UNIVERSITY OF KASHMIR

NAAC ACCREDITED GRADE A+

UNIVERSITY CAMPUS, HAZRATBAL, SRINAGAR 190006, KASHMIR.

NOTICE

It is notified for the information of all those candidates who have applied for the post of Scientist-B (Post Code: **PGD-IT-3**) advertised vide advertisement notice No: **04 of 2023** dated **07-04-2023** that the syllabus for the conduct of MCQ based test has been uploaded on the University Website http://www.kashmiruniversity.net under Jobs/ Recruitment Link.

However, the date for the MCQ based test shall be notified separately.

Sd/-
Deputy Registrar
(Recruitment)

No: KU/ Rectt. / Syllabus-SB/2024
Dated: 11-10-2024

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Syllabus for the post of Scientist-B in the Directorate of IT&SS, University of Kashmir:

Aptitude

Basic English Grammar: Tenses, Articles, Adjectives, Prepositions, Conjunctions, Verb-noun Agreement, and Other Parts of Speech Basic Vocabulary: Words, Idioms, and Phrases in Context Reading and Comprehension Narrative Sequencing. Data interpretation: Data Graphs (Bar Graphs, Pie Charts, and Other Graphs Representing Data), 2- and 3-dimensional Plots, Maps, Tables Numerical Computation and Estimation: Ratios, Percentages, Powers, Exponents, and Logarithms, Permutations and Combinations, Series, Mensuration and Geometry, Elementary Statistics and Probability, Deduction and Induction, Analogy, Numerical Relations, and Reasoning, Transformation of shapes: Translation, Rotation, Scaling, Mirroring, Assembling, and Grouping Paper Folding, Cutting, and Patterns in 2 and 3 Dimensions.

Engineering Mathematics

Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Monoids, Groups. Graphs: connectivity, matching, coloring. Combinatorics: counting, recurrence relations, generating functions. Linear Algebra: Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition. Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration. Probability and Statistics: Random variables. Uniform, normal, exponential, poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem.

Digital Logic

Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).

Computer Organization and Architecture

Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt 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 divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths

Theory of Computation

Regular expressions and finite automata. Context-free grammars and push-down automata.Regular and contex-free languages, pumping lemma. Turing machines and undecidability.

Compiler Design

Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. Local optimisation, Data flow analyses: 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

Emerging technologies

Questions related to latest technologies 5G Network, Data Science, Data Exploration and Cleaning, Data Exploration and Cleaning, Data Visualization, Introduction to Python,Artificial Intelligence and Machine Learning (AI & ML), Neural Networks Basics, Ethics in AI, Automation, BlockChain, Cyber Security, Voice Technology, IOT, Serverless Computing, Biometrics, Robotics, Virtual reality (VR/Augmented reality (AR), Drones, Intelligent Apps, Big Data Analytics, Computer Network. Cloud Technology: Compute, Storage Management Technologies, Edge Computing, etc.