

**RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**  
**SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE**  
**POST OF ANALYST-CUM-PROGRAMMER (DEPUTY**  
**DIRECTOR), DEPARTMENT OF INFORMATION**  
**TECHNOLOGY AND COMMUNICATION**

1. A candidate must appear in all the papers. The marks and time allowed for each Paper shall be as under:-

<b>Name of Papers</b>	<b>Marks</b>	<b>Time</b>
PAPER- I	100	2 Hours
PAPER- II	100	2 Hours

**SCOPE OF PAPERS**  
**Written Examination**

**Paper – I**

**Reasoning Test & Numerical Analysis & General Knowledge**

Problem solving, Data Interpretation, Data Sufficiency, Logical Reasoning and Analytical Reasoning. General Knowledge and Current Affairs relating to India and Rajasthan.

**Data Base Management Systems**

ER Diagram, data models- Relational and Object Oriented databases.

Data Base Design: Conceptual data base design, Normalization Primitive and Composite data types, concept of physical and logical databases, data abstraction and data independence, data aggregation and Relational Algebra.

Application Development using SQL: Host Language interface, embedded SQL programming, Stored procedures and triggers and views, Constraints assertions.

Internal of RDBMS: Physical data organisation in sequential, indexed random and hashed files.

Inverted and multilist structures, B trees, B+ trees, Query Optimisation, Join algorithm.

Transaction Processing, concurrency control and recovery management. Transaction model properties and state serialisability. Lock base protocols, two phase locking.

Different server multi user, multiprocess operating systems and requirement for client interfaces in distributed application environments.

**Data Communication and Computer Networks**

Computer Network Architecture, Circuit switching, Packet And Message Switching, Network Structure. Physical Layer, Data Link Layer, Framing. Retransmission algorithms.

Multiple access and Aloha. CSMA/CD and Ethernet. High Speed LANs and topologies. Broadcast routing and spanning trees.

TCP/IP Stack. IP Networks and Internet. DNS and Firewalls. Intrusion Detection and Prevention.

Transport layer and TCP/IP. Network Management And Interoperability.

## Paper – II

### **System Analysis and Design**

System concept: Definition and characteristics, elements and boundaries, types of system development lifecycle, recognition of needs, feasibility study, prototyping, role of system analyst. System planning and tools like DFD, data dictionary, decision trees, structured analysis and decision tables.

IPO charts, structured walkthrough, input output form design, requirement and classification of forms, layout considerations form control, object oriented Design Concepts and methods.

Software Life Cycle, Software Engineering paradigms. System analysis: Feasibility study requirement analysis, Cost benefit analysis, Planning systems, Analysis tools and techniques.

System Design: design fundamentals, Modular Design, Data and procedural design, object oriented design.

System Development: Code documentation, Program design paradigms, Efficiency Consideration. Verification, Validation and Testing: testing methods, Formal Program Verification, Testing Strategies.

Software Maintenance: Maintenance Characteristics, Maintainability, Maintenance tasks and side effects.

### **Software Project Management**

Software Project Management Concept: The Management Spectrum, People, Product, Process & Project.

Software Process & Project Matrix: Software Measurement Size Oriented Matrixes, Function Oriented Matrices.

Software Project Planning: Objectives, Decomposition Techniques, Empirical Estimation Model.

Risk Analysis and Management: Risk Identification, Projection, Risk Refinement, Risk Monitoring And Management.

Project Scheduling & Tracking, Software Quality Assurance, Software Configuration Management.

### **Note for general guidance:**

- (i) The standard of the paper will be that of a degree examination of a University established by law in India. A brief outline of the scope of each paper is given in this Schedule for general guidance of candidates but is not intended to be exhaustive.
- (ii) All papers unless specifically required, shall be answered either in English or in Hindi, but no candidate shall be permitted to answer any one paper partly in Hindi or partly in English unless specifically allowed to do so.
- (iii) If a candidate's hand-writing is not easily legible, a deduction will be made on this account from the total marks otherwise accruing to him.
- (iv) Questions of question paper of examination may be of multiple choice type or descriptive type or both types.
- (v) Credit will be given for orderly, effective and exact expression combined with due economy of words in all descriptive questions of the examination paper(s)."

**Minimum Qualifying Marks :-** Candidates who obtain a minimum of 40% marks in the aggregate for the written examination shall be considered to have obtained qualifying marks at the written examination, but the minimum qualifying marks in the written examination for the candidates belonging to Scheduled Castes/Scheduled Tribes, shall be 36%. The Commission/Appointing Authority may in their/its discretion award grace marks upto three in the aggregate.