Rajasthan Public Service Commission, Ajmer

RAJASTHAN STATE AND SUBORDINATE SERVICES COMBINED COMPETITIVE EXAMINATION

SYLLABI OF THE PAPER/SUBJECTS PRESCRIBED FOR THE MAIN EXAMINATION

OPTIONAL SUBJECT

COMPUTER SCIENCE   PAPER-I   (Code No. 10)

1. System software and programming language: Components of system software: evolution of system software, Language translator: assembler, interpreter, compiler (one pass, multi pass, different phases of compilation), loader, linker, macro processor operating system. Programming language and formal system: Feature of HLL data types and data structure, Storage allocation, Scope and lifetime of variable, Functional modularity: Procedure, functions. Operating system: Operating system as resource manager, operating system services, Classification of operating system: single use, multi-user, simple monitor, batch processing, time sharing, real time, multitasking, Processor management: process, states level of schedules. Scheduling algorithms, deadlock, protection, prevention recovery, Memory management: partition, paging, segmentation, virtual memory and demand paging, Memory allocation: contiguous, linked, indexed, directory system, History of O/s., design principles, DOS, UNIX, Windows features, design, commands.

2. Problem solving through computers (Procedure oriented): algorithm, flowchart, developing HLL programs, structured and modular programming concepts, program development in C++ language.

3. Software engineering: Programming concepts, structured programming, stepwise refinement, paradigms of programming (including object orientation), Divide and conquer, Greedy algorithms, backtracking, recursion, dynamic programming, basic principles of program verification and testing, object oriented programming in C++.

4. Data structure: notion of data structure, array, stack , queues, linked list, graph, trees, insertion, election, sorting, searching, hashing, analysis of algorithms.

5. Computer graphics : Components of graphics system: Display devices, Display processor, Hard copy devices, Interactive input-output devices. Graphic primitives: geometry and line generation, window

viewport, area filling, display file, Windowing, Clipping and related algorithms, Transformations: basic transformations, general transformation equation, 2-D, 3-D transformations, Hidden surface and hidden line algorithm, shading.

COMPUTER SCIENCE   PAPER-II   (Code No. 10)

1. Basic computer organization: Data representation: fixed point and floating point representation, character representation, computer arithmetic Instruction codes, computer instructions, timing and control fetching and execution of instructions, I/o and interrupt, Addressing modes: direct, indirect immediate, indexed, relative, Addressing formats: one, tow, three addresses, length of instruction, data transfer and manipulation.

2. Microprocessor: evolution and organization, detail architecture and programming of 8085 architecture, development of Intel family processors, Comparison with other families as motorolla, zilog.

3. Advance computer architecture: I/O organization: Peripheral devices, I/O interface, data transfer schemes: Asynchronous, synchronous, handshaking, DMA, I/O processor, Data communication processor, Multiprocessor organization, Pipeline and Vector processing. Hard wired versus Micro program control organization: control memory, microinstruction, micro program, applications of micro program. Memory organization: auxiliary memory, associative memory, virtual memory, cache memory, memory hierarchy.

4. Fundamentals of Business Data Processing: Business requirements, Typical business applications: payroll, inventory, financial accounting, Public delivery system, sales management etc., File Organization: sequential, indexed, random, inverted, Master and transaction file processing, DBSM: desired features, objectives, components of DBMS.

5. Database management system: database design, goals objectives, views conceptual, logical, physical, classical data models: relational, network, merarchical, detail study of RDBMS: relation, Entity Relationship diagram, normalization, relational algebra and calculus, relational languages; SQL, QBE. Database file design, creation, updation, operations. Report generation, RQBE.

6. Computer oriented Numerical and Statistical Methods: Computer arithmetic: fixed point, floating point representation, errors in representation, normalized floating point arithmetic and its consequences. Concept of roots: real and complex, synthetic division, Finding roots of equations: bisection methods, false position method, Newton Raphson method; Secant method, Bairstow's   method,

Solution of simultaneous equations. Iterative and direct methods: Gauss Siedal, Gauss elimination, Gauss Jordan methods Numerical solution of differential equations: Taylor series, Eulers methods. Runga Kutta methods, Predictor corrector methods, Picards methods, Mlines methods, Numerical differentiation: Differential formulae based on Polynomial fits, pitfalls in differentiation, Numerical integration: Tapezoidal rule Simpsons rule, quardrature formulae, Approximation of function by tailors series and chebshew polynomials, Interpolation: Difference Table, Newton's interpolation, Spline interpolation, Linear regression. Polynomial regression, Lagrange's interpolation. Statistical Methods: Summarization of data, frequency distribution, measurement of central tendencies; dispersion, moment, cumulates, probability; discrete and continuous distributions, test of significance, chi square test correlation and regression probability theory.

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