SYLLABUS FOR COMPUTER BASED TEST
ASSISTANT MANAGER (IT) POSITIONS

1. DIGITAL LOGIC:

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

2. 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).

3. PROGRAMMING AND DATA STRUCTURES:

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

4. 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, shortest paths.

5. THEORY OF COMPUTATION:

Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and context free languages, pumping lemma. Turing machines and undecidability.

6. COMPILER DESIGN:

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

7. OPERATING SYSTEM:

Processes, threads, inter process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.

8. 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.

9. 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). WSN, Basics of Wi-

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THE WEST BENGAL POWER DEVELOPMENT CORPORATION LIMITED
(A Government of West Bengal Enterprise)

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Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

Information Systems and Software Engineering: Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input / output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Web technologies: HTML, XML, basic concepts of client-server computing.

10. DATA ARCHITECTURE:

i. Data models

ii. Data management blue print

iii. Data security, performance and scalability

11. DATA ANALYTICS:

i. Hypothesis formulation

ii. Application of analytics in software programming.

12. CLOUD COMPUTING

Definition of Cloud Computing and its Basics, Use of Platforms in Cloud Computing, Cloud Management, Concepts of Services and Applications

13. OBJECT-ORIENTED PROGRAMMING (OOP) FUNDAMENTALS:
i. Principles of OOP: Encapsulation, Inheritance, Polymorphism, Abstraction.
ii. Classes and Objects: Defining classes, creating objects, object interaction.
iii. Data Structures: Arrays, lists, trees, etc., and their role in object-oriented design.
iv. Basic OOP languages: Introduction to Java or C++, focusing on syntax and basic constructs.
v. Design Patterns: Understanding common design patterns like Singleton, Factory, Observer, etc.
vi. Object-Oriented Analysis and Design: Applying OOP principles to analyze and design software systems.

14. ARTIFICIAL INTELLIGENCE

Explain Fuzzy sets and Fuzzy logic systems including relationship between the Classical Sets and Fuzzy Sets, Membership functions, fuzzification and defuzzification methods, Fuzzy Inference System and Applications of Fuzzy Logic.

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15. VISUAL PROGRAMMING AND WEB TECHNOLOGY

WEB APP DEVELOPMENT

Server Side:
Languages: [PHP, NodeJS]
MVC Framework: Laravel

API DEVELOPMENT INTEGRATION [server to server(api call) / server to client (ajax)]

ReST & SOAP
Webhook

CLIENT SIDE DEVELOPMENT

Languages: [JavaScript with ES6, TypeScript]
MVC Framework: Angular
Library: JQuery, React
UI/UX: HTML, CSS, SCSS, Material Design, Bootstrap, Tailwind

PWA DEVELOPMENT FOR COMPATIBILITY WITH MOBILE DEVICES

Angular, Material Design, React, Bootstrap

ERP

Working knowledge of ABAP and SAP functional modules.

INTERNET TECHNOLOGY

Overview, Network of Networks, Intranet, Extranet and Internet., World Wide Web: Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP. Review of TCP/IP Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram, IPv4 and IPv6. IP Sub- netting and addressing: Classful and Classless Addressing, Sub-netting. NAT, IP masquerading, IP tables, Internet Routing Protocol .Routing -Intra and Inter Domain Routing, Unicast and Multicast Routing, Broadcast. Electronic Mail POP3, SMTP.

HTML, Image Maps, XML, CGI Scripts (9L): Introduction, Editors, Elements, Attributes, Heading, Paragraph. Formatting, Link, Head, Table, List, Block, Layout, CSS. Form, Iframe, Colors, Color name, Color value, map, area, attributes of image area. Extensible Markup Language, Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief. Introduction, Environment Variable, GET and POST Methods

Perl, JavaScript, Java applets Introduction, Variable, Condition, Loop, Array, Implementing data structure, Hash, String, Regular Expression, File handling, I/O handling. , Basics, Statements, comments, variable, comparison, condition, switch, loop, break. Object – string, array, Boolean, reg-ex. Function, Errors, Validation. Definition of cookies, Create and Store a cookie with example. Container Class, Components, Applet Life Cycle, Update method; Parameter passing applet, Applications.

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16. CYBER SECURITY

Importance and challenges in Cyber Security, Cyber security - Organizational Implications, Cyber Forensics and Auditing, Cyber Ethics and Laws:

17. CRYPTOGRAPHY & NETWORK SECURITY

Conceptual understanding of network security issues, challenges and mechanisms common network vulnerabilities and attacks and basic concept of cryptography. Evaluate various techniques of cryptography. Illustrate the algorithms of different symmetric key cryptography. Illustrate Apply the public key algorithms, digital signature and message digest. Analyze the approaches of security protocol and authentication. Analyze & explain the concept of electronic mail security and types of firewall and its configurations.

18. INTERNET OF THINGS

Understand the vision of IoT from a global context, Use of Devices, Gateways and Data Management in IoT. Analysed the use of IoT in Industrial and Commercial Building Automation and Real World Design Constraints. Understand the architecture of smart sensor. Build the interfacing among IoT components.

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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.

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