



बिहार स्टेट इलेक्ट्रॉनिक्स डेवलपमेंट कॉर्पोरेशन लिमिटेड (बेल्ट्रॉन)
Bihar State Electronics Development Corporation Ltd. (BELTRON)
A Government of Bihar Undertaking | CIN-U31900BR1978SGC001317

Post: **Manager (PMU)**

Educational Qualification: BE/B.Tech./BSC-Engg./MCA/Equivalent

Experience : Minimum 5 Years of Post qualification.

Part: A

Software Engineering:

Introduction: Introduction to software Engineering, Software Components, Software Characteristics, Software Crisis. Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes. Software Development Life Cycle (SDLC) Models. Water Fall Model, Prototype Model, Spiral Model. Evolutionary Development Models. Iterative Enhancement Models.

Software Requirement Specifications (SRS)

Requirement Engineering Process: elicitation. Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modelling. Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks. ISO 9000 Models. SEI-CMM Model.

Software Design: Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, top-Down and Bottom-UP Design. Software Measurement and Metrics: Various Size Oriented Measures: hale stead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

Software Testing: Testing Objectives, Unit Testing, Integration Testing. Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, top- Down and Bottom-Up and Testing Strategies: Test Drivers and test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products, Static testing Strategies: Formal Technical Reviews (Peer Reviews), Walk through, Code Inspection, Compliance with Design and Coding Standards.

Software Maintenance and Software Project Management: Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, an Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/ Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

Digital Logic: Boolean algebra, Combinational and sequential circuits, Minimization, Number representation and computer arithmetic (fixed and floating Point).

Computer Organization and Architecture: Machine instruction and addressing modes, ALU, data- path and control unit, Instruction pipelining, Pipeline hazards. Memory hierarchy: cache, main memory and secondary storage, I/O interface (interface 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 divided- and-conquer, Graph traversals, minimum spanning trees, shortest paths.

Theory of Computation: regular expression and finite automata. Context-free grammars and pushdown automata, Regular and context-free languages, pumping lemma. Turing machines and unreadability.

Compiler Design: Lexical analysis, parsing, syntax-directed translation, Runtime environments. Intermediate code generation, Local optimization, Data flow analysis: constant propagation, liveness analysis, common subexpression elimination.

Operating System: System calls, Processes, threads, inter process communication, concurrency and synchronization. Deadlock. CPU and I/O Scheduling. Memory management and virtual memory. File Systems.

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: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit switching, Data link layer: framing, error detection, medium Access Control, 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.

Part: B

Introduction to Project Management Unit (PMU), Understanding the purpose and role of a PMU in an organization, key responsibilities and function of a Manager in a PMU, Overview of the Project management process and its importance in project success. Project Planning and Execution, Defining project objectives scope, and deliverables.

Creating a comprehensive project plan with timelines and milestones, implementing effective project execution strategies. Leadership and Team Management, Building and leading high-performing project teams.

Motivating and empowering team members for optimal performance, Conflict resolution and fostering a positive team culture. Communication and Stakeholder Management, Developing a clear communication plan for project stakeholders, Effective communication strategies for various stakeholders, managing expectations and addressing concern from stakeholders. Risk Management and problem-solving, Identifying potential project risks and their impact on project outcomes, Implementing risk assessment and mitigation plans, problem-solving techniques and decision making in project management, Procurement and Vendor management, Identifying Procurement needs and defining procurement strategies, Vendor selection, contract management, and performance evaluation Mitigating risk associated with external vendor and suppliers. Strategic Project Management, Aligning projects with organizational strategy, conducting strategic analysis for project selection and prioritization, balancing conflicting priorities in a project portfolio.