

**DETAILED SYLLABUS FOR THE POST OF JUNIOR SYSTEMS
OFFICER IN Kerala Co-operative Milk Marketing Federation Limited)**
- Direct Recruitment

Cat.No: 690/2022

PART 1 - Mathematics - (15 Marks)

Module 1 :- Linear Algebra: Matrix – multiplication - determinants – transpose – symmetric matrix – Hermitian matrix – rank – characteristic roots- Cayley’s theorem
(2 Marks)

Module 2 :- Complex numbers: Basic definitions-basic operations with complex numbers-Real and imaginary part - polar form of a complex number- products- quotients – powers - modulus - roots of complex number- n^{th} root of unity
(3 Mark)

Module 3: - Analytic Geometry: distance formula - straight line – angle between lines – general second degree equation to represent circle – ellipse – parabola- hyperbola- polar coordinate – cylindrical coordinate – spherical coordinates.
(2 Mark)

Module 4 :- Calculus: limit of a function – indeterminate form – L’Hospital’s rule – continuous function – derivatives – increasing and decreasing function – critical points – stationary points – maxima and minima – concave up and concave down – point of inflexions
(2 Mark)

Module 5:- First Order Deferential Equation: Order – degree – separable equation – linear equation – exact equation – homogeneous equation with constant coefficients.

(2 Mark)

Module 6 : -Vector calculus: Position vector of a point – magnitude – dot product – projection of vector – angle between vectors – cross product – scalar triple products – gradient – divergent – curl- solenoidal vector – irrotational vector.
(2 Marks)

Module 7 : - Abstract Algebra: Group – properties and examples – subgroup- cyclic groups – Permutations – rings – integral domains – ideals – fields.

(2 Marks)

PART- II Statistics (15 Marks)

Module 1: Descriptive Statistics (3 Marks)

Scales of measurement, Different types of Data, Primary Data and Secondary Data, Types of Probability Sampling – Simple Random Sampling, Stratified Random Sampling, Systematic Sampling, Classification and Tabulation, Frequency Distribution, Measures of Central Tendency, Measures of Dispersion, Raw and Central Moments, Skewness, Kurtosis, Correlation, Regression.

Module 2: Probability (6 Marks)

Random Experiment, Events, Definitions of Probability, Elementary Probability Theory, Problems based on Classical Definition of Probability, Conditional Probability, Bayes Theorem, Random Variables, Standard Probability Distributions such as Poisson, Binomial and Normal Distributions.

Module 3: Inferential Statistics (6 Marks)

Population and Sample, Sampling Distributions, Statistic, Statistical Estimation, Desirable Properties of Estimators, Statistical Testing of Hypothesis, Tests based on and Statistics.

PART- III Physics (15 Marks)

Module 1. Properties of Matter (4 marks)

Elasticity-Modulus of elasticity, the three elastic moduli, Surface tension-shapes of drops, concept of excess of pressure, capillary rise, variation of surface tension with temperature, Fluid Dynamics- Streamline and turbulent flow, equation of continuity, Bernoulli's theorem and its applications, Viscosity- coefficient of viscosity, Stoke's formula, variation of viscosity with temperature.

Module 2. Thermal Physics (3 marks)

Thermal conductivity, coefficient of thermal conductivity, Weidman-Franz law, Radiation of heat, Stefan's law, Zeroth Law and First law of Thermodynamics, differential form of first law, different thermodynamic processes, specific heat capacities, Carnot's heat engine, entropy.

Module 3. Optics (3 marks)

Interference of light- The principle of superposition, coherent sources, Double slit interference, interference in thin films, Newton's Rings, Diffraction- Fresnel diffraction, Half-period zones, Fraunhofer diffraction-diffraction at a single slit, diffraction grating, LASER-Basic principle, He-Ne laser, optical fibre- step, index fibre, graded index fibre , numerical aperture.

Module 4. Modern Physics (5 marks)

Black body radiation curve, photoelectric effect, Compton effect, Bohr model- hydrogen atom, wave nature of particles, uncertainty principle, wave function, Vector atom model-quantum numbers associated with vector atom model, L-S and J-J couplings, Zeeman effect, Anomalous Zeeman effect, Paschen-Back effect, Stark effect, Solids-Amorphous and Crystalline Materials, Unit Cell, Types of Lattices, Miller Indices, Nucleus-Constituents of nucleus and their intrinsic properties, binding energy, Nuclear fission and nuclear fusion processes.

PART IV – COMMERCE (15 Marks)

Module 1

Basic Accounting: Accounting process- Accounting Terms- debtor, creditor, current and non-current assets and liabilities - Accounting Vs book keeping- Revenue Vs Capital income and expenditure – Cash system vs accrual system- Double entry vs single entry - Journal - Special journal – Ledger - Trial balance – Components of GAAP- Annual financial statements- Analysis of annual financial statements - Accounting ratios - Comparative statements.
(5marks)

Module 2

Banking: Lending policies - Principles of sound lending - Lending criteria - Loan management- appraisal, monitoring - Forms of Lending- cash credit, overdraft, term loans - Secured and unsecured advances - Modes of charging security- lien, mortgage, hypothecation, pledge, assignment - Primary security and collateral security - Standard asset and non-standard asset, Non-performing assets - Provision for bad and doubtful assets. **(5 marks)**

Module 3

Co - operation : Formation of Co-operative society – Fundamental documents of a society - Important legislations regulate a society- Co-operative principles - Structure of cooperative societies - Administration of a society - Sources of finance of a society - Utilisation of finance of a society- Distribution of earnings - Important books and accounts maintained by a Society. **(5 marks)**

PART V- COMPUTER APPLICATION (40 Marks)

Module I (10 Marks)

Computer Fundamentals: Computer Hardware and Software, Input/Output devices, Generation of Computers, Computer Systems: Micros, Minis and Main-frames, Memory Units: RAM, ROM, Secondary Storage Devices, Cache Memory, Virtual Memory.

Module II (10 Marks)

Programming in C: Tokens, Data types, Operators, Control Statements, User defined functions, Arrays, Pointers, Structure and Union, File operations.

Data Structures: Concept of Data Structures, Types of Data Structures: Linear, Non-linear, Data Structure Operations, An Introduction to Stacks, Queues, Linked Lists, Trees, and Graphs.

Module III (10 Marks)

Operating Systems: Structure of Operating Systems, Operating System Functions, Distributed Systems, The Process, Process State, PCB, Threads, Process Scheduling Basic Concepts, Scheduling Criteria.

Database Management Systems: Introduction to Database System applications, Database design, Data Models: Hierarchical Model, Network Model, Entity Relationship Model, Object Oriented Data Model, Relational Model, Set Operations.

Module IV (10 Marks)

Computer Networks and Security: Use of Computer Networks, Network Topologies, Types of Networks – LAN, WAN, MAN, Data Communication – Data Flow, Data transmission mode - Simplex, Half Duplex, Full Duplex, Modem, Router, Switch, Internet Service Providers, Search Tools.

Artificial Intelligence: Overview of an AI, Definition and Importance of Knowledge, Knowledge-Based Systems, Representation of Knowledge, Natural Language Processing Introduction, Overview of Linguistics,

Grammars and Languages, Basic Parsing Techniques, Natural Language Systems.

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.