RAMAKRISHNA MISSION RESIDENTIAL COLLEGE
NARENDRAPUR, KOLKATA 700103

PG ADMISSION TEST 2018

SYLLABUS

PHYSICS

1. Mathematical Physics
2. Classical Mechanics
3. Quantum Mechanics
4. Statistical Mechanics
5. Atomic and Molecular Physics
6. Solid State Physics
7. Electronics

Special Paper (Advanced) available: Condensed Matter Physics

CHEMISTRY

A. Physical Chemistry

1) The gaseous state and the kinetic theory of gases.
2) Thermodynamics: principles and its applications to
a) Chemical equilibrium (including ionic equilibrium);
b) Phase equilibrium (upto one and two component systems). c) Properties of solutions (electrolyte and non-electrolyte).
d) Redox equilibrium and electrochemical cells. e) Surface equilibrium.

3) Chemical kinetics and catalysis.
4) Quantum Mechanics
5) Molecular Spectroscopy.

B. Organic Chemistry

1. Stereochemistry of Organic Compounds
2. Application of UV, IR and HNMR Spectroscopy in Organic Chemistry
3. Bonding Features of Organic Molecules, Organic Synthesis, Reaction mechanism

C. Inorganic Chemistry

1) Redox reactions & theory of acids & bases.
2) Atomic structure and periodic property
3) Chemical Bonding.
4) Theory of coordination chemistry and electronic spectra
5) Bio-inorganic & organometallic chemistry.

6) Analytical principles: Oxidimetry, Reductivmetry, Acidimetry-alkalimetry, Complexometry and Qualitative Inorganic Analysis.

Special Paper available: Inorganic Chemistry and Organic Chemistry

COMPUTER SCIENCE

1. **Digital System Design**:

Boolean Algebra, Combinational logic (Half and Full adder, Half and Full subtractor, Carry Look Ahead Adder, BCD Adder, Code Converter, Comparator, Decoder, Demultiplexer, Encoder, Multiplexer, ROM, PLA), Sequential circuit (Latch, Flip-flop, Counter, Register), Logic Families.

2. **Data Structure:**

Algorithm and complexity (Asymptotic notation), Arrays, Stacks, Queues, Linked List, Searching (Sequential and Binary Search), Trees (Binary Trees, BST, Threaded Binary Trees, Extended Binary trees, AVL trees), Sorting (Bubble, Selection, Insertion, Quick, Merge, Radix, Heap), Hashing.

3. **Operating System:**

Concepts of Process (Scheduling, Concurrent Processes, Deadlock, Starvation), Memory Management (Overlays, Swapping, Contiguous Memory Allocation, Fragmentation and Compaction; Paging, Segmentation, Segmentation with Paging, Virtual Memory), File System.

4. **Data Base Management System:**

ER Model, Relational Model, Relational Algebra, Relational Calculus, Relational Database Design (Functional Dependencies, Derivation Rules, Closure of FD Set, Membership of A Dependency, Canonical Cover, Decomposition to 1NF,2NF,3NF

Or BCNF Using FD, Lossless Join Decomposition, Dependency Preservation), SQL, File Organization.

5. Discrete Mathematics:

Mathematical Induction, Sets, Function, Principle of Inclusion and Exclusion, Relation, Counting Theory, Pigeon hole principle, Recurrence Relation, Generating Function, Proposition, Predicates and Quantifier (Universal and Existential).

6. Graph Theory:

Definition of linear graph, Properties, Walk, Path & Circuit (Connected & Disconnected Graph, Components, Operation On Graphs, Euler Graph, Arbitrarily Traceable Graph, Hamiltonian paths and circuit, Complete graph, Bipartite graph, complete bipartite graph), Tree (Binary tree and its properties, Spanning tree, Breadth First Search and Depth First Search, Minimum spanning tree), Shortest Path Problem (Dijkstra Algorithm, Floyd and Warshall algorithm), Planar Graph, Cut Set & Cut Vertices, Representation of Graph.

7. Automata Theory:

FSM, NDFA, DFA, Moore machine, Mealy machine, Formal Languages, Chomsky Classification of Languages, Regular Set and Regular Grammar, Regular Expression, Pumping Lemma for Regular Sets, Context-Free Languages, Derivation Trees, Ambiguity in CFG, Simplification of CFG, CNF and GNF, Pushdown Automata, Turing Machine.

8. Programming Through C Language:

Operators and Expressions, Control Instruction (If-Else, Else-If, Switch-Case, For Loop, While Loop, Do-While Loop, Break, Continue, Goto), Functions, Storage Class (Auto, Static, Register, External), Recursion, C Preprocessor, Arrays, Pointers, Strings, Command Line Arguments, Structure and Unions, Input and Output, Files.

ENGLISH:

1. An essay
2. Critical Appreciation of a Poem