COMPUTER SCIENCE (COMS)

Class - XI

Full Marks 100

THEORY(70 Marks)

A. Brief Review of Computer Systems : (35 Marks)

i) Evolution of Computers and Computer Organization :

- **Evolution of Computers**
  - Abacus, Napier's Bone, Pascaline, The Babbage Machine
  - Stored Program Concept, Von Neumann Concept / Architecture
- **Computer Hardware Generations**
  - First, Second, Third, Fourth and Fifth Generation of Computers;
  - Components, Advantages, Disadvantages
- **Concept of Circuit Integration**
  - SSI, MSI, LSI, VLSI, ULSI
- **Classification of Computers**
  - Analogue, Digital, Hybrid Computers
  - Mainframe and Super Computer
  - Mini, Micro, Laptop Computer
- **Computers in Modern Society**
- **Concept of Data and Information, Data Processing**
- **Brief description of each functional block of a computer**
  - Block Diagram of a Computer System
  - Input Devices (Keyboard, Mouse, Scanner, Touch Screen, OMR, OCR, MICR, Graphic Tablet, Barcode Reader, Light Pen, Microphone, Joystick)
  - Output Devices
    - Monitor – CRT, LCD
    - Printer – Impact Printers (Dot Matrix Printer), Non-Impact Printers (Inkjet Printer, Laser Printer)

        - Plotter
    - Central Processing Unit : CU, ALU
    - Storage Devices
        - Primary Memory : RAM (DRAM, SRAM), ROM (PROM, EPROM, EEPROM, UVPROM)
        - Secondary Memory : Magnetic Media (HDD, FDD), Optical Media (CD, DVD, Blue-Ray Disk)
        - Cache Memory
        - Flash Memory
    - Communication Bus
        - System Bus – Address Bus, Data Bus, Control Bus, Power Bus

ii) <u>Data Representation :</u>

- **Number Systems**
    - Concept of Non-Positional Number System
        - Roman Number System

  Concept of Positional Number System
        - Decimal, Binary, Octal and Hexadecimal Number System
    - Conversion
        - Inter-conversion between Decimal, Binary, Octal and Hexadecimal Numbers (Whole numbers and Fractions, using Double Add and Half Add Methods)
    - Arithmetic
        - Addition, Subtraction – Decimal, Binary, Octal and Hexadecimal Numbers
        - Multiplication, Division – Binary Number System only
    - Different methods of Negative Number Representation
        - Signed Magnitude
        - One's Complement
        - Two's Complement
        - Subtraction using Complements (1's, 2's, 7's, 8's, 9's, 10's, 15's, 16's complement)

- **Various Binary Coding Schemes**
    - BCD
    - EBCDIC
    - ASCII
    - ISCII

- Gray Code
- Excess-3 Code

- **Concept of Fixed and Floating Point Numbers**
  - Difference between fixed and floating point numbers
  - Concept of normalised numbers
  - Floating point arithmetic (addition, subtraction, multiplication, division)

- **Bit map representation of images**

iii) <u>Boolean Algebra</u>

- Definition and postulates.
- Boolean operations – OR, AND, NOT
- Proof using identities and truth tables
- De' Morgan's Theorems and Basic Principle of Duality
- Deriving truth table from Boolean expression and vice versa
  - Sum of Product (SOP) Expressions (using min-terms)
  - Product of Sum (POS) Expressions (using max-term)
- Canonical form of Boolean expressions and their complements
- Simplifications (Algebraic method, K-map method up to 4 variables)
- Use of Don't Care terms
- Logic Gates – OR, AND, NOT, XOR, X-NOR Gates
- Universal Gates – NAND and NOR Gate
- Basic gates using Universal Gates
- Two Level Circuits
- Combinational Circuits :
  - Half Adder & Full Adder (definition and representation)
  - Full Adder using Half Adders only
  - Half Subtractor & Full Subtractor (definition and representation)
  - 4 bit Adder and Subtractor Circuit
  - Multiplexer (4x1) and De-multiplexer (1x4)
  - Decoder (Maximum 3 bits), and Encoder (Decimal to Binary, Octal to Binary)

B. Software and Languages: (10 Marks)

- Definition of Software

- Programming Languages : Concepts of High Level, Low Level and Assembly language
- Types of Software
  - System Software
    - Translator – compiler, interpreter, assembler
    - Operating systems:
      - Definition and Function
      - Types of OS – Single User, Multi-user, Multiprogramming, Multiprocessing, Time Sharing
      - Booting (cold and warm), Spooling, Buffering, Concept of Virtual Memory
      - Directory and file Structure, Path and Pathname
      - Concept of GUI, CUI with examples
      - Using MS DOS (Commands and their use – DIR, MD, RD, CD, COPY, CON, MOVE, REN, DEL, TYPE, MORE, ATTRIB, EDIT, DATE, TIME, CLS), Concept of Batch File
      - Using MS Windows OS
      - UNIX OS (Commands and their use – chmod, cd, pr, cp, cat, rn, rmdir, ls, vi, mkdir, more, mv, mail, who), Use of Wild Card, File Permission, Concept of Piping, UNIX shell
  - Application Software (definition and example)
  - Utility Software (definition and example)

C. Programming in C: (25 Marks)

- Concept of Algorithm and Flowchart
- Introduction to C
- Character Sets, Keywords, Constants, Variables, Operators in C
- Data types in C
- Header files
- Input / Output operations
- Control structures
- Loop structures
- Functions (user-defined and common library functions) including recursive function
- Array (one and two dimension numeric array)
- Basic concept of Pointer and String

- Structures
- Problem solving

D. Practical - (30 Marks)

- **MS-Windows / UNIX / LINUX Operating System Commands - (5 Marks)**

- **Programming in C (Algorithm / Flow Chart, Coding, Execution (15 Marks)**
  - One program using branching and loop (5 marks)
  - One program using Function, Array, String, Structure (10 marks)

- **Laboratory Copy (must have minimum 20 programs from topics in class 11) (5 Marks)**
  - 6 programs on control structures
  - 4 programs on array manipulations
  - 4 programs on string manipulation
  - 2 programs on structure manipulation
  - 4 programs on functions

- **Viva Voce (5 Marks)**