8. SCHEME OF EXAMINATION: (OBJECTIVE (OMR/CBT) AND DESCRIPTIVE TYPE)

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for selection	
			SCs, SC(A)s, STs, MBCs/ DCs, BC(OBCM)s and BCMs	Others
PAPER-I (Objective) (Subject code:349) **[Degree Standard]** (80 Questions - 1 Mark each + 60 Questions– 2 Marks each) i. Computer Science ii. Electronics and Communication iii. Electrical and Electronics iv. Information Technology	3 Hours	200	40%	50%
PAPER II (Objective) (Subject code:350) **[Degree Standard]** Engineering Aptitude (50 Questions- 1 Mark each) i. Quantity/ Numerical Ability ii. Data Interpretation iii. Logical Reasoning	1 Hour	50	40%	50%
PAPER-III (Descriptive) (Subject code:349) **[Degree Standard]** Part A:10 Questions - 5 Marks each Part B:10 Questions - 10 Marks each I. Computer Science II. Electronics and Communication III. Electrical and Electronics IV. Information Technology	2 Hours	150	40%	50%
Total Marks		**400**		

Note:

(i) Question papers will be set only in English

(ii) Candidates who have not appeared for any of the paper in the written examination will not be considered for selection.

(iii) Paper-III will be evaluated, only if the candidate secures minimum qualifying marks in Paper-I & Paper-II separately.

ANNEXURE - II
POSTS OF ASSISTANT SYSTEM ENGINEER / ASSISTANT SYSTEM ANALYST IN THE COMMISSIONERATE OF E-GOVERNANCE

(DEGREE STANDARD)
(PAPER I: OBJECTIVE TYPE & PAPER III: DESCRIPTIVE TYPE)

SUBJECT CODE: 349

UNIT - I: BASIC ELECTRONICS (ECE & EEE)

Intrinsic and extrinsic semiconductors, Energy Band Diagrams, PN junction diode, Zener diode, Tunnel diode, Varactor diode, Photo diode, Schottky diode, LED, BJT, JFET, MOSFET, SCR, Diac, Triac, Power BJT, Power MOSFET, IGBT Heat sinks and junction temperature, LCD, Photo transistor, Opto Coupler, Solar cell, CCD, IC fabrication; BJT, JFET, MOSFET amplifiers : Biasing analysis, Small signal analysis and frequency response, BJT and MOSFET Multistage amplifiers : Differential, Darlington, cascode and cascade; Feedback amplifiers, Tuned amplifiers, RC and LC oscillators, Power amplifiers. Rectifiers and wave shaping circuits; Operational Amplifier characteristics and applications , CMRR, Slew rate, Waveform generators, Active filters, Timers, PLL, VCO, ADC, DAC, Regulators and Converters.

UNIT - II: DATA STRUCTURES AND ALGORITHMS

Data abstraction - Abstract Data Types (ADT) - Array ADT - Linear List ADT (Polynomials) - Array Based Implementations - Linked List Implementations – Doubly Linked List – Circular Link List - Applications of Lists - Stack ADT - Implementation of Stack - Applications of Stack - Queue ADT - Implementation of Queue - Applications of Queue – Double-Ended Queue - Evaluation of Expressions - Trees - Binary Trees - Implementation of Binary Trees - Tree Traversals - Operations - Threaded Binary Trees - Binary Search Trees - Priority Queues - Binary Heap - Applications of Priority Queues – Sorting Algorithms - Insertion Sort - Shell Sort - Heap Sort - Merge Sort - Bucket Sort – External Sorting - Searching - Linear Search - Binary Search - Hashing - Hash Functions - Separate Chaining - Open Addressing - Linear Probing - Quadratic Probing - Double Hashing - Rehashing - The Role of Algorithms in Computing - Growth of Functions – Recurrences - The Substitution Method - The Recurrence Tree Method - The Master Method - Analysis of Quick Sort, Merge Sort – Sorting in Linear Time - Lower Bounds for Sorting - Greedy Algorithms - Elements of Greedy Strategy - Huffman Code - Dijkstra's Shortest Path Algorithm - Dynamic Programming – Matrix Chain Multiplication - Elements of Dynamic programming – Longest Common Sequences – Warshall's and Floyds Algorithm – Backtracking – Graph Coloring Problem - Branch and Bound Strategy - Knapsack Problem.

UNIT - III: DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes – Binary, BCD, 84-2-1, 2421, Excess 3, Biquinary, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map and Tabulation methods; Code-Converters, Half and Full Adders, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Magnitude Comparator, Decoder, Encoder, Priority Encoder, Mux/Demux, Case study: Digital transreciver / 8 bit Arithmetic and logic unit; Flip flops – SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, circuit implementation - Counters, Ripple Counters, Ring Counters, Shift registers, Universal Shift Register; HDL for sequential logic circuits; Model Development: Designing of rolling display/real time clock; Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits; Logic families- TTL, MOS, CMOS, BiCMOS - Comparison of Logic families - Implementation of combinational logic/sequential logic design using standard ICs, ROM, PLA and PAL.

Evolution of Computers, VLSI Era, System Design- Register Level, Processor Level, CPU Organization, Data Representation, Fixed – Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types. Addressing modes; Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline Design, Modified booth's Algorithm; Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming; Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory; Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RISC and CISC processors, Superscalar and vector processor.

UNIT - IV: PROBABILITY AND QUEUEING THEORY

Mean, median, mode and standard deviation; combinatorial probability, probability distribution functions - binomial, Poisson, exponential and normal; Joint and conditional probability; Random Variables - Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable; Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and

Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables); Random Processes - Classification – Stationary process – Markov process - Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions; Queuing theory and Processes - Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little's formula - Queues with finite waiting rooms – Finite source models, M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and M/E /1 as special cases – Series queues – Open and closed Jackson networks.

UNIT- V: OPERATING SYSTEMS

Introduction to Operating Systems – Computer System Organization and Architecture – Operating System Structure, Operations – Process, Memory, Storage Management – Protection and Security – Distributed Systems – Computing Environments – Open-Source Operating Systems – OS Services –System Calls – Types – System Programs – OS Structure – Process Concept, Scheduling – Operations on Processes – Cooperating Processes – Inter-Process Communication – Examples – Multithreading Models – Thread Libraries – Threading Issues – OS Examples – Scheduling Basic – Scheduling Criteria – Scheduling Algorithms – Thread Scheduling – Multiple processor Scheduling – Operating System Examples – Algorithm Evaluation – The Critical-Section Problem – Peterson's Solution – Synchronization Hardware – Semaphores – Classic Problems Of Synchronization – Synchronization Examples – Deadlocks – System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery From Deadlock - Memory Management – Swapping – Contiguous Memory Allocation – Paging –Segmentation Example: The Intel Pentium - Virtual Memory: Background – Demand Paging – Copy On Write – Page Replacement – Allocation of Frames – Thrashing - File Concept – Access Methods – Directory Structure – File-System Mounting – Protection – Directory Implementation – Allocation Methods – Free-Space Management – Disk Scheduling – Disk Management – Swap-Space Management – Protection – Study of The Linux System - Study of Windows 7.

UNIT - VI: DATABASE MANAGEMENT SYSTEMS

INTRODUCTION TO DBMS   -   File   Systems   Organization   -   Sequential, Pointer,Indexed, Direct - Purpose of Database System- Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS-Relational Algebra. LOGICAL DATABASE DESIGN: Relational DBMS - Codd's Rule - Entity-Relationship model - Extended ER Normalization – Functional Dependencies, Anomaly-1NF to 5NF- Domain Key Normal Form – Denormalization. - SQL & QUERY OPTIMIZATION - SQL Standards - Data types - Database Objects-DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL- QUERY OPTIMIZATION: Query Processing and Optimization - Heuristics and Cost Estimates in Query Optimization - TRANSACTION PROCESSING AND CONCURRENCY CONTROL - Introduction-Properties of Transaction– ACID Properties – System & Media Recovery –Concurrency – Locking Protocols –Log Based Recovery – Two Phase Commit Protocol – Recovery– Deadlocks & Managing

Deadlocks – Indexing & Hashing Techniques – Query Processing & Optimization – Sorting & Joins Serializability-Concurrency Control – Locking Mechanisms- Two Phase Commit Protocol-Dead lock -TRENDS IN DATABASE TECHNOLOGY - Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing - Introduction to Distributed Databases-Client server technology- Multidimensional and Parallel databases- Spatial and multimedia databases- Mobile and web databases- Data Warehouse-Mining- Data marts.XML Data Bases: XML-Related Technologies- XML Schema-XML Query Language-Storing XML in Databases–SQL –Data Constraints-Database Security – Database Tuning – Data Mining and Warehousing.

UNIT - VII: PROGRAMMING INC

Introduction to IT – Problem Solving – C Programming – Constants – Variables – Data Types – Expressions - Input/Output Operations – Decision Making and Branching Statements – Looping Statements – Arrays – Initialization – Declaration - One dimensional and Two dimensional arrays. String - String Operations – String Arrays. Simple programs – Sorting – Searching – matrix operations – Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion – Pointers – Definition – Initialization – Pointers arithmetic – Pointers and arrays – structure data type – structure definition – Structure declaration – Structure within a structure – Union – Programs using structures and Unions – Storage classes, Pre-processor directives. Functions and Pointers in C: Storage classes – Recursion Preprocessor directives – Arrays – Strings – Arrays, Pointers and Strings. Pointers to functions – Dynamic Memory Allocation – Structures – Unions – Enumeration Types – Bit fields – Fields.

UNIT-VIII: OBJECT ORIENTED PROGRAMMING & OBJECT ORIENTED ANALYSIS AND DESIGN

Object Oriented Programming : Classes and methods – Constructors and Destructors – Class and Object – Scope – Overloading – Arrays – Type Casting – Pointer – Inheritance – Sub Classes – Implications of Inheritance – Exception Handling – Assertions – Garbage Collection – String Class – Inheritance – Multiple Inheritance – Polymorphism – Abstract Classes and Methods - Overloading and Overriding – C++ Programming features – Data Abstraction – Encapsulation – Class – Object – Constructors – static members – constant members – member functions – pointers – references – Role of this pointer – Storage classes – function as arguments – String Handling – Copy Constructor – Polymorphism – compile time and run time polymorphisms - function overloading – operators overloading – dynamic memory allocation – Nested classes – Inheritance – virtual functions. Abstract class – Exception handling – Standard libraries – Generic Programming – templates – class template – function template – STL containers – iterators – function adaptors – allocators – Parameterizing the class – File handing concepts – Java, API Packages – Pure Polymorphism – Operator instance of and Down

Casting – final Methods and Classes – Clone class – Multithreading – Files and Streams – Formatted Output – Object Concurrency – Serialization – Generic Collections – Generic Classes and Methods – Applets – Frameworks.

Elements of the Object Model - classes and object - Relationships among objects - Relationships among classes - Class Diagrams - Use cases - Use case Diagrams - Domain Models - Sequence Diagrams - State transition Diagrams - Object Diagrams - Interaction Diagrams.

UNIT - IX: MICRO PROCESSORS AND EMBEDDED SYSTEMS (ECE & EEE)

8085 Architecture, Pin configuration, Instruction set, Addressing modes, Interrupts, Timing diagrams Memory and I/O interfacing; 8086 Architecture, Instruction set, Addressing modes, Minimum and Maximum mode configuration, Assembler Directives, Assembly Language Programming, Interrupts; Programmable Peripheral Interface (8255), Keyboard display controller (8279), ADC0808 and DAC0808 Interface, Programmable Timer Controller (8254), Programmable interrupt controller (8259), Serial Communication Interface (8251), DMA Controller interfaces(8257); 8051 – Architecture, Special Function Registers (SFRs), Instruction set, Addressing modes, Assembly language programming, I/O Ports, Timers / counters, Interrupts and serial communication; Interfacing to: matrix display, (16x2) LCD, high power devices, optical motorshaft encoder, Stepper Motor, DC Motor speed Control using PWM, RTC and EEPROM interface using I2C protocol.

Embedded system design process – Formalism for system design– Design example: Model train controller- ARM Processor Fundamentals- Instruction Set and Programming using ARM Processor;   CPU: Programming input and output – Supervisor mode, exception and traps – Coprocessor – Memory system mechanism – CPU performance – CPU power consumption- CPU buses – Memory devices – I/O devices – Component interfacing- System Level Performance Analysis- Parallelism; Program design – Model of programs – Assembly and Linking – Basic compilation techniques – Program Optimization- Analysis and optimization of execution time, power, energy, program size – Program validation and testing- Example: Software Modem; Multiple tasks and Multi processes – Processes – Context Switching – Operating Systems –Priority based Scheduling- RMS and EDF - Inter Process Communication mechanisms – Evaluating operating system performance – Power optimization strategies for processes; Multiprocessors- CPUs and Accelerators – Performance Analysis- Distributed Embedded Architecture – Networks for Embedded Systems: - I2C, CAN Bus, Ethernet, Myrinet – Network based design – Internet enabled systems. Design Example: Elevator Controller.

UNIT - X: WEB TECHNOLOGY

SCRIPTING LANGUAGES – Web page Designing using HTML, Scripting basics – Client side and server side scripting. Java Script – Object, names, literals, operators and expressions – statements and features – events – windows – documents – frames – data types – built-in functions – Browser object model – Verifying forms – HTMLS – CSS3 –

HTML5 canvas – Web site creation using tools – AJAX, JSON, JSF, AngularJS, Struts, Spring Hibermate, JSP Web Design Principles, Web Security, Web services XML, Web servers, PHP, ASP.NET – JDBC – JDBC Overview – JDBC Implementation – Connection class – Statements – Catching Database Results, handling database Queries. Networking – InetAddress class – URL class – TCP sockets – UDP sockets, Java Beans – RMI – APPLETS – Java applets – Life cycle of an applet – Adding Images to an applet – Adding sound to an applet. Passing parameters to an applet. Event Handling. Introducing AWT: Working with Windows Graphics and Text. Using AWT Controls, Layout Managers and Menus. Servlet – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking

UNIT - XI: CLOUD COMPUTING

Introduction to Cloud Computing - Definition of Cloud - Evolution of Cloud Computing - Underlying Principles of Parallel and Distributed Computing - Cloud Characteristics - Elasticity in Cloud - On-demand Provisioning - Service Oriented Architecture - REST and Systems of Systems - Web Services - Publish-Subscribe Model - Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtualization Support and Disaster Recovery - Layered Cloud Architecture Design - NIST Cloud Computing Reference Architecture - Public, Private and Hybrid Clouds - laaS - PaaS - SaaS - Architectural Design Challenges - Cloud Storage - Storage-as-a-Service - Advantages of Cloud Storage - Cloud Storage Providers - S3 - Inter Cloud Resource Management - Resource Provisioning and Resource Provisioning Methods - Global Exchange of Cloud Resources - Security Overview - Cloud Security Challenges - Software-as-a-Service Security - Security Governance - Virtual Machine Security - IAM - Security Standards - Hadoop - MapReduce - Virtual Box - Google App Engine - Programming Environment for Google App Engine - Open Stack - Federation in the Cloud – Four Levels of Federation - Federated Services and Applications - Future of Federation.

UNIT - XII: INFORMATION SECURITY

Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard – Basic Concepts in Number Theory and finite Fields – Advanced Encryption Standard – Block Cipher Operation – Fermat's and Euler's Theory – CRT – Discrete Logarithms, Public Key Cryptography and RSA – Diffie – Hellman Key Exchange – Elliptic Curve Cryptography – Cryptographic Hash Functions – Message Authentication Code – Digital Signature – Certificates. Security in Operating Systems – Security in the Design of OS – Open Web Application Security – Wireless Network Security – Introduction to Mobile Security – Transport – Level Security – SSL – TLS – HTTPS – SSH – Electronic Mail & Security – PGP – IP Security – Legal & Ethical Issues.

UNIT - XIII: MACHINE LEARNING

Models of learning - Learning classifiers, functions, decision trees, neural networks, support vector machines, Bayesian networks, bag of words classifiers, N-gram models; Markov and Hidden Markov models, probabilistic relational models - nearest neighbor classifiers, locally weighted regression, ensemble classifiers - Dimensionality reduction, feature selection and visualization - Clustering, mixture models, k-means clustering, hierarchical clustering, distributional clustering - Reinforcement learning.

UNIT - XIV: COMPUTER NETWORKS

NETWORKING FUNDAMENTALS: Requirements – OSI and TCP/IP Layering and Protocols – Internet Architecture - Local, Metropolitan and Wide Area Networks – Packet, Circuit and Virtual Circuit Switching; LINK LAYER PROTOCOLS: Framing – Error Control – Flow Control – Automatic Repeat Request (ARQ) protocols - IEEE 802.2, PPP and HDLC; MEDIUM ACCESS PROTOCOLS: Shared media systems - Bus, Star and Ring topologies - TDMA, FDMA, CSMA, CSMA/CD, Ethernet, IEEE 802.3, IEEE 802.11 - Shared and Switched Ethernet – Bridging - Virtual LANs; NETWORK LAYER: Internet Protocol (IP) suite - Hierarchical network architectures - IPv4 and IPv6 addressing and CIDR – IPv4 and IPv6 headers - Routing protocols including distance-vector and link-state - Interior and Exterior Gateway Protocol concepts - Routing Algorithms – IETF protocols such as OSPF, RIP, BGP – Internetworking - ICMP, NAT, ARP and RARP; TRANSPORT LAYER: UDP header - TCP header, operation, flow control and congestion control; APPLICATION LAYER: Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web services – DNS – FTP - Real-time Transport Protocol (RTP) and RTP Control Protocol (RTCP), Real Time Streaming Protocol (RTSP).

UNIT - XV: SOFTWARE ENGINEERING, SOFTWARE PROCESS AND PROJECT MANAGEMENT

SOFTWARE PROCESS AND PROJECT MANAGEMENT - Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – Software Project Management: Estimation – LOC and FP Based Estimation, COCOMO Model – Project Scheduling – Scheduling, Earned Value Analysis - Risk Management - REQUIREMENTS ANALYSIS AND SPECIFICATION - Software Requirements: Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management-Classical analysis: Structured system Analysis, Petri Nets-Data Dictionary -SOFTWARE DESIGN - Design process – Design Concepts-Design Model– Design Heuristic – Architectural Design – Architectural styles, Architectural Design, Architectural Mapping using Data Flow- User Interface Design: Interface analysis, Interface Design – Component level Design: Designing Class based components, traditional Components - TESTING AND IMPLEMENTATION - Software testing fundamentals-Internal and external views of Testing-white box testing - basis path testing-control structure testing-black box testing-Regression Testing – Unit Testing – Integration Testing – Validation Testing – System

Testing And Debugging – Software Implementation Techniques: Coding practices-Refactoring - PROJECT MANAGEMENT – Cost Estimation – FP Based, LOC Based, Make/Buy Decision, COCOMO II - Planning – Project Plan, Planning Process, RFP Risk Management Identification, Projection, RMMM - Scheduling and Tracking –Task Set & Network Scheduling, EVA - Process and Project Metrics.

UNIT - XVI: BIG DATA ANALYTICS

Evolution of Big Data - Best Practices for Big Data Analytics - Big Data Characteristics - Validating - The Promotion of the Value of Big Data - Big Data Use Cases - Characteristics of Big Data Applications - Perception and Quantification of Value - Understanding Big Data Storage - A General Overview Of High-Performance Architecture - HDFS - Mapreduce And YARN - Map Reduce Programming Model - Advanced Analytical Theory and Methods: Overview of Clustering - K-Means - Use Cases - Classification: Decision Trees - Overview of a Decision Tree - The General Algorithm - Decision Tree Algorithms - Evaluating a Decision Tree - Naïve Bayes - Bayes' Theorem - Naïve Bayes Classifier - Association Rules - Overview - Apriori Algorithm - Evaluation Of Candidate Rules - Applications Of Association Rules - Recommendation System: Collaborative Recommendation - Content Based Recommendation - Knowledge Based Recommendation- Hybrid Recommendation Approaches - Using Graph Analytics For Big Data: Graph Analytics - The Graph Model - Representation As Triples - Graphs And Network Organization - Choosing Graph Analytics - Graph Analytics Use Cases - Graph Analytics Algorithms And Solution Approaches - Real Time Sentiment Analysis, Stock Market Predictions - Nosql Databases : Schema-Less Models: Increasing Flexibility For Data Manipulation - Key Value Stores - Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive - Sharding – Hbase – Applications of Big Data analytics.

**POSTS OF ASSISTANT SYSTEM ENGINEER /
ASSISTANT SYSTEM ANALYST IN THE COMMISSIONERATE OF
E-GOVERNANCE**

(DEGREE STANDARD)

(PAPER II: OBJECTIVE TYPE)

SUBJECT CODE: 350

ENGINEERING APTITUDE

UNIT- I: QUANTITY / NUMERICAL ABILITY

Numerical computation, numerical estimation, numerical reasoning; Number system; Integer Number Sequences, Rational Number Sequences, Arithmetic Sequences, Geometric Sequences; Square Numbers, Cube Numbers; Fibonacci Series; Polynomials; Algebra; Geometry - Euclid's Geometry, Lines and Angles, Triangles, Quadrilaterals, Circles, Coordinate Geometry, Areas Of Parallelograms And Triangles, Surface Areas And Volumes; Probability, Permutation combination; Mensuration, Arithmetic mean, Geometric mean, Harmonic mean , Median, Mode, Variance, Standard Deviation; Time and work; Averages, Percentages, Profit and loss; Quadratic and linear equations; Relation and Functions; Vectors; HCF & LCM, Logarithm.

UNIT- II: DATA INTERPRETATION

Interpretation and analysis of data based on text, tables, graphs (line, area), charts (column, bar, pie), venn diagram.

UNIT - III: LOGICAL REASONING

Clocks, calendars, binary logic, seating arrangement, logical sequence – Logical Number, Alphabetical, Diagrammatic; Assumption, Premise, Conclusion, Linear and matrix arrangement, Puzzles - Classification, Comparison, Sequential, Selection, Family, Jumbled puzzle; Dice, Visual Reasoning, In alphabetical or miscellaneous, In coding decoding, In blood relation, In direction and distances, In order and ranking, Data sufficiency, Statement, In syllogism.