Scheme and syllabus of competitive examination for the posts of Senior Computer Instructor:-

The examination shall carry 200 marks. There will be two papers. Paper-I shall be of 100 marks and paper-II shall be of 100 marks.

Paper -I

1. The question paper will carry maximum 100 marks.
2. Duration of question paper will be 2.00 hours.
3. The question paper will carry 100 questions of multiple choices.
4. Paper shall include following subjects :-
   (i) Art & Culture, History, Geography, General Science and Current Affairs of Rajasthan.
   (ii) General Ability shall include following point :-
      A. Logical Reasoning and Analytical Ability.
      B. Decision Making and Problem Solving.
      C. General Mental Ability.
      D. Basic Numeracy - Numbers and their relations, orders of magnitude, etc. **(Class X level)**
      E. Data Interpretation - Charts, Graphs, Tables, Data Sufficiency, etc. **(Class X level)**
5. Negative marking shall be applicable in the evaluation of answer. For every wrong answer **one**

   third (1/3) of the marks prescribed for that particular question shall be deducted.

Explanation: Wrong answer shall mean an incorrect answer out of multiple choices given for a question.

Paper -II

1. The question paper will carry maximum 100 marks.
2. Duration of question paper will be 2.00 hours.
3. The question paper will carry 100 questions of multiple choices.
4. Negative marking shall be applicable in the evaluation of answer. For every wrong answer **one**

   third (1/3) of the marks prescribed for that particular question shall be deducted.

Explanation: Wrong answer shall mean an incorrect answer out of multiple choices given for a question.

5. Paper shall include following subjects:-
   (i) Pedagogy
   (ii) **Mental Ability:** Decision making and Problem solving, Data Interpretation, Data Sufficiency, Logical Reasoning and Analytical Ability, Major developments in the field of Information Technology.
   (iii) **Fundamentals of Computer:** Number system, arithmetic operations, introduction to various categories of computer language, functional details of Input and Output devices.
   (iv) **Programming Fundamentals :** C, C++, Java, DotNet, Artificial Intelligence (AI), Machine learning, Python and Block Chain, programming, data types (Built in and user defined), Scope of variables, precedence of operators, control flow, functions, arrays pointers, structures and unions, enumerated data-types and file handling, command line arguments.
   (v) **Object Oriented Programming using C++ and JAVA:** Objects and classes. Inheritance, polymorphism, event and exceptions handling, files and streams.
   (vi) **Data structures and Algorithms:** Abstract data types, Arrays as data structures, linked list v/s array for storage, stack and stack operations, queues, binary trees, binary search trees, graphs and their representations, sorting and searching, symbol table.
   (vii) **Algorithms:** Tree traversals, Branch and bound and greedy methods, complexity of algorithms.
   (viii) **Digital Logic Systems:** Boolean expressions, K-maps, TTL and CMOS logic families, combinational logic design using half/full adders, Sub tractors, and multiplexer, synchronous sequential system design
   (ix) **Computer Organization and Architecture:** Von-Neumann architecture of computers. Registers and micro operations, control logic, processor addressing and bus organization. Processor input/output and DMA. Memory organization and cache coherence.

(x) **Operating Systems:** CPU scheduling, Deadlocks, Memory management, file systems, disk scheduling. Concept of Client server architecture in distributed environment and RPC. Process, threads and their synchronization.

Real Time OS: clock synchronization and task scheduling.

System initialization, booting and handling user accounts. Backup and restore, Bourne shell programming for Linux.

(xi) **Database Management System:** E-R models, Relational algebra, calculus and databases, Integrity constraints, triggers, normalization, and indexing. Transaction processing, concurrency control and Relational Database Management System (RDBMS).

(xii) **Software Engineering:** Phases of System Development Life Cycle. System modeling. Software requirement specifications and DFDs. Introduction to software testing, software project management.

(xiii) **Data and computer networks:** Evolution of Networking, Data Communication terminologies, Transmission media, Network devices. TCP/IP & OSI/ISO reference models, functions of different layers, characteristics of physical media, multiplexing in physical layer, medium access protocols, introduction to 802.3, 802.4, 802.5, 802.11 LAN technologies, IP protocol including routing and congestion control, TCP and UDP, DNS.

(xiv) **Network Security:** Groups, rings and fields in finite space, Euler and Fermat's theorem, primality testing, security services and mechanisms, symmetric and asymmetric encryption including DES, AES, IDEA, RSA algorithms, key management in symmetric and asymmetric encryption, message authentication and hashing, email security, viruses and trusted systems, Networking (LAN&WAN), Security, Ethical Hacking.

(xv) **Basics of communication:** Channel capacity, attenuation, communication impairments, propagation of EM waves through free space (excluding free space models). PCM and delta modulation, WDM, brief introduction to GSM and CDMA based communication systems.

(xvi) **Web Development:** HTML/DHTML, Web Page Authoring Using HTML, Document Object Model Concept and Importance of Document Object Model, Dynamic HTML document and Document Object Model. Introduction to Cascading Style Sheet (CSS), Extensible Markup Language (XML), Basic of PHP and Java Script.