

## **B.C.A. PART-II EXAM, 2007**

### **Paper 211 : Financial and Marketing Management**

Nature, scope and objective of Financial Management, Basic Financial Concepts Statement of changes in financial Position. Working capital, cash and total resource basis, Financial Statement Analysis- Ratio analysis, Capital Budgeting: Principles and Techniques, Analysis of risk and uncertainty, Concept and measurement of cost of capital, merger/amalgamation and acquisitions/takeovers, lease financing, Operating financial and combined leverage, capital structure, cost of capital and valuation, designing capital structure, Theory of working capital management, planning of working capital, working capital financing, measurement of cash and marketable securities, inventory management.

Role of marketing in modern organizations, the market environment, market planning, marketing research and information system, understanding the buyer, organizational buying behavior, segmenting and targeting the market, market measurement and forecasting, prod-

uct management, new product decisions, brand equity, pricing decisions, promotion decisions, advertising management, sales promotion, personal selling, managing the sales force, managing the distribution function, marketing strategy, marketing organization, marketing performance and control.

### **Reference books**

1. M.Y. Khan and P.K.Jain, Financial Management, Tata Mc-Graw Hill.
2. Prasanna Chandra, Financial Sense, Tata McGraw Hill.
3. Ranjan Saxena, Marketing Management, Tata McGraw Hill.
4. William J. Stanton, Michael J. Etzel, Bruce J. Walker, Fundamentals of Marketing, Mc Graw Hill International.

### **Paper 212 : Digital Electronics and Circuits**

Review : Positive and negative logic, Logic functions- NOT, AND, OR, NOR, EX-OR, EX-NOR, Truth tables, Boolean Algebra, de Morgan's theorems; Standard forms for logical expressions, Sum of Products, Product of Sums specification of logical functions in terms of Minterms and Maxterms, Karnaugh Maps, simplification of logical functions, introduction of "don't care" states, Quine-McLuskey algorithm, Synthesis using only NAND or only NOR gates.

**Digital Logic Families** : Characteristics of Digital ICs, Introduction to Bipolar Families (RTL, DCTL, DTL, ECL), Introduction to Unipolar Logic families (PMOS, NMOS, CMOS), TTL Circuits, 7400, 74H00, 74L00, 74S00, 74LS00, 74AS00 series, TTL parameters, Sourcing and sinking, Loading rules, Three state TTL devices, External Drive for TTL Loads, Positive and Negative Logic, ECL OR/NOR Gates, ECL characteristics. Combinational Circuits, Multiplexer- IC 74150 and IC 44151, Demultiplexer-IC 74154, Decoder-IC 74139, BCD to Decimal Decode-IC 7445, BCD to Seven segment De-coder IC 7446/7447 IC 7448/7449 Decimal to BCD Priority Encoder - IC 7447, parity Checkers - IC 741 80, Magnitude Comparator IC 7485.

**Sequential Circuits** : RS Flip Flop, Clocked RS Flip Flop, D Flip Flop, Edge Triggered D Flip Flop, JK Flip Flop, Master-Slave Technology and its advantage, Shift Register as Flip Flop system, IC

7496, UP/DOWN counters, 74 series asynchronous counters, 74 series synchronous counter.

**Reference Books :**

1. Albert Paul Malvino and Donald P. Leach, Digital Principles and Applications, (Fourth Edition) Tata Mc Graw Hill Publishing Company Ltd, New Delhi.
2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Vikas Publishing House Pvt. Ltd.
3. R.P. Jain, Modern Digital Electronics, Tata Mc Graw Hill Publishing Company Ltd. New Delhi.
4. Adel S. Se&a, and Kanneth C. Smith, Microelectronic Circuits, Oxford University Press.

**Paper 213: Mathematical methods for Numerical Analysis and Optimization**

Computer arithmetics and errors. Algorithms and programming for numerical solutions. The impact of parallel computers : introduction to parallel architectures. Basic algorithms. Iterative solutions of nonlinear equations : bisection method, Newton - Raphson method, the Secant method, the method of successive approximation. Solutions of simultaneous algebraic equations, the Gauss elimination method, Gauss-Seidel Method, Polynomial interpolation and other interpolation functions, spline interpolation, system of linear equations, partial pivoting, matrix factorization methods. Numerical calculus: numerical differentiating, interpolatory quadrature. Gaussian integration. Numerical solutions of differential equations. Euler's method. Runge-Kutta method. Multistep method. Boundary value problems: shooting method.

**Reference Books**

1. E. Balagurusamy, Numerical Methods, Tata Mc Graw Hill.
2. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall of India Pvt. Ltd.
3. M.K. Jain, S.R.K. Iyenger and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, Wiley Eastern Ltd.
4. S.S. Sastry, Introductory Methods of Numerical analysis, Prentice Hall of India Pvt. Ltd.

5. Curtis F. Gerald and Patrick O. Wheatley, Applied Numerical Analysis, Addison Weseley.
6. J.H. Mathews, "Numerical Methods for Computer Science, Engineering and Mathematics", Prentice Hall of India Pvt. Ltd.

### **Paper 214 : Database Management System**

Data and information [Basic concepts, Problems of Early Information Systems, Advantages of a DVMS].

Database architectures [Three levels of the architecture: external, conceptual and internal level], centralized and distributed. Database models; hierarchical [Concepts of a Hierarchy, IMS Hierarchy], relational [Concepts of relational model, relational algebra, relational calculus], network [Concepts of a Network, DBTG Network, DBA Scheme declaration] and object oriented database [only basic information about OODBMS and ORDBMS]. Database query languages [basic retrieval capability, retrieval and explosion, update commands, QBEL, client/server design, Standard Query Language [Basic SQL Query, Nested Queries, Aggregate Operators, Null Values].

Data Management Issues: backup, recovery, maintenance, and performance. Database design [Scheme Refinement, Functional Dependencies, Normal forms, Decompositions, Normalization], tuning [Tuning indexes, Tuning queries and views, tuning the conceptual scheme, DBMS benchmarking], security [Access control, Discretionary and Mandatory Access control, Encryption] and implementation.

### **Reference Books :**

1. Ramakrishnan and Gharke, Database Management Systems, Tata Mc Graw Hill Pub. Co. Ltd.
2. Date, Database Management Systems, Pearson Education Asia.
3. Gerald V Post, Database Management Systems, Tata Mc Graw Hill.
4. Naveen Prakash, Introduction to Database Management Systems, Tata Mc Graw Hill.
5. Leon, and Leon, SQL, Tata Mc Graw Hill Pub. Co. Ltd.
6. Ivan Bayross, Database Technologies, Sybex Computer Books Inc.

7. Abbey and Corey, Oracle 8, Tata Mc Graw Hill Pub. Co. Ltd.
8. Abbey and Corey, Oracle 8, Tata Mc Graw Hill Pub. Co. Ltd.
9. Occardi, Relational Database, BPB Publications.

### **Paper 215 : Object Oriented Programming**

Necessity of Object Oriented Programming, Essentials of OOP (Encapsulation, Constructors, Destructors, Inheritance, Pointers to Objects, Polymorphism).

Java programming basic, Instantiable Classes and Constructors, Processing Input with Applets.

**Programming in Visual Basic :** Object model, Visual Basic Environment Visual Basic Code Statements, Controls, Coding for the controls, variables, constants and calculations, decision control structure, loop control structure, nested Ifs statements, Input validations, Calling event procedures, Menus, Sub Procedures and Sub Functions, Multiple forms, Variables and Constants in Multiple Form Projects List Boxes and Combo Boxes, Using Mfg Box and String Function, Arrays, Using List Boxes and Arrays, Multidimensional Arrays, Classes, initializing and terminating events. Collections, Using the Object browser, Data Files, Sequential File Organization, Random Data Files. Accessing Database files, Navigating the database in Code, Displaying Data in Grids, Validation and Error Trapping, Dragging and Dropping Multiple Objects, Graphics. Layering, Simple Animation, Active X, Dynamic Link Libraries, Object Linking and Optimizing VB Code, OLE Automation and VBA, automating Word, Excel and Outlook 98.

**Programming in Java :** Constants, Variables, Data types, arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement operator, Conditional Operator, Bit-wise Operator, arithmetic expression, Type conversion in expressions, Mathematical Functions, decision control structure, loop control structure, Classes, Objects and Methods, Boolean Methods, void Methods, Overloading, Nesting of Methods. Constructors, Class Invariants, Composition, Recursive. Classes, Extending a class, Overriding Method, Inheritance versus Compositions, Class hierarchies, Arrays and Vector, String Arrays, Wrapper Classes, Defining,

extending and implementing interfaces, accessing interface variables, Graphics, Managing Layouts, Event driven programming, applets, Thread and exceptions. Managing Input Output files, Reusable classes, Searching, Sorting and recursive algorithms.

### **Reference Books**

1. C. Thomas Wu, An Introduction to OOP with Java, Mc Graw Hill.
2. Timothy Wood, An Introduction to Object Oriented Programming, Addison Wesley.
3. Deitel and Deitel, Java, How to Program, Pearson Education Asia.
4. Cay S. Horstmann and Gary Cornell, Core Java, Pearson Education Asia.
5. E. Balaguruswamy, Programming with Java, Tata McGraw Hill.
6. Zukowski: Mastering Java 2, BPB Publications.
7. Herbert Schildt, Java 2, Tata Mc Graw Hill.
8. Julin Case Bradley and Anita C. Millsbaugh: Programming in Visual Basic 6.0, Tata McGraw Hill.
9. Dan Rahmel: Visual Basic 6, Tata McGraw Hill.
10. Wayne S. Freeze : Visual Basic 6, BPB Publications.

### **Paper 216 : Networking Technologies And TCP/IP**

Network architecture, configuring network, network strategies, networks types, LAN, MAN and WAN, [Basic concepts, Line configuration, topology, transmission mode, identify key components of network, categories of network, differentiating between LAN, MAN, WANS and Internet].

The OSI model, The physical layer (bandwidth limited signals, transmission media, wireless transmission), the data link layer, error detection and correction, data link protocols, the medium access sublayer, the channel allocation problem, multiple access protocol, IEE standard 802 for LANs and MANs, Bridges, the network layerm routing algorithm, congestion control algorithm, internet working, the transport layer, the application layer, MAC protocols for high speeds LANs.

Introduction to TCP/IP [Understand the TCP/IP Protocol Suite,

its history and modification processes compare TCP/IP to the Open Systems Interconnection (OSI) reference model, Examine a number of TCP/IP applications such as FTP, Telnet, DNS, DHCP, Boot, etc.

**Reference Books**

1. Andrew S. Tanenbaum, **Computer Networks**, Prentice Hall
2. Behrouz A forouzan, **TCP/IP**, Tata McGraw Hill Pub. Co.
3. DE Corner and DL Stevens, **Internet working with TCP/IP** Volume I-III, Prentice Hall of India.
4. Wright and Stevens, **TCP/IP Illustrated**, Pearson Education Asia.
5. Karanjit S Siyan, **Inside TCP/IP**, Techmedia.
6. Minasi, **Mastering LAN**, BPB Publications.
7. Minoli, **Internet, Interanct Engineering**, Tata Mc Graw Hill Pub. Co. Ltd.

**Paper 217 : System Analysis and Design**

**Introduction to Systems Design Environment** : Systems Development Approaches-Function Oriented. Data Oriented, Object Oriented, Development Process, Methodologies, Tools, Modeling Methods, Processing Types and Systems, Batch Processing, Real-time Processing, Management Process, Management, Systems Analysis, Programmers, Computer Operators, End Users, System Structure, People, processes, and data, Databases, Personal Systems, Centralized Systems, Data Warehousing, data mining, Distributed Systems, Evolution of Distributed processing, Client server systems. Agent Oriented systems.

**System Development Life Cycle**, Linear or Waterfall Cycle, Linear cycle phase problem definition, system specification, system design, system development, testing, maintenance Problems with Linear Life Cycle, Iterative Cycles, Spiral model Requirements analysis, Importance of Communication, Identifying Requirements, Data and Fact Gathering Techniques, Feasibility Studies, Introduction to Prototyping, Rapid Prototyping Tools, Benefits of prototyping.

Interface design tools, user interface evaluations, Introduction to Process Modeling, Introduction to Data Modeling.

System Design Techniques, Document Flow Diagrams, Documents, Physical Movement of documents, Usefulness of Document

Flow diagrams, Data Flow Diagrams, DFD notation, Context diagram, DFD leveling, Process descriptions structured English, Decision Trees and Decision Tables, Entity Relationship Diagrams, Entities, Attributes, Relationships, Degree, Optionality, Resolving many to many relationships, Exclusive relationships, Structure Charts, Modules, Parameter passing. Execution sequence, Structured Design, Conversion from Data Flow Diagrams to Structure Charts.

System Implementation, Maintenance and documentation, Testing, Evaluation, Maintenance Activities, Documentation, Document Configuration Maintaining a Configuration.

### **Reference Books**

1. Igor Hawryskiewycz, Introduction to Systems Analysis and Design, 4th edition, Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentley, Systems analysis and Design Methods 4th edition, Tata McGraw-Hill.
3. Philip L Weaver, Practical SSADM ver 4+ A Complete Tutorial Guider, Pitman publishing, 1995.
4. Mark Lejk, and David Deeks, an Introduction to Systems Analysis Techniques Prentice Hall.
5. Don Yeates, Maura Shields and David Helmy, System Analysis and Design Longman group limited, 1994.

### **Paper 218 : Internet and Intranet**

**Internet** : Internet Accounts, Telephone, Cable and Satellite connections. Dial up networking, setting up a dial up connection, high speed connection (ISDN, ADSL and Cable modems), Networking Essentials (Lease Line, Routers, Modems), Intranets, E-mail concepts (receiving, sending, addressing, downloading, formatting, sending attachments), sending and receiving Secure E-mail, chatting and conferencing, E-mail mailing list, Newsgroup, IRC, ICQ, Yahoo Pager, Voice mail and Video conferencing.

**World Wide Web** : Elements of the Web, Web browser, viewing pages with a browsers, using a browser for Mail, News and chat, Security and Privacy issues (cookies, firewalls, executable Applets and scripts, blocking systems), Netscape navigator and Communicator and features therein Internet Explorer and features therein. Lynx,



Opera, finding and installing **Players, Plug - Ins** and **Active X** controls, dealing with **Web pages** that contain **Active X, Java** and **Java Script**, playing streaming **Audio and Video**, playing **MP music**. Using **Search engines**, **subscriptions and channels**, making use of **Web resources** (**Portal, News and weather, Sports, Personal Financing and Investing, Entertainment, Shopping, Computers and Internet, Travel, Health and Medicine, Communities and Clubs**), **Introduction to E-Commerce**.

**Creating and Maintaining Web Sites** : **Planning, Navigation and Themes, Elements of a Web Page, steps of creating a site, publishing and publicizing site, structuring web site, starting a Web Page (HTML Tags Standard Tags), Formatting Text, Adding Pictures and links, Gathering information in forms, formatting page in frames, formatting web page by using styles, creating web page by using web page editors (Netscape composer, Front Page Express 2000), creating web graphics, using GIF, JPEG, getting Web Clip Art, Progressive Display and Transparency, optimizing images on the web, animating web graphics, Anti-aliasing, Image Slicing, Seamless Tiling, Multimedia graphics, Capturing Audio, generating digital file, editing, processing, encoding and linking the audio file, unloading web pages, unloading by using FTP, Netload, Front Page Express and Netscape Composer, analysing web traffic, building traffic to your site, File Transfer Protocol (FTP) and File Transfer Protocol Programs.**

**HTML tables, Javascript, CGI, Introduction to Perl, perl: control structures, hashes, basic I/O, regular expressions Simple CGI Scripts, HTML style sheets. Perl : regular expressions, string handling, sorting, formatting data CGI programming.**

**The basics of HTML as used with ASP. Using forms to obtain information from users ASP variables and arrays, ASP control structures (loops, conditions, procedures, functions) ASP objects Creating and reading cookies, Connecting a web page to a database (retrieving updating, and inserting data into a data base. Error handling and debugging ASP scripts.**

**Introduction to XML, Setting up Web servers, Configuring Web and FTP servers.**

**Reference Books :**

1. M.L. Young : Internet Millennium Edition, Tata McGraw Hill.
2. Harley Hahn : The Internet, Tata McGraw Hill.
3. G. Robertson : Hands on HTML, BPB Publications.
4. D.A. Tauber, B. Kienan : Microsoft From Page 2000, BPB Publications.
5. Joel Sklar : Principles of Web Design, BPB Publications.
6. Stephen W. Active Server Pages, Techmedia.

**Paper 219 : Electronic Communication and  
Data Communication**

**Modulation** [Principles of Modulation, AM and FM Modulator Circuits, Pulse Code Modulation, Baseband Modulation, M-ary Pulse Modulation waveforms, Duobinary signaling and decoding. Digital Band-pass Modulation] **Demodulation** [Basics of Demodulation and detection, signals and Noise, Detection of Binary Signal in Gaussian Noise, Demodulation of shaped Pulses, Digital Band Pass Demodulation], **Data transmission** [Basic Concepts. Data Communication Systems, Serial Data formats, encoded data formats, error detection and correction], information about microwave [Electromagnetic spectrum, Characteristics, Use of Microwave in Communications, FM Microwave Radio Repeaters], **Satellite** [Artificial Satellites, Geosynchronous Satellites, Look angles, Orbital classifications, Spacing and Frequency allocation, Multiple accessing, Channel Capacity.] and **optical fiber communication** [Basic concept of light propagation, Fiber Cables, Optical fiber versus Metallic cable facilities, Light sources, Optical Detectors, Fiber cable losses, wave division multiplexing, fiber distributed data interface the fiber channel, SONET]. **ISDN** [ISDN services, subscriber access to ISDN, B Channels, D Channels, H channels, ISDN layers, Broadband ISDN, DSL [Digital Subscriber Lines : HDSL, VDSL, SDIS, IDSL].

**Reference Books :**

1. M.A. Miller, Data and Network Communications, Thomson Learning.
2. Behrouz A Forouzan, Data Communications and Networking, Tata Mc Graw Hill.

3. Bernard Sklar, Digital Communications, Pearson Education Asia.
4. Wayne Tomasi, Electronic Communications Systems, Pearson Education Asia.
5. B.P. Lathi, Modern Digital Analog Communication Systems, Oxford University Press.
6. Fred Harshall, Data Communications, Communication Networks, Pearson Education Asia.
7. W.A. Sahay, Understanding Data Communication Network, Vikas Publishing House.
8. Gilbert Held, Understanding Data Communication, Techmedia.
9. Kennedy, 'communication Systems', Tata Mc Graw Hill.

**Paper 221 : Visual Basic, Visual C, and  
Visual Foxpro Programming (Laboratory)**

**Visual Basic Programming**

- ⊛ Event driven programming : objects, properties, methods, events.
- ⊛ Introduction to Visual Basic : development environment, forms controls, menus, dialogue boxes.
- ⊛ Programming in Visual, Basic : data types, data structures, control structures, subprograms, intrinsic functions, error handling, file handling.
- ⊛ Multiple Form Programming - Information Kiosks.
- ⊛ Windows API : functions, API viewer, 'declare' statements, making API calls.

**Visual C Programming**

- ⊛ List the major elements of Visual C Frame work.
- ⊛ Analyze the basic structure of a Visual C application and be able to document, debug, compile, and run a simple application.
- ⊛ Create, name, and assign values to variables.
- ⊛ Use common statements to implement flow control, looping, and exception handling.
- ⊛ Create methods (functions and subroutines) that can return values and take parameters.
- ⊛ Create, initialize, and use arrays.
- ⊛ Use common objects and reference types.

**Visual Fox Pro Programming**

- ★ Variable naming conventions in Visual Foxpro.
- ★ Creating a prototype, specifying title, application database, forms, reports, menu and other files, saying and running the project.
- ★ Using Visual Foxpro's debugging facilities.
- ★ Integrating Visual Foxpro with OOP.
- ★ Communicating with other applications.
- ★ Using Windows API.
- ★ Creating a Visual Foxpro Database
- ★ Using SQL in Visual Foxpro Applications
- ★ Client/Server Database development using Visual Fox Pro.

**Reference Books :**

1. Julia Case Bradley and Anita C. Millspaugh: Programming in Visual Basic 6.0, Tata Me Graw Hill.
2. Dan Rahmel : Visual Basic 6, Tata McGraw Hill.
3. Wayne S. Freeze : Visual Basic 6, BPB Publications. 4 Chapman, Visual C. Techmedia.
4. Paddock, Petersen, talmage and Ranft, Visual Fox Pro 6, BPB.

**Paper 222 : Web authoring Tools,**

**Java and Perl Programming (Laboratory)**

[The Web authoring Tools course teaches students the World Wide Web Design with HTML, DHTML, and javascript. The necessary theoretical aspects and basics should be explained during the practical class of the Instructor. The latest version of HTML, DHTML and Javascript should be used. In addition to the standard form, the extensions developed by Microsoft and Netscape should also be used. Extensive practical exercises should take students through all major aspects of the design and development of Web sites.]

- ★ Build HTML documents from scratch.
- ★ View HTML document using a variety of Web Browsers
- ★ Organize information using Lists
- ★ Use HTML frames and tables for page layout.
- ★ Connect to a variety of resources by using hypertext links.
- ★ Create style sheets to format the look and feel of the pages
- ★ Understand key image theory concepts.
- ★ Create new images from scans or from scratch

- ⊛ Optimize image sizes.
- ⊛ Create animated gifs and transparent images.
- ⊛ Be able to create graphical elements for use on web pages : buttons, banners navigation bars, background tiles.
- ⊛ Embed images and other multimedia.
- ⊛ Post information to HTTP server.
- ⊛ Evaluate a document design for effectiveness, usability and efficiency.
- ⊛ Using DHTML create functionalities like animation, stage- based presentations, splash pages, pull-down menus, drop down menus, drag drop techniques.
- ⊛ Integrating Javascript with HTML and DHTML.
- ⊛ Using Javascript Object Model, Javascript's Event System. Manipulating User defined Objects and variables.
- ⊛ Dynamically updating Objects in a Window, focussing and defocusing method.
- ⊛ Using Javascript's Time Out Mechanisms and Cookie Mechanism.
- ⊛ Read and write cookies to store visitor's information.

### **Java Programming**

[The Java Programming Language course teaches students the syntax of the Java programming language; object-oriented programming with the Java programming language; creating graphical user interfaces (GUI), exceptions; file input/output (I/O); threads and networking. The necessary theoretical aspects should be explained during the practical class only. The Java 2 Software Development Kit (SDK) or any later version should be used. Extensive practical exercises should take students through all major aspects of the design and development of Java programs.)

- ⊛ Learn about getting and installing the Java Development Kit.
- ⊛ Learn about Java programming language structure and syntax.
- ⊛ Learn about control statements (The If statement, Logical Operators, The Conditional Operator, The Switch Statement, Variable Scop, Loops).
- ⊛ Learn about Java arrays, Java Strings, Operations on Strings and String Buffer Objects.

- ✧ Learn about Class, Objects, Methods and Problem solving using classes, objects and relationships.
- ✧ Learn about console and file I/O.
- ✧ Learn about Java 2 SDK tools : Javac, Java, Javadoc, and Jar.
- ✧ Learn about Java Exceptions, Inheritance and Polymorphism.
- ✧ Create sophisticated Java applications that leverage object-oriented features of the java language, such as inheritance and polymorphism.
- ✧ Use the file I/O class libraries to read and write to and from data and text files.
- ✧ Create and use Java GUI components such as panels, buttons, labels, text fields and text areas.
- ✧ Create stand-alone Java applications, and use the frame and menu classes to add graphics to Java applications.
- ✧ Create basic Java applets and launch them from a Web browser.

### **Perl Programming**

- ✧ Learn about getting and installing the Perl 5.
- ✧ Learn about Perl 5 structure and syntax.
- ✧ Learn about control structures, (The If-then else, while, until, do while, for conditional statements), creating a counting loop, the next, last and redo control statements.
- ✧ Learn about lists Arrays and hashes in Perl.
- ✧ Learn about program flow and subroutines in Perl.
- ✧ Learn about Class, Objects, Methods and Problem solving using classes, objects and relationships.
- ✧ Learn about console and file I/O.
- ✧ Learn about Java 2 SDK tools: javac, java, javadoc, and jar. Creating and reading from files.
- ✧ Searching for files.
- ✧ Pattern matching Syntax
- ✧ Packages and modules, loading, libraries and importing a module. Interacting with data bases.
- ✧ Using the Perl DBI.
- ✧ Working CGI programs,
- ✧ Sending and receiving data.

- ✪ Returning data
- ✪ Cross platform functions.

**Reference Books : [Web authoring Tools]**

1. Elizabeth Castro, HTML 4, Pearson Education Asia.
2. D.S. Ray and E.J. Ray, Mastering HTML 4, Sybex Computer Books Inc.
3. Jeff Rule, DHTML, Tata Mc Graw Hill.
4. Joseph Schmuller, Dynamic HTML, Sybex Computer Books Inc.
5. Jason J manager, Javascript essentials, Osborne Mc Graw Hill.
6. Joel Sarkar, Principles of Web Design, Thomson Learning
7. C Xavier, WWW Design with HTML, Tata Mc Graw Hill.
8. Don Gosselin, Java Script, Thomson Learning.

**Reference Books : [Java Programming]**

1. H.M. Deitel and P.J. Deitel, Java How to Program, Pearson Education Asia.
2. E. Balagurusamy, Programming with Java, Tata McGraw Hill Pub. Co. Ltd., 2001.
3. Peter Norton, Peter Norton's Guide to Java Programming, Techmedia.
4. Ken Arnold, James Gosling, David Holmes, The Java Programming, Pearson Education Asia (Addison Wesley).
5. A. Drozdek, Data Structures and Algorithms in Java, Vikas Publishing House, 2001.
6. J. Zukowski, Mastering Java 2.
8. Lafore, Data Structures & Algorithms in Java, Techmedia.
9. Gilbert, Object Oriented Programming in Java, Techmedia.

**Reference Books : [Perl Programming]**

1. R. Allen Wyke, and Donald B. Thomas, Perl: A beginners guide, Tata Mc Graw Hill.
2. Jon Orwant, Perl 5, Techmedia.
3. Laura Lemay Perl in 21 days, Techmedia.

**Paper 223 : Digital Electronics Lab (Laboratory)**

In this lab the student must perform. Ten experiments based on topics covered in the theory Paper 212 : Digital Electronics And Circuits, [which is outlined above].