.

Module 2: Time Series Analysis and Forecasting (6 marks)

Introduction to time series data,Descriptive statistics and visualization for time series data, Trend analysis and decomposition, Seasonal analysis and forecasting, ARIMA models and forecasting, Exponential smoothing models and forecasting, Vector Autoregressive models (VAR), ARCH and GARCH models for volatility forecasting.

Module 3: Multivariate Analysis (4 marks)

Introduction to multivariate data, Multivariate descriptive statistics, Principal component analysis (PCA), Factor analysis, Cluster analysis, Discriminant analysis, Canonical correlation analysis (CCA), Multidimensional scaling (MDS), Structural equation modeling (SEM).

Module 4: Latest Sampling Methods and Econometric Methods (4 marks)

Latest sampling methods: Stratified double sampling, Multi-stage sampling, Complex surveys, Big data sampling methods,Latest econometric methods: Panel data analysis, Time-varying parameter models, Bayesian econometrics, High-dimensional data, analysis

Module 5: Testing of Hypothesis (7 marks)

Hypothesis testing: Concepts and terminology, Null and alternative hypothesis, Type I and Type II errors, Significance level, Power of a test, One-sample tests: Testing population mean and proportion, Two-sample tests: Testing difference in means and proportions, Paired-sample tests: Testing difference in means for dependent samples, Goodness-of-fit tests: Chi-square test for one-way and two-way tables, Tests for independence: Chi-square test for independence, Fisher's exact test, Analysis of variance (ANOVA): One-way ANOVA, Two-way ANOVA, Post-hoc tests, Nonparametric tests: Wilcoxon rank-sum test, Kruskal-Wallis test, Friedman test.

Module 6: Software for Data Analysis (5 marks)

Introduction to statistical software: R, SPSS, SAS, STATA, Python, Data management and manipulation in statistical software Data visualization in statistical software Descriptive statistics and inferential statistics in statistical software/ Time series analysis in statistical software Multivariate analysis in statistical software, Survey sampling and design of experiments in statistical software

Mathematics (33 Marks)

Module 1: Functions and Limits (5 marks)

Sets, sequences, limit of a sequence, functions (trigonometric functions, logarithmic functions, exponential functions etc.), limit of a function, and continuous functions.

Module 2: Differentiation (8 marks)

The derivative, derivatives of functions such as exponential, trigonometric and logarithmic functions. Cost curves (marginal cost, average cost etc.), demand curve (elasticity of demand and marginal revenue).

Maxima and minima of functions and its applications (competitive equilibrium of a firm, monopoly price output etc.) – Constraint Optimization (Lagrange method)

Module 3: Integration (6 marks)

Evaluation of integral and its economic applications. Total cost, marginal cost, Law of growth, Domar's model of public debt and national income.

Module 4: Differential Equation and Difference Equation (4 marks)

Formation of differential equations, linear and nonlinear differential equations, solutions of linear differential equations. Applications of differential equations. Difference Equation-It's solutions and economic applications

Module 5: Vectors and Matrices (6 marks)

Sum and product of matrices, transpose of a matrix, determinant, rank. Inverse of a matrix. Solutions of a system of linear equations- Vectors, geometric interpretation of vectors

Module 6: Financial Economics (4 marks)

Interest Periods and Effective Rates- Continuous Compounding- Present Value-Net Present Value, Mortgage Repayments, Internal Rate of Return, Cost benefit analysis.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.