

## **TENTATIVE SYLLABUS - PROGRAMMER**

### **Discrete Mathematics, Probability and Statistics -**

Compound Statements, Truth Tables, The Algebra of Propositions, Logical Arguments, Sets, Operations on Sets, Binary Relations, Partial Orders, Mathematical Induction, The Principle of Inclusion-Exclusion, Probability theory: Sample spaces, Events and probability, Discrete probability: Union, Intersection and Compliment of events, Conditional probability, Baye's theorem. Linear correlation coefficient, Linear regression, Non Linear regression, Multiple correlation and Multiple regression, Theory of sampling and population

### **Digital Electronics, Computer Organization and Operating System**

Digital Logic Systems and Microprocessors: Boolean expressions, K-maps, TTL and CMOS logic families, combinational logic design, synchronous sequential system design. Microprocessors: 8086 architecture, data transfer scheme and interfaces, Addressing modes.

Computer Organization and Architecture: Von-Neumann architecture of computers. Registers and micro operations, control logic, processor addressing and bus organization. Processor input/output and DMA. Memory organization and cache coherence.

Operating Systems: CPU scheduling, Deadlocks, Memory management, file systems, disk scheduling. Process, threads and their synchronization. Real Time OS: clock synchronization and task scheduling. System initialization, booting and handling user accounts. Backup and restore, Bourne shell programming for Linux.

### **Data Structures and Programming in C -**

Data Structures: Linked List, Stack, Queue, Priority Queues, Hashing, Binary trees, Tree traversal, AVL trees, Graphs- shortest paths, minimum spanning trees; Sorting algorithms.

Programming in C: Operators and expressions, Control statements, Storage types, Functions, Arrays, Strings, Structures, Pointers and dynamic memory management, File Handling.

### **Object Oriented Programming through C++/Java -**

Data Abstraction, Encapsulation, classes, constructors and destructors, Classes, and dynamic memory allocation, Inheritance, Polymorphism, generic classes, exception handling and File processing.

Java applets, Java features, Byte codes, Internet classes, wrapper classes, multithreading support classes, vector, stack, interface observer, stream tokenizer, GUI classes, Java I/O, classes, The Applet class, applet architecture, applet display methods and repainting

### Database Management System-

Keys, E-R Model, Normalization - 1NF to 5NF; Aggregate functions, Nested Sub queries, Views, Joined Relations, Transaction- ACID properties; Concurrency Control, triggers, stored procedures

### Client Server Architectures and Web Programming -

Two and three-tier client server architectures, web servers, HTML & XML, Style Sheets, client side scripting-java script and VB script; Server Side Scripting-php, JSP and ASP.NET programming for creating dynamic web pages using database, forms and session; AJAX and SignalR

### Computer networks and Programming -

Computer networks and security: TCP/IP & OSI/ISO reference models, functions and protocols of different layers, characteristics of physical media, multiplexing, medium access protocols, introduction to 802.3, 802.4, 802.5, 802.11 LAN technology, IP protocol including routing and congestion control, TCP and UDP, DNS. Email protocols. Symmetric and asymmetric encryption including DES, AES, IDEA, RSA algorithms, key management in symmetric and asymmetric encryption, viruses and trusted systems, Kerberos.

Network Programming: Sockets Programming: TCP Programming (TELNET, HTTP). UDP Sockets: TFTP, DNS. Secure Sockets (SSL), TLS, SSH, HTTPS, Remote Method Invocation (RMI). Simple Object Access Protocol (SOAP), UDDI, and Web Services.

### Software Engineering -

System modeling, system engineering process, life cycle models, design and implementation, validation, evolution, automated, process support - software requirements, SRS, feasibility studies - elicitation and analysis - validation - management - system models, context models, behavior models, data models, object models, object-oriented design, design evolution, real-time software design, critical systems specifications - critical system development, software testing.

***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***

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