SYLLABUS

Syllabus for Assistant Registrar (IT)/Computer Programmer/Software Engineer

➢ **Nature of Written Test:** It is an online test. It will consist of multiple choice objective type questions.

➢ **Medium:** English

➢ **Number of sections:** 2

  ▪ **Section I:** Mental Ability and Quantitative Aptitude Test 30 Questions, each question carrying 1 mark

  ▪ **Section II:** Technical Test (Software Development) 70 Questions, each question carrying 1 mark

➢ **Duration:** One & Half hour for Section I and II together

➢ **Total Marks:** 100

➢ **Minimum Marks for Passing in each section:** Nil

➢ **Details of Section I:** The test will contain questions on three abilities or skills

  1. Analytical Reasoning Skills (6 marks):
  2. Quantitative Skills (6 marks): Arithmetic, Elementary Algebra, Commonly known concepts of Geometry
  3. Verbal Skills (6 marks): Reading Comprehension, Sentence Correction, and Sentence Completions
  4. General Awareness and Current Affairs (6 marks):
  5. English Language (6 marks):

➢ **Details of Section II:** The test will contain questions on following concepts or skills

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

Computer Organization and Architecture: Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Programming and Data Structures: Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs.

Algorithms: Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph search, minimum spanning trees and shortest paths.

Theory of Computation: Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and contex-free languages, pumping lemma. Turing machines and undesirability.

Compiler Design: Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.

Operating System: Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems. UNIX, Linux, Windows XP.

Databases: ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Computer Networks: Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

System Programming: Assemblers, Macros, Basic Loader Function, Bootstrap Loader, Relocation and linking concepts, Compiler Design (Options, Interpreter, P – Code Compiler), Compiler. Software Tools for Program Development, Editors, Debug, Monitors, Programmes, Environments user Interfaces.

Software Engineering:
S/W Engineering Discipline Evolution and Impact, Program vs S/W Product, Emergence of S/W Engineering. Software Life Cycle Models. Software Project Management. Requirements Analysis and Specification. Object Modelling using UML. Coding and Testing. Software Reliability and Quality Management. Software Maintenance. Software Reuse.

Web Application Design & Development: HTML, JavaScript, CSS, Client/Server Side Programming using PhpCreating dynamic websites, error handling and debugging, Php MySQL/Oracle Database Connectivity.

Syllabus for Hardware Engineer

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- ➢ **Number of sections:** 2
    - ▪ **Section I:** Mental Ability and Quantitative Aptitude Test 30 Questions, each question carrying 1 mark
    - ▪ **Section II:** Technical Test (Software Development) 70 Questions, each question carrying 1 mark
- ➢ **Duration:** One & Half hour for Section I and II together
- ➢ **Total Marks:** 100
- ➢ **Minimum Marks for Passing in each section:** Nil
- ➢ **Details of Section I:** The test will contain questions on three abilities or skills
    1. Analytical Reasoning Skills (10 marks)
    2. Quantitative Skills (10 marks): Arithmetic, Elementary Algebra, Commonly known concepts of Geometry
    3. Verbal Skills (10 marks): Reading Comprehension, Sentence Correction, and Sentence Completions

- ➢ **Details of Section II:** The test will contain questions on following concepts or skills

    Data Communication: Components, LAN / MAN / WAN, Topologies, Analog, Digital Communication, ISO-OSI Architecture, TCP/IP, Transmission impairments, Media – Guided and unguided, Encoding techniques, Modulation, Error detection and correction, ARQ techniques, Multiplexing, FDM-TDM-WDM, Wireless communication, Switching techniques, Polling.

    Computer Networks: Data Link Layer – MAC Sublayer, CSMA, CSMA/CD, Ethernet, IEEE Standards, LLC, ATM, Network layer – Routing algorithms, Congestion control algorithms, IPV4 and IPV6, Subnetting, Transport Layer – Services, Service primitives, Addressing, Application Layer – DNS, E-mail architecture, SMTP, POP3, MIME, Network Management Devices – Repeater, Hub, Switch, Router, Gateway, Wireless access point, UDP, HTTP, FTP, TELNET, VOIP

    Information Security: Computer Security, CIA triad, OSI Security Architecture, X.800, Cryptography, Symmetric and asymmetric encryption, MAC, Hash function, Digital signature, User authentication – Token based, Biometric, Remote user authentication, Intrusion Detection Systems, Honey pots, Denial of Service, Firewall

    Mobile Computing: Cellular systems, SDMA, FDMA, TDMA, CDMA, GSM, GEO, MEO, LEO, WLAN protocols, Bluetooth, WAP, VPN

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

Computer Organization and Architecture: Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).

Compiler Design: Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation.

Operating System: Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems. UNIX, Linux, Windows XP.

Syllabus for Assistant Programmer

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  - ▪ **Section II:** Technical Test (Software Development) 70 Questions, each question carrying 1 mark

- ➢ **Duration:** One & Half hour for Section I and II together

- ➢ **Total Marks:** 100

- ➢ **Minimum Marks for Passing in each section:** Nil

- ➢ **Details of Section I:** The test will contain questions on three abilities or skills

  1. Analytical Reasoning Skills (10 marks)
  2. Quantitative Skills (10 marks): Arithmetic, Elementary Algebra, Commonly known concepts of Geometry
  3. Verbal Skills (10 marks): Reading Comprehension, Sentence Correction, and Sentence Completions

- ➢ **Details of Section II:** The test will contain questions on following concepts or skills

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

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Syllabus for Data Entry Operator

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  - ▪ **Section II:** Technical Test (Software Development) 70 Questions, each question carrying 1 mark

- ➤ **Duration:** One & Half hour for Section I and II together

- ➤ **Total Marks:** 100

- ➤ **Minimum Marks for Passing in each section:** Nil

- ➤ **Details of Section I:** The test will contain questions on three abilities or skills

  4. Analytical Reasoning Skills (10 marks)
  5. Quantitative Skills (10 marks): Arithmetic, Elementary Algebra, Commonly known concepts of Geometry
  6. Verbal Skills (10 marks): Reading Comprehension, Sentence Correction, and Sentence Completions

- ➤ **Details of Section II:** The test will contain questions on following concepts or skills

  Operating System: Working with MS DOS, Operating Hard disks and latest removable storage devices, demonstrating the partition of hard disk. Booting process. Booting computer in DOS and Windows environment Practicing DOS commands – formatting, copying, deleting, moving and renaming etc.

  MS Windows & Ubuntu: Using desktop, taskbar, start button, title bar, menus and help. My Computer & Recycle bin. Creating, deleting and renaming of files, folders & short cuts. Operating & closing of OS. Using different windows at a time. Moving through windows and mouse, File management Through OS. Storage & retrieval of data – concepts of tracks, sectors, cylinders, boot record, disk partition and file allocation table. System Software, Application Software, functions of OS, Booting, post, booting sequence, cold boot, warm boot.

  Word processing: Data processing in various software their features, versions and advantage, operation of word processor, Application of MS word, Document enhancement, Advance application, Printers, resolution, specifications different types and their applications. Scanners specification and applications.

  Spreadsheet, Power Point, Access: Spreadsheet packages, MS Excel Application and Excel commands. Advanced application of MS Excel. Preparation of PowerPoint. Concept of Database/relational database management systems, Records, fields,

different types of fields. Various types of database systems. Introduction to various database languages such as dbase, FoxPro, Visual Basic, Oracle and SQL.

Working with LAN: Networking concepts, LAN, WAN, their applications.

Antivirus: Concepts of virus, how computer get affected, Antivirus tools, protection

Network and Internet: Concepts of Network, internet, intranet, ISDN, Broadband concepts and applications.