CDAC - Common Admission Test - Syllabus

Section A - Computer Fundamentals and Concepts of Programming (10 Questions)

- Evaluation and Types of Computers
- Number Systems, Conversions and Data Representation (Binary, hex, octal etc.)
- Input and Output Devices
- Low level language vs High level language
- Evaluation of Programming languages
- Algorithm and Flowcharts

Section A - English (15 Questions)

- Synonyms, Antonyms
- Reading Comprehension(Passage)
- Sentence completion
- Prepositions (of, by, on, at, with etc.)
- Articles (A, An, The)
- Choosing Appropriate Filler with appropriate phase or part of sentence
- Arrangement of Sentences(Given 4 Sentences in PQRS form and arranged them)
- Spotting Errors
- Idioms and Phrases
- Active and passive voice

Section A - Quantitative Aptitude (15 Questions)

- Number Systems :HCF & LCM, Decimal Fractions, Square Root And Cube Root, Average, Problems on Numbers
- Simplification
- Ages,
- Surds & Indices
- Percentages, Profit & Loss, Ratio & Proportion, Partnership
- Chain Rule
- Allegation & Mixture
- Simple Interest & Compound Interest
- Area: Volume and Surface Area
- Calendar, Clocks
- Races & Games of skills
- Permutation & Combinations, Probability
- Height & Distances
- Pipe and Cisterns
- Time & Work, Time & Distance
- Boats & Streams
- Train
- Odd Man Out and Series

Section A- REASONING (10 Questions)

- Verbal Reasoning : Analogy
- Blood Relation (sentence form , A+B –>A is sister of B)
- Puzzle Test
- Direction Sense Test
- Sitting Arrangement (Circular Table , Straight Line)
- Series (Number)
- Direction Sense(North East West South)
- Coding Decoding (A-Z)
- Data Sufficiency

Section B - C Programming (10 Questions)

- **History** Of C, Keywords In C, Standards, Data Types, Type Modifiers, Qualifiers
- **Operators**: Priority and Associativity
- **Decision Control**: If ..else and switch case
- **Iteration**: while, do..while ,for ,Jump Statements
- **Function**:
  - Built-in, User defined
  - Pass by Value and Pass By address
  - Recursion, Storage Classes In C
- **Pointer**: Wild Pointer, NULL Pointer,Void Pointer
  - Scale Factor, Pointer Arithmetics, Function Pointer
- **Array**: 1D & 2D Array
  - Static and Dynamic Implementation
  - Memory Allocation
  - Accessing members using array and Pointer Notation
- **String**: Library Functions, String size and length
  - String access using pointer and pointer arithmetic
  - Multiple Strings and CommandLine Argument using two D Array , Array of Pointers
- **PreProcessor Directives**:
  - #include, #define, #pragma
  - Operators # and ##
  - Difference Macro and Function
- **Structure**:
  - Memory Allocation
  - Access of structure members using dot(.) and arrow (->) operator
  - Array of Structure
  - Bit Field
- **Union**: Memory Allocation
  - Accessing Different type of members in shared memory
- **File Handling**:
  - Types of Files, Modes of Files
  - Sequential & Random Access File
  - Byte Read / Write, Buffer size data Read / Write, Binary Data Read / Write

Section B - Data Structure (10 Questions)

- **Introduction to Data Structure**
- **Algorithms**: Divide and conquer algorithms
  - Greedy Algorithm
- **Time Complexity:**
  - Best Case, Average Case, Worst Case
- **Sorting**: Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort
- **Searching**:
  - Binary Search, Linear Search
- **Stack**:
  - Applications of Stack
    - Expression Conversion, evaluation and balancing
  - Operations of Stack
- **Queue**:
  - Types of Queue
  - Applications of Queue
  - Operations of Queue
- **LinkedList :**
  - Singly Linear /Circular LinkedList operations and time complexity
  - Doubly Linear /Circular LinkedList time complexity
- **Tree :**
  - Tree Terminologies
  - Types of Tree Binary Tree and its types, AVL Tree, Spanning Tree
  - Traversal : Inorder, Preorder, PostOrder
- **Graph:**
  - Basic Terminologies of graph

Section B - Object Oriented Concepts (10 Questions)

- Difference Between Structure in C & C++
- POP Vs OOP
- Class, Object
- Inspectors, Mutators, Facilitators, Constructor and Destructor
- cin, cout, Default Arguments, Inline Functions.
- Array of objects, new/delete Operator, references ,Constructor/Destructor revisited, Dynamic Array of Objects.
- Static Data Members and Member Functions
- Introduction to Exception Handling
- Composition, Friend Function and Friend class
- Function overloading, Operator Overloading Introduction
- Copy constructor and Assignment operator.
- Inheritance, Types, Modes, virtual inheritance
- Virtual Functions, Pure Virtual Functions
- Abstract Class, Interface Concept
- Template programming: With Functions and Class.
- File Handling intro, RTTI and Casting Operators Basics

Section B - Operating System (5 Questions)

- **Introduction**
  Introduction to Operating System, What is OS, Booting the System

- **Introduction** to **Computer Hardware** and its major components(CPU, Memory, IO): Memory Technologies and its characteristics, IO Module Structure, External Devices Structure and IO techniques.

- **System Architecture Design** of **OS**: System Calls, Dual Mode Operation: System mode and Kernel mode

- **Process Management**: What is Process, States of the Process, PCB, CPU Scheduling, CPU Scheduling Algorithms, Inter Process Communication, Process Synchronization/Coordination, Deadlocks and Deadlock Handling Methods.

- **Memory Management**: What is memory management, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management, Demand Paging, Thrashing.
- **File** & **Storage Management**: What is File, What is File System, File System Structure, File System Architecture, Disk Space Allocation Methods, Disk Scheduling algorithms.

Section B - Data Communication and Networking (5 Questions)

- **NETWORK:**
  Centralized Computing, Decentralized Computing
  Server-client, Cloud computing
- **Common Types of Networks:**
  LAN,WAN,WLAN,MAN,SAN,CAN
  Primary and Main Types of Networks
  Basic types of LAN
  Token Ring
  Ethernet
  MAC Address
  IPV4,IPV6, Port Numbers
  Switch , Switch Techniques and Bridges
  Router

- OSI Layer
- IP Addressing:
- **Common TCP/IP stack Protocols:**
  ARP (Address Resolution Protocol)
  IP (Internet Protocol)

ICMP (Internet Control Message Protocol)
TCP (Transmission Control Protocol)
UDP (User Datagram Protocol)
FTP (File Transfer Protocol)
Telnet (Telecommunications Network)
DNS (Domain Name System)
HTTP (Hypertext Transfer Protocol)

Section B - Basics of BigData (5 Questions)

- **Big Data Concept**
- **Characteristics of Big Data**
  - **Volume, Velocity, Variety, Veracity, Value**
- **History of Big Data**
- **Big Data Processing**
  - **Batch processing**
  - **Streaming processing**
- **Types of data**
  - **Structured**
  - **Semi-structured**
  - **Unstructured**
- **Databases**
  - **RDBMS - ACID, SQL (basic concept only)**
  - **NoSQL - BASE, CAP theorem**
- **ETL vs ELT**
- **Data warehouse - OLAP vs OLTP**
  - **Data cleansing**
  - **Data modeling**
- **Data Engineering Life Cycle - Overview**
- **Big Data Frameworks (short intro only)**
  - **Hadoop**
  - **Hive**
  - **Spark**
- **Big Data Programming Languages**
  - **Python, Java, Scala**
- **Big data jobs/career opportunities**

Section B - Introduction Artificial Intelligence(5 Questions)

- **Definition of AI : Definition of AI , What is agent, What is environment and Need of AI**
- **AI Understanding : What are AI Elements?**
- **Types of AI : Purely Reactive ,Limited Memory, Theory of Mind, Self aware**
- **Main Domains of AI technology : Data Science, Computer Vision and Natural Language Processing(NLP)**
- **History of AI**
- **Ways to implement AI : Introduction to Machine Learning and its categories (supervised and unsupervised) algorithm, Introduction to Deep Learning (input layer, hidden layer and output layer)**
- **AI Uses and its various Applications**
- **Advantages and Disadvantages of AI**
- **Introduction to Neural Networks : What is neural network? What is Fuzzy Logic? and what is t meaning of Genetic Algorithms?**
- **Current Trends and Future Directions in AI**

Section C - Digital Electronics (20 Questions)

- **Introduction**
  Signal, Analog Signal, Digital Signal
- **Number System**
  Decimal number ,Binary number, Octal number, Hexadecimal number
  Converting from Another Base to Decimal
  Converting from Decimal to Another Base
  Converting from a base Other than 10 to Another Base Other than 10

Octal to binary, Binary to octal
Hexadecimal to binary, Binary to hexadecimal, BCD
Laws, Boolean Algebra, K-Map, Logic Gates, Universal gate
Binary Addition, Binary Subtraction
1's complement,2's complement,9's complement,10's complement, Multiplication, Division
Gray code,Excess-3 code

- **Combinational Circuit**
  Half Adder ,Full Adder, Half Subtractor, Full Subtractor
  Multiplex, Demultiplexer
  Decoder, Encoder
- **Sequential Circuit**
  RS Flip-flop, D Flip-flop, JK Flip-flop, T Flip-flop
  Counter, Shift Register
- **Logic Family** in **short**
  Circuit of each logic family
  Advantages, Disadvantages
- **Resolution Problems**

Section C - Computer Architecture (15 Questions)

- Machine Instructions
  Memory-Reference Instructions
  Register-Reference Instructions
  I/O Instructions
  Addressing Modes
- ALU Data Path
- CPU Control Unit Design, Memory Interfacing, Pipelining
- Memory (cache memory, main memory , secondary memory)
  Register Memory
  Primary Memory/Main Memory (RAM)
  Types of RAM
  SRAM, DRAM, SDRAM, DDR SDRAM
  Secondary Memory (ROM)
  Types of ROM
  ROM, PROM, EPROM, EEPROM, Flash

Section C - Microprocessor (15 Questions)

- **Introduction**,Basic Concept, What is Microprocessor, Basic Microcomputer

Classification of Microprocessor
RISC Architecture, CISC Architecture
Harvard Architecture, Von Neumann Architecture

Microprocessor 8085

8085 Architecture
Bus Structure in 8085,Registers

8085 PIN DESCRIPTIONS

Interrupt
Classification of Interrupts ,Interrupt Handling Procedure

8085 Instruction
Instruction Set Classification, Instruction Format
Addressing Modes in Instructions

INSTRUCTION EXECUTION AND TIMING DIAGRAM
Opcode fetch, Memory Read, Memory Write, I/O read, I/O Write Counter and Delay
Microprocessor 8086

- **Architecture of 8086**
  8085 PIN DESCRIPTIONS, Addressing modes, Instruction Set Classification
  Brief Introduction to Microprocessor Interfacing
  - 8255 =>Programmable Peripheral Interface
  - 8254/8253 =>Programmable Interval timer
  - 8259 =>Programmable Interrupt controller
  - 8279 => Programmable Keyboard/Display Interface
  - 8257 => DMA (Direct memory access) controller
  - 8251 => Programmable communication Interface(USART)