MATHEMATICS: ALGEBRA, ANALYSIS AND CALCULUS

The candidate should know basic concepts of mathematics including:
- Principle of Induction
- Basics of Boolean logic
- Modular arithmetic
- Sets, ordered sets, countable sets and related operators (e.g., union, intersection)
- Fundamental functions (e.g, exponential, logarithm, sine, cosine, abs)
- Vectors and matrices, and relative operations
- Graphs and trees
- Solution of second order equations
- Maximum and minimum of a real function
- Differential Calculus
- Integral Calculus

ELEMENTS OF COMPUTER SCIENCE:

The candidate should know basic elements of computer science including:
- Representation of information - representing integer and rational numbers, representing text
- Elements of computational complexity
- Search algorithms: linear and binary search
- Sorting algorithms: bubble sort, quick sort, merge sort, insertion sort

BIOCHEMISTRY

The candidate should know basic aspects of biochemistry including:
- Proteins structure;
- Enzymes function and kinetics;
- Bioenergetics and the role of ATP;
- General aspects of metabolic pathways;

BIOLOGY OF CELLS AND ORGANISMS

The candidate should know basic concepts of cell and organism biology including:
- main features and peculiarities of prokaryotic and eukaryotic cells
- main cell organelles and their function in the cell metabolism
- cellular macromolecules (nucleic acids, proteins, polysaccharides, lipids) and their function in the cell
- cell division in somatic and germinal cells and the inheritance of genetic information
- Principles of systems physiology, including central nervous system and transduction in nervous system
- Sensory perception and transduction

The text and sources indicated below are purely indicative. Most of the concepts and knowledge needed for the admission interview can be found in textbooks of each specific discipline used in first level degree programs.

Bibliography (mathematics):
https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/
"Mathematics A discrete Introduction" , Edward R. Scheinerman
"Introduction to Algorithms", Cormen, Leiserson, Rivest, Stein

Bibliography (biochemistry):
"Biochemistry", by Denise Ferrier (Lippincott Illustrated Reviews).
"Harper's Illustrated Biochemistry", by V. W Rodwell et al. (McGraw Hill)
"Lehninger Principles of Biochemistry", By D.L. Nelson and M.M. Cox (W.H. Freeman and Co.)

Bibliography (biology of the cell and organisms):
"Life: The Science of Biology, 11th edition, by Sadava et al. Oxford University Press. Book 1 (The cell) and Book 2 (Heredity and Genome)
"Principles of Neural Science". Kandel, Schwartz, Jessel, 4th edition. 2000. McGraw-Hill, New York.