



PUBLIC SERVICE COMMISSION, WEST BENGAL

161-A, S.P. Mukherjee Road, Kolkata – 700 026

Recruitment to the posts of **Assistant Professor of Computer Science & Engineering** for Govt. Engineering & Technological Colleges under the Higher Education Department in

W.B.G.S, Govt. of W.B. against Commission's **ADVT. NO. 9 [1C(ii)] / 2013**
& 4 [1(i)] / 2013

Scheme of the Common P.S.T is as follows:-

Date of P.S.T - 04.09.2015

Type of Test – M.C.Q.

No. of questions – 100

Full Marks – 100

Duration – 1 hour 30 minutes (From **12:00 noon to 1:30 p.m.**)



Syllabus for Recruitment to the posts of Assistant Professor in Computer Science & Engineering for Govt. Engineering & Technological Colleges under Higher Education Department , Government of West Bengal.

Calculus : Limit, Continuity & differentiability, Mean value Theorems ,Theorems of integral calculus, evaluation of definite & improper integrals, partial derivatives, Total derivatives, maxima & minima.

Linear Algebra and Set Theory : Algebra of matrices, determinants, systems of linear equations, Eigen values and Eigen vectors, similarity transformations, diagonalization; Sets; Relations; Functions; Groups; Partial Orders; Lattice; Boolean Algebra.

Mathematical Logic : Propositional Logic; First Order Logic.

Probability : Conditional Probability; Mean, Median, Mode and Standard Deviation; Random Variables; Distributions; uniform, normal, exponential, Poisson, Binomial.

Numerical Methods : LU decomposition for systems of liner equations; numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods; Numerical integration by trapezoidal and Simson's rules.

Graph Theory and Combinatorics : Connectivity; spanning trees; Cut vertices & edges; covering; matching; independent sets; Graph coloring; Planarity; Isomorphism; Permutations; Combinations; Counting; Summation generating functions; recurrence relations; asymptotics.

Basic Electrical and Electronics : DC circuits; Linear & non-linear circuits; Krichhoff's laws; Maxwell's loop current method; star- delta transformation; Superposition; Thevenin's theorem; Norton's theorem;



AC fundamentals; phase & phase difference; average & RMS values; form factor & peak factor; impedance & admittance; power & power factor R-L, R-C, series & parallel combination of R,L & C. Basic Electronics; PN junction; Bipolar Junction transistors; FET.

Digital Design : Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).



Theory of Computation :Regular languages and finite automata, Context free languages and Push-down automata (PDA), Recursively enumerable sets and Turing machines, Undecidability.

Computer Organization and Architecture : Instruction set architecture, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Hazards, Forwarding, Exception handling, Cache and main memory, Storage, RAID.

Programming and Data Structures : Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data type, Arrays, Stacks, Queues ,Linked Lists, Trees, Binary search trees, RB-tree, Binary heaps Programming approaches; procedural, object oriented, data driven, functional and logic programming.

Algorithms : Analysis, Asymptotic notation, notions of space and time complexity, Worst and average case analysis; Design : Greedy approach, Dynamic programming, Divide- and - conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP- complete.

System software : Assembler, Macros, Loaders & Linkers .

Microprocessor & Microcontrollers.

Compiler Design: Laxical analysis, Parsing, Syntax directed translation, Symbol table, Runtime environments, Intermediate and target code generation, Basics of code optimization.

Operating System : Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O system, Protection and security.



Databases : ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B + trees), Transactions and concurrency control.



Information Systems and Software Engineering : 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.

Computer Networks : ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP (v4), Application layer protocols (icmp, dns, smtp, pop, ftp,http); Basic concepts of hubs, switches, gateways, and routers. Network security basic concepts, digital signature, firewalls.

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