# Syllabus for written examination for PGT (Computer Science)

## COMPUTER SYSTEMS ARCHITECTURE

1. THE COMPUTER SYSTEM

   System buses: Computer Components, Computer function, Interconnection Structures, Bus Interconnection, PCI.

   Internal Memory: Computer Memory System Overview, Semiconductor Main Memory, Cache Memory, Advanced DRAM Organization.

   Input/ Output: External Devices, I/O Modules, Programmed I/O, Interrupt- Driven I/O, Direct Memory Access, I/O Channels and Producers, The External Interface.

   Operating System Overview.

2. THE CENTRAL PROCESSING UNIT

   Computer Arithmetic: The Arithmetic and Logic Unit (ALU), Integer Arithmetic, Floating-Point Representation, Floating-Point Arithmetic.

   Instruction Sets: Characteristics and Function, Machine Instruction Characteristics, Types of Operands, Types of Operation, Addressing Modes and Formats, Register Organization, The Instruction Cycle, Instruction Pipelining.

   Assembly Language

   The Control Unit: Micro-operations, control of the CPU, hardwired Implementation, Micro program Controller, Basic Concepts, Microinstructions, Sequencing, Microinstruction Execution.

   Reduced Instruction Set Computer: An Introduction.

## OPERATING SYSTEMS

Introduction: System software, resource abstraction, OS strategies; multiprogramming, batch, time sharing, personal computers and workstation, process control & real time systems, processes & threads using FORK, JOIN, QUIT.

Operating System Organization: Factors in operating system design, basic OS function, implementation consideration: process modes, kernels, methods of requesting system services, device drivers.

Device Management: Service management approaches, buffering, device drivers, performance tuning.

Process Management: System view of the process and resources, initiating The OS, process address space, process abstraction, resource abstraction, process hierarchy.

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.

Synchronization Principles: Interactive processes, critical section, deadlock, coordinating processes, semaphores, spread memory, multiprocessors, events, monitors and the inter-process communication.

Deadlocks: System deadlock model, prevention strategies, hold and wait, circular wait, allowing pre-emption, Banker's Algorithm, serially reusable resources, consumable resources, general resources system recovery.

Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, segmentation.

File Management: Directory structure, basic file operations and their implementation.
Protection and Security: Policy mechanism, authentication, internal access authorization.

## DIGITAL ELECTRONICS

Fundamental Concepts: Digital signal, NAND, NOR and Exclusive-OR operation, Boolean Algebra, Basic Digital Circuits.

Number system and Codes: Primary, Octal, Hexadecimal, Signed Numbers Codes, hamming codes.

Combinational Logic Design: K-map representation of logical functions and simplification using K-map of 4 and 5 variables, Quine- McCluskey's method.

Multiplexers, Demultiplexers, Adders and Subtracters, multipliers, Comparators, Parity generators and checkers, Code converters, Priority Encoders, Decoders.

Races, hazards, and asynchronous behavior

Flip-Flops: Clocked RS flip flop, D-type flip flop, Excitation table of flip flop, Edge triggered flip flop, Clocked flip flop design.

Sequential Logic Designs: Registers, Shift registers, Asynchronous counters, synchronous counters, RAM, ROM.

## PROGRAMMING FUNDAMENTALS

Basic Computer Organization: Functional Units, basic I/O devices and storage devices; Representation of integers, real (fixed and floating point), characters (ASCII and Unicode); Basic operations of a programming environment.

Problem Solving Approaches: Notion of an algorithm, problem solving using top-down design and decomposition into sub-problems, stepwise methodology of developing an algorithm, methodology of developing an algorithmic solution from a mathematical specification of the problem, use of recursion for problems with inductive characterization.

Programming using a modern programming language such as Java, emphasizing the following notions: Building blocks: arithmetic and logical expression, variables, assignment; Specifying the input-output interface (type); control structures including sequencing, conditionals, loops, procedural abstractions (procedures, methods); basic data structures-integers, reals, strings and arrays-and internal representation of scalar and vector data; data abstraction and encapsulation-objects, classes and packages; input/ output of data.

Numerical and non-numerical applications using above concepts.

PROGRAMMING TOOL: VISUAL BASIC

Introduction to Programming –Modular Programming, Object Oriented Programming, Event Driven Programming:

About Visual Basic (Object Based Programming Language), Rapid Application Development using Visual Basic;

Concept of Project In Visual Basic, VB Project Options- Standard EXE, ActiveX DLL, ActiveX EXE, ActiveX Control, Active X Document EXE, Addin, VB Application Wizard, IIS Application, DHTML Application;

Getting Familiar with Visual Basic User Interface-Pull-Down menus, Toolbar, Toolbox, Project Explorer, Properties Window, Form Layout Window, Form, Immediate window;

Opening and Closing window, Resizing and moving windows, Docking windows; Quitting Visual Basic;

Visual Basic Tool Box (Standard Window Controls)- Pointer, Picture Box, Lbel, Text Box, Frame, Command Button, Check Box, Option Button, Combo Box, List Box, Horizontal Scrollbar, Vertical Scrollbar, Timer, Drive List box, Directory List box, File List Box, Shape, Line, Image, Data, OLE;

Object Naming Conventions, Event Procedures;

Data Types: Integer, Long, Single, Double, Currency, String, Byte, Boolean, Date, Object, Variant;

Variables: Need to use variable, Declaring Variables, Variable Naming Convention, Assigning value to Variables, Data Types of variable, Scope and lifetime of Variables (Public and Private);

Menu Editor : Concept of menus, Shortcut menus and Popup menus Designing Menu System, Menu Editor Dialog Box Options (Name, Index, Shortcut, Help Context ID, Negotiate Position, Checked, Enabled, Visible, Window List, Right Arrow, Left Arrow, Up Arrow, Down Arrow, Menu List, Next, Insert, Delete, OK, Cancel), To Create Menu Controls in the Menu Editor, Menu Naming Conventions, Setting the Name Property, Creating a Menu Control Array, Creating Sub Menus, Separating Menu Controls, Assigning Access Keys and Shortcut Keys, Controlling Menus at Runtime-Enabling and Disabling Menu Commands, Displaying a Checkmark on a Menu Control, Making a Menu Control Invisible, Adding Menu Control at Runtime, Displaying Pop-Up Menu;

General Controls (Advance): Image List, Common Dialog Box, ADO DC, DB Combo, Media Player Control, DB Grid;

Adding a Toolbar: Creating an Image List, Adding Images to the Toolbar, To Add Code for the Toolbar Buttons;

Adding Status Bar: Adding Status Bar panels, Adding Time on the panel.

Dialog Boxes: Pre-defined dialog box, Custom dialog box;

DATA STRUCTURES

Introduction to the object-based and object-oriental programming paradigms; records, abstract data types and objects, data abstraction and internal representation; programming-in-the-large issues: modularity and code re-usability, classes and packages; graphical user interfaces; command-line arguments; interfacing with libraries and separate compilation; language support and OOP: Sub-typing, Inheritance, classes and subclasses, header files, function templates, overloading.

Programming with Data structures: Stacks, queues, lists, trees and balanced binary trees, specification of exception conditions and exception handling, notion of efficient algorithmic solution, efficient representations of data structures (e.g.sparse arrays), algorithms for searching and sorting.

PROGRAMMING IN C++

1. Object Oriented Programming: Concept of Object Oriented Programming- Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies.

2. Implementation of Object Oriented Programming concepts in C++: definition of a class, Members of a class-Data Members AND Member Functions (methods), Using Private and Public visibility modes, default visibility mode (private); Member function definition: inside class definition and outside class definition using scope resolution operator (::); Declaration of objects as instances of a class; accessing members from object (s), Array of type class, Objects as function arguments-pass by value and pass by reference;

Constructor and Destructor:

Constructor: Special Characteristics, Declaration and Definition of a constructor, Default Constructor, Overloaded Constructors, Copy Constructor, Constructor with definition of destructor;

Destructor: Special Characteristics, Declaration and definition of destructor;

Inheritance (Extending Class): Concept of Inheritance, Base Class, Derived Class, Defining derived classes, protected visibility mode; Single level inheritance, Multilevel inheritance and Multiple inheritance, Privately derived, Publicly derived and Protectedly derived class, accessibility of members from objects and within derived class (es);

3. Data File Handling:

Need for a data file, Types of data files-Text file and Binary file;

Basic file operations on text file: Creating/ Writing text into file, Reading and Manipulation of text from an already existing text File (accessing sequentially);

Binary File: Creation of file, Writing data into file, Searching for required data from file, Appending data to a file, Insertion of data in sorted filed, Deletion of data from file, Modification of data in a file;

Implementation of above mentioned data file handling in C++;

Components of C++ to be used with file handling:

4. Pointers:

Declaration and Initialization of Pointers: Dynamic memory allocation/ deallocation operators: new, delete; Pointers and Arrays: Array of Pointers, Pointer to an array (1 dimensional array), Function returning a pointer. Reference variables and use of alias; Function call by reference. Pointer to structures: Deference operator: *,->; self referential structures;

RELATIONAL DATABASE MANAGEMENT SYSTEM

1. Database Management System

Introduction to database concepts: Relation/ Table, attribute, Tuple/ Rows, fields, Data, Concept of String, Number and Date values, Data type and Data Integrity (Domain and Referential Integrity). Candidate key, Alternate key, Primary Key, Foreign Keys; Data Normalization-first, second, third, BCNF normal form;

Examples of Commercially available Database Management System's (Back-End) – Oracle, MS-SQL Server, DB2, MySQL, Sybase, INGRES.
Examples of Front End Software's: Oracle Developer, Visual Basic, Visual C++, Power Builder, Delphi;

2. RDBMS Tools: Oracle

ORACLE: Introduction, Version, Two Tier and Three Tier support;

Interface with oracle, Login Screen, Entering Name and Password;

Classification of SQL Statements: DML (SELECT, INSERT, UPDATE, DELETE), DDL (CREATE, DROP, ALTER, RENAME, TRUNCATE), DCL (GRANT, REVOKE), TCL (COMMIT, ROLLBACK);

SQL SELECT Statement: SQL SELECT statement, Selecting All the Columns, Selecting Specific Column, Column Heading Default, Using Arithmetic Operators, Operator Precedence, Significance of NULL value, NULL values in Arithmetic Expressions, Defining and using Column Alias, Concatenation Operator (ll), Duplicate rows and their Elimination (DISTINCT keyword), Role of SQL and SQL*Plus in interacting with RDBMS, Displaying Table Structure (DESC command);

SELECT Statement Continued: Limiting Rows during selection (using WHERE clause), Working with Character Strings and Dates, Using Comparison operators, BETWEEN Operator, IN Operator, LIKE Operator, is null comparison, Logical Operators, Use of Logical

Operators (AND/OR/NOT Operators), Logical Operator Precedence, ORDER BY Clause, Sorting in Ascending/Descending Order, Sorting By Column Alias Name, Sorting On multiple Columns;

Functions: SQL Functions, Types of SQL Function (Single Row/ Multiple Row), Single Row SQL Functions, Character Functions (Case Conversion/ Character Manipulation), Case Conversion Functions [lower (), InitCap (), UPPER ()] Character Manipulation Function [CONCAT (), INSTR (), LENGTH (), TRIM (), SUBSTR (), LPAD () ], Number Functions (ROUND (), TRUNC (), MOD() ), Working with Dates [LAST_DAY(), MONTHS_BETWEEN(), NEXT_DAY(), ADD_MONTHS(), ROUND(), TRUNC() ] Arithmetic Operation on Dates, Date Functions and their Usage, Data type Conversion Functions, Implicit and Explicit Conversion, TO_CHAR Function with Dates, TO_CHAR Function For Numbers, TO_NUMBER and TO_DATE Functions, NVL Function and its Usage, DECODE Function and its Usage;

Grouping Records: Concept of Grouping Records and Nested Grouping, Nested Grouping of records, Group Functions, Types of group functions [MAX (), MIN (), AVG (), SUM (), COUNT ()], using AVG and SUM Functions, Using MIN and MAX Functions, Using the COUNT Function, using COUNT(*), DISTINCT clause with Count, Group Functions and Null Values, Using NVL Function with Group Functions, Grouping Records: Group By Clause, Grouping By More than One Column, Illegal Queries with Group By Clause, Excluding Group Results: Having Clause, Nesting Group Functions.

Sub Queries: Concept of Sub-Query, Sub Query to solve a Problem, Guidelines for Using Sub Queries, Types of Sub-Queries (Single Row and Multiple Row) and (Single Column and Multiple Column); Single Row Sub-Query and its Execution;

Displaying Data From Multiple Tables: Concept of Join, Result of Join, Cartesian Product and Generating Cartesian Production example using Mathematical Set), Types of Joins (EQUL, SELF, NON-EQUI, OUTER (LEFT and RIGHT)), Equi-join, Additional Search Conditions using AND operator, Short Naming Convention for Tables (Table Aliases), Non-Equi join and its Implementation, Outer-Join and Its Usage, Self-Join (Joining a table to Itself);

Manipulating Data of A Table /Relation: Concept of DML (Data Manipulation Language), INSERT Statement, Inserting New Rows, Inserting New Rows, with Null Values, Inserting Date Values, Use OF substitution Variable to Insert Values, Copying Rows From Another Table, Update Statement to Change Existing Data of a Table, Updating Rows In A Table, Updating Rows Based on Another Table, Delete statement/ Removing Row/ Rows from a Table, Deleting, Rows Based on condition from another Table; Making Data Manipulation Permanent (COMMIT). Undo Data Manipulation Changes (ROLLBACK)

Database Objects: View, Table, Sequence, Index, and Synonyms, DDL (Data Definition Language), Naming Convention, Creating Views, Creating Synonyms, Simple Views and Complex Views, Retrieving Data From a View, Querying a View, Modifying a view.

Including Constraints: Constraints, Concept of using Constraints, Constraint Guidelines, Defining Constraints, NOT NULL, UNIQUE KEY, PRIMARY KEY, FOREIGN KEY, FOREIGN KEY Constraint Keywords, CHECK, Adding a constraint, Dropping a Constraint, Disabling Constraints, Enabling Constraints, Viewing Constraints, Viewing The Columns, Associated with Constraints;

Creation of a Table/ Relation: CREATE TABLE Statement, Data types, the DEFAULT option, Creating Tables, Referencing Another User's Tables, Querying the Database Dictionary to view all tables in the Oracle Database, Creating a Table by Using a Sub-Query;

Managing Existing Tables and other Database Objects: The ALTER TABLE Statement, Adding a New Column in a Table, Modifying Existing Column, Dropping a Column, Renaming an Object, Truncating a Table, Adding Comments to a Table, Dropping Views, Dropping Synonyms, Dropping Tables; giving permission to other users to work on Created Tables and Revoking it (GRANT and REVOKE statement).

BUSINESS COMPUTING

General concept, User interfaces (front End), Underlying Database (back End), Integration of User Interface and Database;

More application areas of Databases:

Inventory control, Financial Accounting, Pay-Accounting System, Invoicing Management System, Personal Management System/ hard system, Fees Management System, Result Analysis System, Admission Management System, Income Tax Management System;

Advance Program Development Methodology: System Development Life Cycle, Relational Database Concept, Relational Database, Management System, Data Models (Entity Relationship Model), Entity and Entity Set, Attributes (Single, Composite and Multi-Valued), Relationship (One-to-One, One-to-Many and Many-to-Many), Entity Relationship Modeling Conventions, Communicating with an RDBMS using SQL, Relational Database Management System, SQL Statements, About programming language in SQL.

Data Dictionary, Data Warehousing, Data Mining, Meta Data;

Object Modeling: Introduction to object oriented modeling using Unified Modeling Language (Concepts only).

Client Server Computing: Concept of Client Server Computing.

WEB DEVELOPMENT

1. HTML/ DHTML

Introduction, Objectives, Introduction to Universal Resource Identifier (URI) – Fragment Identifiers and Relative URI's, History of HTML, SGML, Structure of HTML/ DHTML Document, Switching between opened Windows and browser (Container tag, Empty tag, Attribute);

Basic Tags of HTML: HTML, HEAD, TITLE, BODY (Setting the Fore color and Background color, Background Image, Background Sound), Heading tag (H1 to H6) AND ATTRIBUTES (ALIGN), FONT tag and Attributes (Size: 1 to 7 Levels, BASEFONT, SMALL, BIG, COLOR), P, BR, Comment in HTML (<!>), Formatting Text (B, I, U, EM, BLOCKQUOTE, PREFORMATTED, SUB, SUP, STRIKE), Ordered List-OL (L1, Type-1, I, A, a; START, VALUE), Unordered List-UL (Bullet Type- Disc, Circle, Square, DL, DT, DD), ADDRESS Tag;

Creating Links: Link to other HTML documents or data objects, Links to other places in the HTML documents, Links to places in other HTML documents;

Anchor Tag<A HREF> AND <A NAME>, Inserting Inline Images <IMG ALIGN, SRC, WIDTH, HEIGHT, ALT, Image Link, Horizontal Rules <HR ALIGN, WIDTH, SIZE, NOSHADE>;

2. Web Page Authoring Using HTML

Tables: Creating Tables, Border, TH,TR, TD, CELLSPACING, CELLPADDING, WIDTH, COLSPAN, CAPTION, ALIGN, CENTER;

Frames: Percentage dimensions, Relative dimensions, Frame- Src, Frameborder, height and width, Creating two or more rows Frames <FRAMESET ROWS>, Creating two or more Columns Frames <FRAMESET COLS>, <FRAME NAME SRC MARGINHEIGHT MARGINWIDTH SCROLLING AUTO NORESIZE>, <NOFRAMES>, </NOFRAMES>;

Forms: Definition, Use- Written to a file, submitted to a database such as MS-Access or Oracle, E-mailed to someone in particular, Forms involve twoway communication;

From Tags: FORM, <SELECT NAME, SIZE, MULTIPLE/ SINGLE> <OPTION>…</SELECT>, <TEXTAREA NAME ROWS COLS>,, </TEXTAREA>, METHOD, CHECKBOX, HIDDEN, IM-AGE, RADIO, RESET, SUBMIT, INPUT <VALUE, SRC, CHECKED, SIZE, MAXLENGTH, ALIGN>;

3. Document Object Model

Concept and Importance of Document Object Model, Dynamic HTML document and Document Object Model.

Cascading Style Sheets

Introduction to Cascading Style Sheet (CSS), three ways of introducing the style sheets to your document. Basic Syntax; Creating and saving cascading style sheets. <STYLE> tag. Examples showing the linking of external style sheet files to a document; Inline and Embed, <DIV>tag; COLOR, BACKGROUND-COLOR, FONT-FAMILY, FONT-STYLE, FONT-SIZE and FONT-VARIANT; FONT- WEIGHT, WORD-SPACING, LETTER-SPACING, TEXT-DECORATION, VERTICAL-ALIGN, TEXT-TRANSFORM; TEXT-ALIGN, TEXT-INDENT, line-height, Introduction to Margin, Padding and Border;

Margins (all values), MARGIN- PROPERTY, PADDIND (all values), PADDING-PROPERTY; BORDER (all values), BORDER-PROPERTY, BACKGROUND-IMAGE, BACKGROUND-REPEAT; Additional Features, Grouping Style Sheets, Assigning Classes; Introduction to Layers, <LAYER>, <ILAYER> tag;

4. Extensible Markup Language (XML)

XML: Introduction;

Features of XML: XML can be used with exiting protocols, Supports a wide variety of applications, Compatible with SGML, XML documents are reasonably clear to the layperson;

Structure of XML: Logical Structure, Physical Structure;

XML Markup: Element Markup i.e (<foo>Hello</foo>), Attribute Markup i.e. (<!element.name property="value">);

Naming Rules: used for elements and attributes, and for all the descriptors, Comments Entity

Declarations: <! ENTITY name "replacement text">;

Element Declarations: <! ELEMENT name content>;

Empty Elements: <! ELEMENT empty. element EMPTY>;

Unrestricted Elements: <! ELEMENT any. element ANY>;

Element Content Models: Element Sequences i.e. <! ELEMENT counting (first, second, third, fourth)>,

Element Choices <! ELEMENT choose (this.one/ that.one )>, Combined Sequences and Choices;

Element Occurrence Indicators:- Discussion of Three Occurrence Indicators

? (Question Mark)

* (Asterisk Sign)

+ (Plus Sign)

Character Content: PCDATA (Parseable Character data) <! ELEMENT text (#PCDATA),

Document Type Declaration (DTD) and Validation;

Developing a DTD: Modify and existing SGML DTD, Developing a DTD from XML Code, either automatically or manually;

Viewing: Viewing XML in Internet Explorer, Viewing XML Using the XML Data Source Object XSL (Extensible Style Sheet Language) or CSS (Cascading Style Sheet);

Browse the records: Single record at a time (Using buttons), Multiple record at a time (Using an HTML Table);

5. Active Server Pages (ASP)

Active Server Pages (ASP): Concept of ASP, features of ASP, other equivalent tools-JSP, PHP;

Constants: String and Numeric;

Data types: Integer, Floating Point (Single, Double), String, Date, Boolean, Currency, Variant, Object;

Variables: Explicit and Implicit Declaration;

Operators:

Arithmetic: +, - (Unary and Binary), *, /, \(integer division) mod,^;

Comparison: <, >, <=, >=, <>, =;

Logical: AND, OR, NOT, XOR, EQV, IMP;

String Operator: & or + (for Concatenation);

Functions:

Conversion functions: Abs (), Cbool (), CByte (), Cint(), CStr (), CSng (), CLng (), Cdate ();

String Manipulation Functions: Ucase (), Lcase (), Len (), Left (), Right (), Mid (), Ltrim (), InStr(), Rtrim (), Ltrim ();

Time & Date Functions: Date (), Day(), Hour (), Left (), Len (), Minute (), Month (), Monthname (), Now ();

Arrays: Declaration and use of 1 dimensional and 2 dimensional arrays;

Controls: OF..THEN, IF..THEN..ELSE..END IF, IF..THEN..ELSEIF..THEN..END IF, SELECT..CASE..END SELECT, FOR ..NEXT, FOR EACH..NEXT, DO WHILE..LOOP, DO..LOOP WHILE, DO UNTIL.LOOP;

Procedures and Functions, Passing parameters/ arguments;

Concept of object model structure (client to server and server to client);

Objects: Properties, Methods, Events, Setting Object properties, Retrieving Object properties, calling objects/ methods;

Types of Objects: Response, Request, Application, Session, Server, ASP Error;

Response Object: Write Method, Addheader, Append To Log, Binary Write, Using Shortcuts <%=value/ expr%>, Controlling information: Buffer, Flush Clear, End;

Request Object: Request Object Collection: Querystring, Form, ServerVariables, Cookies, ClientCertificate;

Application: Contents, Lock, Unlock, Remove, Remove ALL;

Asp components: AD Rotator, Content Rotator, Counter, Page Counter, Permission Checker;

Text Files: Open and Read content from a text file;

Elementary Database Concepts: Concept of Table/ Relation, Relationship, Candidate Key, Primary Key, Alternate Key, Foreign KEY

Connecting with Databases: Creation of DSN, using OLEDB.

Working on Databases: Inserting, Retrieving, Modifying/ Updation of records from Tables in Databases using server objects (ADODB. Connection, DODB. Recordset);

Server Variables: HTTP_User_Agent, REMOTE_ADDER, REMOTE_HOST, SERVER_NAME;

WEB SCRIPTING

1. VB Script

Introduction, Adding VBScript code to HEML page, VBScript Data type-Variant Subtypes, VBScript Variables: (Declaring variable, Naming restrictions, Assigning value to variables, Scalar variables and Arrays), VBScript Constants, VBScript Operators, and Operator precedence;

MsgBox: functions of message box (Prompt, Buttons, Title, Helpline, Context), Return values of MsgBox function, button argument setting.

Conditional statement: If..Then..Else, Select case;

Loops: Do loops, While..Wend, For..Next, For..Each..Next;

VBScript variables: Sub procedures, Function procedures;

Using VBScript with HTML form controls, Data handling functions, String functions, Date and Times function;

2. Java Script

Introduction, History of Java Script, Using Java Script in an HTML Page, Objectives, Properties Methods and Events;

Event handling, Adding Java Script in an HTML Page (Using SRC attribute within script with examples), Variable and data types- Data types and type casting, String processing, Arrays, Operators, Control flow with looping- for loop, while loop, using continue and break statement, Adding comments to scripts, The Window object, The Document Object, The Location Object, The Form Object, Working with control Objects (Button, reset and submit objects, Checkbox objects and Radio objects, Select object, Password, text and text area object, The Data object, Performing calculation.

MULTIMEDIA AND AUTHORING TOOLS

1.Graphics Devices: Monitor display configuration, Basics of Graphics Accelerator Card and its importance;

Basic concepts of Images: Digital Images

Digital Image Representation

Image Formats

TIFF, BMP, JPG/ JPEG, GIF, IC, PDF, PSD:

Graphic Formats

Theory of design, form, line, space, texture, color, typography, layout, color harmony, unity, balance, proportion, rhythm, repetition, variety, economy, still life, light and shade, Poster Design:

Still life, colored layout, Poster Design, Designing of Books, magazines brochures, children's literature, narrative text handling, scripts in Indian Languages, picture books, comics, illustrations with photographs, scientific illustrations, conceptual illustrations, handling of assignment for the market;

Image Scanning with the help of scanner: Setting up Resolution, Size, File formats of images; image preview, Bitonal, Grey Scale and color options;

Significance of PDF-creation, modification;

Animation, Morphing and Applications

Graphic Tools: Image Editing Software (Photoshop/ CorelDraw)

Basic Concepts: An Introduction, creating, Opening and saving files, Menus, Toolbox, Color control icons, Mode control icons, Window controls icons; creating new images, Image capture (TWAIN) from scanner other files;

Image Handling: Cropping an image, adjusting image size, increasing the size of the work canvas, saving an image;

Layers: Adding layers, dragging and pasting selections on to layers, dragging layers between files, viewing and hiding layers, Editing layers, rotating selections, scaling an object, preserving layers transparency, moving and copying layers, duplicating layers, deleting layers, merging layers, using adjustment layers;

Channels and Masks: Channel palette, showing and hiding channels, splitting channels in to separate image, merging channels, creating a quick mask, editing masks using quick mask mode;

Painting and Editing: Brushes palette, brush shape, creating and deleting brushes, creating custom brushes, setting brush options, saving, loading and appending brushes, Options palette;

Opacity, pressure, or exposure, paint fade-out rate, making selections, using selection tools, adjusting selections, softening the edges of a selection, hiding a selection border,

moving and copying selections, extending and reducing selections, pasting and deleting selections, Image tracing (CorelDraw).

Concept of Multimedia: Picture/ Graphics, Audio, Video;

Sound: Recording Sound using Sound Recorder (Capture), Sound capture through sound editing software (ex: Sound forge), Sound editing, Noise correction, Effect enhancement;

Voice Recognition Software Philips/ Dragon, MIDI Player, Sound Recorder, MONO & Stereo.

Sound File Format: AIFF (Audio Input File Format from Apple Mac), MIDI, WAV, MP3, ASF (Streaming format from Microsoft). Importing audio and saving audio from Audio CD.

Sound Quality: CD Quality, Radio Quality, Telephone Quality;

Picture/ Graphics/ Image files;

2. Movie File Formats: AVI, MPEG, SWF, MOV, DAT;

Movie Frames: Concept of Frame, Frame Buffer, and Frame Rate; Authoring Tools; Making Animation, Embedding Audio/Video, and Embedding on the web page;

3. Multimedia Authoring Using Macromedia Flash

Making of Simple Flash Movie, Setting Properties, Frame Rate, Dimensions, and Background Color;

Scene: Concept of Scene, Duplicate Scene, Add Scene, Delete Scene, and Navigating between Scenes;

Layers: Concept of Layer, Layer Properties, Layer Name, Show/ Hide/ Lock layers, Type of Layer- Normal/Guide/ Mask, Outline Color, Viewing Layer as outline, Layer Height, Adding/ deleting a layer;

Frame: Concept of Frame;

Creating a Key Frame, Inserting Text Into the Frame, Inserting Graphical Elements into the frame, Converting Text/ Graphics to symbol, Inserting Symbol into the Frame, Setting Symbol Property (Graphics/ Button/ Movie), Inserting Blank Frame, Inserting Blank Key Frame, Inserting Key Frame into the Blank frame, Selecting all/ Specific frames of a Layer, Copying/ Pasting selected Frames,

Special Effects: Motion Tweening, Shape Tweening, Color effect, Inserting Sound Layer; Testing a Scene and Movie;

Import/ Export (Movie/ Sound and other multimedia objects)

Publishing: Publishing A Flash Movie; Changing publish Settings; Producing SWF (Flash Movie), HTML page, GIF image, JPEG Image (*. Jpg), PNG Image, Windows Projector (*. Exe), Macintosh Projector (*. Hqx), Quick Time (*. Mov), Real Player (*.smil);

Testing with Publish Preview.

## COMMUNICATION AND NETWORK CONCEPTS

Evolution of Networking: ARPANET, Internet, Interspace;

Different ways of sending data across the network with reference to switching techniques ;

Data Communication terminologies: Concept of Channel, Baud, Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps, kbps, Mbps, Gbps, Tbps);

Transmission media: Twisted pair cable, coaxial cable, optical fiber, infrared, radio link, microwave link and satellite link.

Network devices: Modem, RJ45 connector, Ethernet Card, Hub, Switch, Router, Gateway;

Different Topologies- Bus, Star, Tree; Concepts of LAN, WAN, MAN;

Protocol: TCP/IP, File Transfer Protocol (FTP), PPP, Level-Remote Login (telnet), Internet, Wireless/ Mobile Communication, GSM, CDMA, WLL, 3G, SMS, Voice mail, Electronic Mail, Chat, Video Conferencing;

Network Security Concepts: Cyber Law, Firewall, Cookies, Hackers and Crackers;

WebPages; Hyper TEXT markup Language (HTML), extensible Markup Language (EML); Hyper Text Transfer Protocol (HTTP); Domain Names; URL; Protocol Address; Website, Web Browser, Web Servers; Web Hosting.

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