COMPUTER ENGINEERING

Section B: (70 Questions)

Data Base Management Systems:

Database Architecture, ER Diagram, data models- Relational and Object oriented databases. Data Base Design: Conceptual data base design, Mapping ER Model to Relational Model, Functional Dependencies, Normalization, Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation and Relational Algebra.

Application Development using SQL: SQL Standards - Data types - Database Objects- DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - Host Language interface, embedded SQL programming, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organisation in sequential, indexed random and hashed files. Inverted and multilist structures, B trees, B+ trees, Static Hashing-Dynamic Hashing, Query Optimisation, Join algorithm.

TRANSACTION PROCESSING AND CONCURRENCY CONTROL: Transaction Processing, concurrency control and recovery management. Transaction model properties and state serializability. Lock base protocols, two phase locking Protocol-Dead lock.

Database Security: Data Classification-Threats and risks – Database access Control – Types of Privileges –Cryptography- Statistical Databases.

Data Communication and Computer Networks:

Computer Network Architecture, OSI Reference Model, TCP/IP Reference Model, Circuit switching, Packet and Message Switching, Network Structure. Physical Layer, Data Link Layer, Framing, Flow & Error Control, Retransmission algorithms.

Connecting Devices: Repeaters, Hubs, Bridges, Spanning tree algorithm. Two & Three layer Switches Routers, Gateways, Backbone networks, Concept of VLAN, Multiple access and Aloha. CSMA/CD and Ethernet. High Speed LANs and topologies. Broadcast routing and spanning trees.

Unicast, Multicast and Broadcast Routing, Distance-Vector, Link-State, Network Layer Protocols (IP, ICMP), IP addressing

TCP/IP Stack. IP Networks and Internet. DNS and Firewalls. Intrusion Detection and Prevention.

Transport layer and TCP/IP. Network Management and Interoperability, Congestion Control.

System Analysis and Design System concept:
Definition and characteristics, elements and boundaries, types of system development lifecycle, recognition of needs, feasibility study, prototyping, role of system analyst.

(System planning and tools like DFD-Logical and Physical DFDs, data dictionary, decision trees, structured analysis and decision tables. IPO charts, structured walkthrough, input output form design, requirement and classification of forms, layout considerations form control, object oriented Design Concepts and methods.

Software Life Cycle, Software Engineering paradigms.

System analysis: Feasibility study requirement analysis, Cost benefit analysis, Planning systems, Analysis tools and techniques.

System Design: design fundamentals, Modular Design, Data and procedural design, object oriented design. System Development: Code documentation, Program design paradigms, Efficiency Consideration. Verification, Validation

and Testing: testing methods, Formal Program Verification, Testing Strategies. Software Maintenance: Maintenance Characteristics, Maintainability, Maintenance tasks and side effects.

Programming Concepts:

Introduction: Object Oriented Programming and Design: Review of Abstraction, Objects and other basics, Encapsulation, Information hiding, Method, Signature, Classes and Instances, Polymorphism, Inheritance, Exceptions and Exception Handling with reference to object modeling, Coupling and Cohesion in object oriented software. Object Oriented Design – Process, Exploration and Analysis.