

COMPUTER APPLICATION (COMA)

Class - XI

Full Marks 100

THEORY - 70 Marks

PRACTICAL - 30 Marks

A. Brief Review of Computer Systems (30 Marks)

i) Evolution of Computers and Computer Organization :

▪ Evolution of Computers

- o Abacus, Napier's Bone, Pascaline, The Babbage Machine
- o Stored Program Concept, Von Neumann Concept / Architecture

▪ Computer Hardware Generations

- o First, Second, Third, Fourth and Fifth Generation of Computers;
- o Components, Advantages, Disadvantages

▪ Concept of Circuit Integration

- o SSI, MSI, LSI, VLSI, ULSI

▪ Classification of Computers

- o Analogue, Digital, Hybrid Computers
- o Mainframe and Super Computer
- o Mini, Micro, Laptop Computer

▪ Computers in Modern Society

▪ Concept of Data and Information, Data Processing

▪ Brief description of each functional block of a computer

- o Block Diagram of a Computer System
- o Input Devices (Keyboard, Mouse, Scanner, Touch Screen, OMR, OCR, MICR, Graphic Tablet, Barcode Reader, Light Pen, Microphone, Joystick)
- o Output Devices
 - Monitor – CRT, LCD
 - Printer – Impact Printers (Dot Matrix Printer), Non-Impact Printers (Inkjet Printer, Laser Printer)

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

ii) Data Representation :

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

- **Various Binary Coding Schemes**

- o BCD
- o EBCDIC
- o ASCII
- o ISCII

- **Concept of Fixed and Floating Point Numbers**

- o Difference between fixed and floating point numbers

- **Bit map representation of images**

- **Concept of Multimedia**

iii) Boolean Algebra

- 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
- SOP and POS Expressions (Minterm and Maxterm expressions)
- Canonical form of Boolean expressions and their complements
- Simplifications

**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

SYLLABUS

- 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)
 - Using MS Windows OS
- Application Software (definition and example)
- Utility Software (definition and example)

C. Programming using Visual Basic (10 Marks)

- **Introduction to Visual Basic (Version 6 or compatible)**
- **Getting familiar with VB user interface**
 - o Standard exe, pull-down menus, toolbar, toolbox, project explorer, properties window, form layout window, form immediate window, opening and closing windows, resizing and moving windows, quitting VB
- **VB Tool Box**
 - o Standard window controls, label, textbox, command-button, frame, checkbox, option-button, list-box, combo-box, picture box, timer control, shapes
 - o Basic properties of controls
- **Programming Fundamentals**
 - o Data types in VB (integer, long, single, double, currency, string)
 - o Variable and Constants
 - o Input / Output operations

SYLLABUS

- o Control Statements
 - Branching: If-Then-Else, Switch
 - Looping: For-Next, While, Do-While
- Simple problem solving

D. Word Processing using MS Word (MS Office 2007 or compatible) (10 Marks)

- Introduction to Word Processing
- Creating, Opening, Editing and Saving a document
- Copy, Cut, Paste operations
- Page Setup, Headers and Footers
- Formatting Texts, Paragraph, Page Borders
- Inserting Clip-Art, Word-Art, Auto-Shapes, Picture, Symbol, Equation
- Table insertion
- Mail Merge
- Macros
- Spelling and Grammar check
- Printer Setup and Document Printing

E. Power Point Presentation using MS Word (MS Office 2007 or compatible) (10 Marks)

- Introduction of Power Point
- Creating, Opening, Editing and Saving a PowerPoint presentation
- Use of Wizards

SYLLABUS

- Different styles and background
- Formatting Texts
- Inserting Clip-Art, Word-Art, Auto-Shapes, Picture
- Applying slide-transition, applying animation to text and objects
- Inserting sound and video-clips
- Slide Show
- Printing of slides

F. Practical (30 Marks)

- One program on Visual Basic (10 Marks)
- Laboratory Copy (Minimum 10 programs) (5 Marks)

(Suggestive programs on VB are given below)

- o To display a message using Label, Textbook, Message Dialogue
- o To concatenate two text entries and display
- o To perform a simple arithmetic operation (+, -, *, /) and display the result in message dialogue or textbox
- o To make simple decision making (IF statement) solution and display relevant message (example: problems related to eligibility for a given value of age, profit/loss messages for given values of cost price and sale price, grade display for given values of marks of students etc.)
- o To create a simple GUI application to perform both arithmetic and logical operations together (Total, Average, Grade calculation of given set of marks, salary calculations on different criteria)

SYLLABUS

- o To create a simple GUI application to perform an operation based on the criteria input by the user in a checkbox/radio button

(ex1: Find the discount of an item on the basis of category of item [electrical appliance / electronic gadget/stationery specified using a radio button] and its cost [below 1000/above 1000/equal 1000 specified using radio button])

(ex2: Calculate the incentive of a sales person on the basis of his sales amount, customer feedback, count of customer specified using checkbox)

- o To create a simple GUI application to change the properties of a control based on the selection made by the user.

(ex1: To change the background/foreground colour of any of the controls of the form based on the colour selected from a list)

(ex2: To change the background/foreground colour of a label based on the values input/stored in a combo-box)

- Use of MS Word – Same features as in Theory part (5 Marks)
- Use of PowerPoint – Same features as in Theory part (5 Marks)
- **Viva Voce** (5 Marks)

COMPUTER APPLICATION (COMA)

Class - XII

Full Marks 100

Theory Marks 70

Practical Marks - 30

A. Logic Gate and Combination Circuits

(15 marks)

- 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. Networking

(20 marks)

- Introduction to Networking (Definition, Advantage, Disadvantage, Application)
 - Analogue and Digital Communication
 - Modes of Communication : Simplex, Half Duplex and Full Duplex Communication
 - Types of Network – LAN, MAN, WAN
 - Network Architecture : Client Server & Peer-to-Peer Networks
 - Serial and Parallel Communication
 - Bandwidth, Channel Capacity, Baud
 - Synchronous and Asynchronous Transmission Modes
 - Baseband and Broadband Networks

SYLLABUS

- **Components of a Network**

- Servers (File server, Communication Server, Print Server) and Workstation
- NIC
- Guided Media
 - Cables – UTP, STP, Co-axial, Fibre Optic
- Unguided Media
 - Infrared, Radio & Microwave Communication, Satellite
- Network Operating System – Characteristics

- **Network Topologies -**

- Bus
- Ring
- Star

- **Network Connecting Devices –**

- Hub
- Repeater
- Bridge
- Switch
- Router
- Gateways

- **LAN Protocols**

- Ethernet (CSMA / CD) and Token Ring Protocol

- **Switching Technique**

- Circuit, Message and Packet Switching

- **Use of MODEM**

- **TCP / IP Protocols - TCP, IP, UDP, FTP, HTTP, TELNET**

- **IP Addressing**

- Class A, Class B, Class C IP address

- **Domain Name System**

- **URL**

- **Introduction to Internet**
 - Basic requirement for connecting to the Internet, ISP
 - Services provided by Internet – www, browser, e-mail, search engine, social networking
 - Networking Security – Computer Virus, Concept of Firewall, Password
- **HTML**
 - Basic Page Design, Using Ordered and Unordered Lists, Using Image, Hyperlinking, Using Tables

C. Database Management System

(15 marks)

- **Introduction of Database :**
 - Definition of Database
 - Advantage and disadvantages of DBMS
 - Database Languages (DDL, DML, DCL)
 - Data Dictionary, Metadata
 - Database Schema and Instance
 - DBMS and its components
 - Various Data Models – ER Model, Hierarchical Model, Network Model, Relational Model (only concepts)
 - Different Database Users
 - Functions of DBA
- **Relational Model**
 - Concept of Relation, Tople, Attribute, Domain, Degree, Cardinality
 - Concept of Keys – Key, Super Key, Candidate Key, Primary Key, Alternate Key
 - Concept of Relationships – 1:1, 1:N, N:M relationships
 - Database Constraints – Equity Integrity Constraint, Domain Constraint, Referential Integrity Constraint and Concept of Foreign Key
- **Relational Algebra**
 - Selection Operation
 - Projection Operation
 - Set Operation

SYLLABUS

- o Cartesian Product
- o Natural Join Operation
- **SQL**
 - o Simple SELECT Queries (SELECT, FROM, WHERE, DISTINCT, AND, OR, IN, NOT IN, BETWEEN, LIKE, ORDER BY)

D. Introduction to Spread Sheet – (MS Office 2007 or compatible) (10 marks)

- Introduction to Excel
- Concept of Workbook, Worksheet, Row, Column, Cell
- Creating Opening, Editing, Saving a Workbook
- Changing Row and Column widths
- Formatting cells
- Different data types in Excel
- Entering labels and values
- Use of following inbuilt functions only – SUM, PRODUCT, AVERAGE, MAX, MIN, ROUND, COUNT, COUNTIF, IF, AND, OR, NOT, DATE, TIME, NOW, CONCATENATE, UPPER, LOWER
- Copying Cells – Relative, Absolute and Mixed Referencing
- Making calculations and re-calculations
- Auto fill, Fill with series
- Conditional Formatting
- Sorting and Filtering Data (use of Auto Filter)
- Goal Seek
- Hiding Rows and Columns
- Use of Macros
- Creating Line Diagrams, Pie Charts, Bar Graphs

E. Using MS Access (MS Office 2007 or compatible) (10 marks)

- Introduction to Access
- Table creating using Design View and Wizard
- Different data types in Access

SYLLABUS

- Manipulation of data using Access facilities – Inserting, Updating, Deleting data
- Creating Relationships between Tables
- Form creation using Wizard, Auto Form
- Query generation using Design View
- Report generation using Wizard, Auto Report

F. Practical

(30 marks)

- Using MS Excel and Access **(10 marks)**
- Web Page design using HTML **(5 marks)**
- Project Work (two projects) **(10 marks)**
 - Suggestive Topics:
- Application of Excel:
 - Using Excel creation of Mark Sheet, Balance Sheet, Monthly / Yearly Expenditure, Reports
 - Web page designing using HTML (minimum 5 linked pages)
 - Travel and Tourism
 - Festivals
 - Book Catalogue
 - Pollution and pollution control
 - Viva Voce **(5 marks)**