



NATIONAL BOARD OF EXAMINATIONS IN MEDICAL SCIENCES NEW DELHI

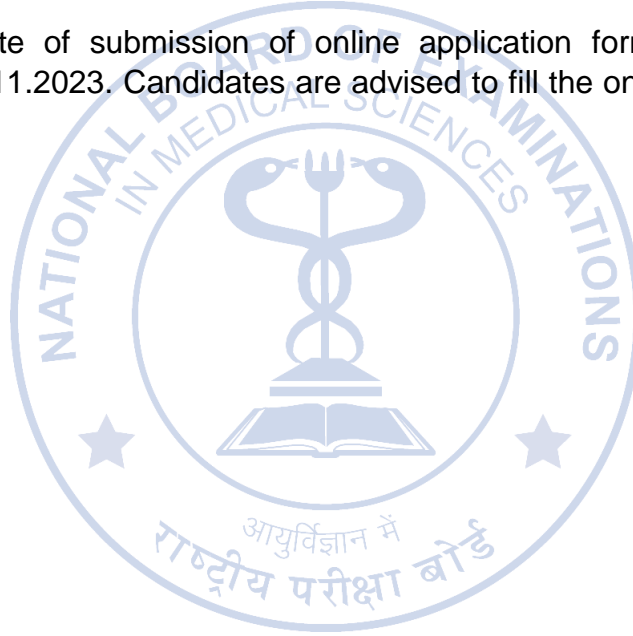
No. A.12022/1/2023-Estt.

Dated: 11th Nov, 2023

NOTICE

In Continuation to NBEMS Advertisement Vacancy Notice No. [A.12022/1/2023-Estt. dated 21.09.2023](#) and Corrigendum No. [A.12017/Misc./1/2022-Estt dated 29.09.2023](#).

2. In reference to Para 'D' and 'E' of the ibid vacancy notice, the Scheme and Syllabus of examination for the post of Junior Programmer, Group B, Level-7 is attached at [Annexure – A](#).
3. The last date of submission of online application form will be remained unchanged i.e. 09.11.2023. Candidates are advised to fill the online application form accordingly.



NBEMS

Scheme & Syllabus for the Post of Junior Programmer in NBEMS

SELECTION PROCEDURE: –

There will be two stages of examination i.e. a Computer Based Test (CBT) of 200 marks and Skill test of 100 marks. Final merit list will be drawn on the basis of total marks obtained by the candidates in the CBT and skill test.

Stage-I: The Stage-I Examination shall be Computer Based Test (CBT) comprising of 120 Questions with maximum marks as 200. The question paper will consist of 65% questions from Technical Area and 35% questions from Generic Area. The duration of the objective type test shall be of 180 Minutes (Three hours). There will be Negative marking of 1/4th for each wrong answer in CBT. The minimum qualifying marks will be 40% for SC/ST/PwBD/ESM and 50% for others.

Stage-II: The Stage-II Examination (Skill Test) shall be of 100 marks and the time duration shall be 90 minutes. Five candidates against every vacancy, in each category in order of merit prepared on the basis of CBT (Stage-I) shall be called to participate in Skill Test i.e. Stage-II.

The minimum marks to be obtained in Stage-II for being eligible for final selection shall be 40% for SC/ST/PwBD/Ex-SM candidates and 50% for other candidates. Schedule of Skill Test shall be uploaded on the website www.natboard.edu.in in due course of the process.

SYLLABUS: -

Total Duration: 3 Hours

No. of Questions: 120

Sl. No.	Topic
Section A: Generic 35%	
1.	Logical Reasoning, Analytical Reasoning Capabilities, Quantitative and Qualitative abilities, General Aptitude.
Section B: Technical (Computer Science) 65%	
1.	Probability and Statistics: Sampling theorems, Conditional Probability, Mean, Median, Mode and standard deviations, Random Variables discrete and continuous distributions, Poisson, Normal and Binomial distribution, correlation and regression analysis.
2.	Digital Computer Principles: Number systems- Binary, Decimal. Octal, and Hexadecimal Conversion, Arithmetic operations, Boolean expression, simplification, Postulates and theorems, Simplifications, K-map, Combinational logic circuits - Adder, Subtractor, Multiplexer, Demultiplexer, Encode, Decoder, Sequential circuit - SR, JK, T, D, flip flops, shift registers, Asynchronous, synchronous and Module and counters.

3.	Computer Organization and Architecture: Multiprocessors and microcomputers, Machine Instructions and addressing mode. ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Cache and main memory, Secondary storage, Semiconductor memory - Internal organization, SRAM. DRAM, SDRAM, Rambus Memory, ROM Technology, virtual memory, Instruction sequencing, Instruction execution, Hardwired control and microprogrammed control, micro instructions, Instruction pipelining.
4.	Programming and Data Structures: Programming in C, Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.
5.	Object Oriented Programming: Object Oriented design concept, programming in C++ and on programming languages viz. Java, Net, Open Source (PHP), Python, GoLang, NodeJS, etc.
6.	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, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds. Basic concept of complexity classes, N, NP, NP-hard, NP-complete.
7.	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.
8.	System Software: Lexical analysis, parsing, syntax directed translation, code generation and optimization, Assemblers, linkers and loaders microprocessors operating systems- processes, threads, inter-process communication, synchronization deadlocks, CPU scheduling, memory management and virtual memory, file system, I/O systems, protection and security module.
9.	Information Systems and Software Engineering: Information gathering requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding and testing, implementation, maintenance.
10.	Computer Networks: IOS/OSI stack, LAN technologies (Ethernet, Token Ring), flow and error control techniques, Routing algorithm, Congestion Control, TCP/UDP and sockets IP(v4) Application layer protocol (ICMP, DNS, SMTP, POP, FTP, HTTP, HTTPS): Basic concept of hubs, switches, gateways and routers. Network security: Basic concepts of public key and private key cryptography. Hash function, Digital Signature, Firewalls, User authentication- Token based, Biometric, Remote user authentication, Intrusion detection systems, honey pots, Denial of Service. Wireless network, 2G and 3G Networks, Bluetooth.
11.	Web Technologies: HTML5, CSS3, XML basic concept of client-server computing, web server, proxy server, web application development, MVC architecture, web services, frontend and backend technologies.