HINDUSTAN PETROLEUM CORPORATION LIMITED

Regd. Office: 17, Jamshedji Tata Road, Mumbai - 400020. CIN NO: L23201MH1952GOI008858

SYLLABUS FOR COMPUTER BASED TEST IS OFFICERS POSITIONS

Section 1: Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Section 2: Basics of Computer Organization and Architecture

Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode). CPU architecture, microprocessors execute instructions and interact with hardware

Section 3: Programming Concepts

Modern Programming concepts (Advanced Java/J2EE fundamentals, Python Programming, Mobile App Development (Android/iOS)), OOPS core principles, Web Technologies (HTML, CSS, XML, JavaScript, PHP), Unix/Linux Shell Programming, Database programming SQL, PL/SQL. Application Server concept (Tomcat, IIS, Node.js), React frameworks, API concepts including RESTful services

Section 4: Concepts of Data Structures & Algorithms

Data Structure core principle - arrays, linked lists, stacks, queues, trees, heaps, graphs, hashing, and sorting/searching techniques. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths

Section 5: Operating System

System calls, processes, threads, inter-process communication, deadlocks, concurrency and synchronization. Resource allocations, I/O Management, Task scheduling. User Management, Disk Management, Memory management (paging, segmentation, virtual memory). File systems basics of contemporary Operating Systems like Windows and Linux.

Section 6: Databases

ER models, Relational model: relational algebra, tuple calculus, Normalization techniques, SQL queries, file organisation, indexing, transactions, concurrency control, backup and recovery methods. Understand ACID properties, locks, and query optimization basics. Database architecture: RDBMS, NoSQL, Vector, Graph, Distributed etc.

Section 7: Concepts of Computer Networks

Networking fundamentals, layered architecture (OSI and TCP/IP). Basics of packet, circuit and virtual circuit switching. Data link layer: framing, error detection, Medium Access Control(MAC), Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing. Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets. Application layer protocols: DNS, SMTP, HTTP, FTP, Email and Network Security Principles.

Section 8: Information Security / Cyber Laws

Study cryptography basics, authentication mechanisms, firewalls, IDS (Intrusion Detection System) and IPS (Intrusion Prevention System), malware, secure coding practices, and risk management. understanding of cyber laws, ethical hacking concepts, data privacy and compliance.

Section 9: Emerging Technologies (Cloud, IoT, AI/ML, etc.)

Cloud service models (IaaS, PaaS, SaaS), virtualization, containerization, edge computing, IoT (Internet of Things) architecture, Big Data Analytics, Artificial Intelligence and Machine Learning, Data Mining techniques, Blockchain concept.

.

NOTE: The syllabus/topics mentioned are indicative in nature. Candidates are expected to possess significant knowledge/proficiency pertaining to the relevant subjects and their qualifying degree.