

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER
SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF
LECTURER IN COMPUTER SCIENCE FOR COLLEGE
EDUCATION DEPARTMENT
PAPER-II

- 1. Discrete Mathematical Structures:** Counting principles, linear recurrence, mathematical induction, relations and functions, predicate and propositional logic. Graph: Definition and properties, connected graph, cycles & circuits, Tree: rooted tree, spanning trees. Models of Computability: Regular Expressions and Finite Automata. Context free grammars and Push down Automata. Regular and Context free languages, pumping lemma. Turing Machines and undecidability.
- 2. Data Structures and Algorithms:** Analysis, Asymptotic notation, Notions of space and time complexity, Best, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and conquer; Tree and graph traversals, Spanning tree algorithms, Shortest paths; Hashing, Sorting, Searching. Basic concepts of complexity classes P, NP, NP-hard, NP-complete.
- 3. Database Management System:** ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normalization-1NF, 2NF, 3NF, BCNF and 4NF), Structured Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.
- 4. System Software:**
Assemblers: one pass & two pass assemblers design, Macros & Macro processors, loaders & linkers, Text editors & debuggers, Program generators, Compiler & Interpreter, Different phases of compilation process.
- 5. Emerging Trends and Technologies:** Concept of Parallel Computing (Parallel Virtual Machine and Message passing Interface) , Mobile Computing: Cellular system, Handoff, Location Management, Pervasive Computing, WLAN, E-Technologies: E-commerce framework and applications, Business models, electronic payment System: Digital Token, Smart Cards, Credit Cards, risks in e-payment systems. Data Warehousing and Data Mining.

Note :- **Pattern of Question Paper**

- 1. Objective type paper**
- 2. Maximum Marks : 75**
- 3. Number of Questions : 150**
- 4. Duration of Paper : Three Hours**
- 5. All questions carry equal marks.**
- 6. There will be Negative Marking.**