PATNA UNIVERSITY COMPUTER CENTRE

NEW ADMINISTRATIVE BUILDING
PATNA UNIVERSITY MAIN OFFICE CAMPUS
PATNA – 800 005
Ph. No. – 0612 – 2660191

PGDCA (Vocational) Syllabus
SEMESTER-I
PAPER I

COMPUTER FUNDAMENTALS

FUNDAMENTALS OF COMPUTER

1. COMPUTER – A Definition
   Data Processing, Information
2. Basic Anatomy of Computers-
   Bits, bytes and words,
   Input, Output, CPU, Peripheral devices, Backing Storage.
   Input interface, Output interface.
3. Classification of Computers-
   Micro, Mini, Super, Mainframe.
   Digital, Analog, Hybrid.
   On the basis of generation (component).
4. Computer Applications-
   In Business & Industry, Science & Technology, Education, Health, Communication, Banking & other Public Services
5. Peripheral Devices-
   Input Device
   keyboard, Mouse, Punch card, Joystick, Touch Panels, OMR, OCR, MICR, Image Scanners, Light Pen, Voice System Output Devices
   Printers
   Impact printers and Non-impact printers Character printers, line printers and page printers Dot Matrix, Daisy wheel, Thermal, Laser, Ink Jet, Drum Printer, Chain Printer
   Plotters
   Drum and Flat Bed Plotters
   VDU
   Visual Display Adapters
   LCD
   Secondary Storage Device
   Magnetic Disk (Winchester and hard disks), Magnetic Tape, Floppy disk, Optical disk
6. Memory and register-
   Primary memory, Secondary memory
   RAM SRAM, DRAM
   ROM PROM, EPROM, EEPROM, CDROM

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ROM BIOS, Buses,
Registers- Program counter, Memory buffer register, Memory address register, Accumulator,
CACHE MEMORY

7. Computer Codes and Arithmetic –
   Number system
   1. Positional
      Decimal, Binary, Octal, Hexadecimal.
   2. Non Position (Roman)
      Conversion of Decimal numbers in other systems and vice-versa. Binary Arithmetic – Addition, Subtraction (1's complement, 2's Basic Gates (OR, AND, NAND, NOT, XOR, NOR).
8. Types of processing –
   1. Batch processing 2. On-Line 3. Real-time
9. Introduction to -
   OS, Utilities, Compilers/interpreters, Assemblers
   Multiprogramming, Multitasking, Multiprocessor.
10. Networking -
    Topologies (Bus, Star, Ring, Mixed), Advantages and Disadvantage of Networking, LAN, WAN

DOS

- **Internal Commands**
- **External Commands**

Directory Structure
File naming convention and valid characters for filenames
Internal Commands –
CLS, DIR, COPY CON, TYPE, REN, COPY, DATE, TIME, DEL, MD, RD, CD, ERASE, PROMPT, ECHO, PATH, PAUSE, SET, VER,VOL.
WILDCARD CHARACTERS * AND ?
(.) Current directory, (.) root directory
External Commands –
FORMAT, CHKDSK, SCANDISK, DISKCOPY, SORT, FIND, ATTRIB, XCOPY, TREE, UNDELETE, EDIT, DELTREE, MOVE, DEFRAG, MORE
Redirection, Executable files, Text files, Batch files

PAPER II

OFFICE AUTOMATION

WINDOWS
GETTING STARTED
Starting Windows95
Tip of the day
Windows95 desktop and taskbar
Starting programs via the start menu
Double-clicking to start programs

Quitting programs
Shutting down and quitting windows
Running DOS programs
Startup group

WINDOWS BASICS

Parent and child windows, parts of a window
Opening, activating, hiding (minimizing), resizing, scrolling, arranging and closing a window
Moving information from one window to another

HELP

Context Sensitive Help
Search for Help

WORKING WITH DISKS, FOLDERS, AND FILES

Disk icons and their windows
The Windows Explorer
Creating and naming new folders
Moving and copying folders and files
Deleting folders and files
Emptying the Recycle Bin Naming files
File types in windows95
Associating files
Renaming files
Formatting disks
Finding lost files IMPORTANT TECHIQUES AND TIMESAVERS
Moving or copying by dragging and dropping
Moving or copying by creating scraps
Shortcut icons
property settings
Object linking embeding

PERSONALIZING WINDOWS95

The welcome screen and tips
Adding programs to the start menu
Clock,calender, regional setting
Mouse behaviour and mouse property window
Desktop pattern and wallpaper
Windows colour scheme
Screen savers

ACCESSORIES

Ms Paint
Notepad
Calculator
WordPad

MS-EXCEL

GETTING STARTED

- Excel Basics
- Enter Data
- Select Cells
- Using AutoFill
- Move through a Worksheet
- Getting Help

SAVING AND OPENING WORKBOOKS

- Save a Workbook
- Close a Workbook
- Exit Excel
- Open a Workbook
- Create a New Workbook
- Switch Between Workbooks

EDITING WORKSHEETS

- Edit Data
- Clear Data
- Undo Last Change
- Move Data
- Copy Data
- Check Spelling

USING FORMULA AND FUNCTIONS

- Formulas
- Enter a Formula
- Functions
- Enter a Function
- Add Numbers
- Copy Formulas

WORKING WITH ROWS AND COLUMNS

- Insert a Row Column
- Delete a Row or Column
- Change Column Width
- Change Row Height

FORMATTING WORKSHEETS

- Change Appearance of Numbers
- Align Data
- Center Data Across Column
- Bold, Italic and Underline
- Clear Formats
- Change Fonts Add Borders

PRINTING WORKSHEETS
- Preview a Worksheet
- Change a margins
- Prints a Worksheet
- Add a Header or Footer

USING MULTIPLE WORKSHEETS
- Switch Between Worksheets
- Copy or Move Data-Between Worksheets

CHARTING DATA
- Create a Chart
- Move a Chart
- Size a Chart
- Print a Chart
- Change Chart Type

DATABASE MANAGEMENT
- Goal seek
- Data sort
- Data filtering
- Sub-totaling
- Pivot table Scenario Manager
- Introduction to macro

MS-POWER POINT

GETTING STARTED
- Create new slide
- Select slide
- Enter data
- Getting help

SAVING AND OPENING SLIDES
- Save a new slide
- Close a slide
- Exit Power Point

EDITING SLIDES
- Insert Slide
- Delete Slide
- Clear Slide
- Duplicate slide

VEWING SLIDES
- Normal view
- Outline view
- Slider sorter
- Slide Presentation

USING MULTIPLE SLIDES
- Create new slide
- Insert time, data, page no.
- Copy slides from file
- Copy objects from WORD
- Copy graphs from EXCEL

FORMATING SLIDES
- Change data alignment
- Change fonts
- Create bullets, numbers
- Create periods

SLIDE PRESENTATION
- Presentation templates
- Change Wizards
- Change slide background
- Change Slide color

DRAWING SHAPES Group slides
- Rotate picture
- Change picture color
- Crop picture

MS-WORD

GETTING STARTED
- Enter Text
- Move Through a Document
- Select Text
- Getting Help

EDITING DOCUMENTS
- Insert Text
- Delete Text
- Replace Selected Text
- Undo Changes
- Redo Changes
- Change the Case of Text
- Move Text

Copy Text
Change Views

SMART EDITING
Find Text
Replace Text
Check Spelling
Using AutoCorrect
Using the Thesaurus
Check Grammar

SAVING AND OPPENING DOCUMENTS
Save a New document
Close a Document
Exit Word
Open a Document

USING MULTIPLE DOCUMENTS
Create a New Document
Arrange Open Documents
Copy or Move Text Between Documents
Maximize a Document
Switch Between Documents

PRINTING DOCUMENTS
Preview a document
Print a Document

FORMAT CHARACTERS
Bold, Underline and Italics
Change Fonts
Insert a Symbol

FORMAT PARAGRAPHS
Change Line Spacing
Change Paragraph Alignment
Display or Hide the Ruler
Change Tab Settings
Indent Paragraphs
Create Numbered and Bulleted Lists

FORMAT PAGES
Insert a Page Break
Create a New Section
Change Margins
Add Headers or Footers
Center a page

WORKING WITH TABLES
Create a Table
Type Text
Add a Row or Column
Delete a Row or Column
Format a Table

Books referred:

1. Windows95 for Busy People
   - *Ron Mansfield*
2. Easy Guide To Windows95
   - *Alan Simpson*

3. Microsoft Office Professional For Windows95

PAPER III
PROGRAMMING TECHNIQUES

1. Programming Techniques
   Techniques of programming (flowchart, pseudocodes).
2. Introduction to 'C' Programming
   - Data Types In 'C'
   - Operators & Expressions
   - Control Flow
   - Functions & Program Structure
   - Arrays
   - Pointers
   - Structures and unions
   - Pointers to Structure
   - File Handling

Details Covered :

1. **Programming Techniques**
   - Data, Constants, Variables
   - Flowchart
   - Structured Flowcharts
   - Introduction To Pseudocode
   - Selection
   - Iteration
   - Modular Approach
   - Array
   - Sorting (LINEAR, BUBBLE)
   - Searching (SEQUENTIAL, BINARY)
   - Structured programming

2. 'C' Programming -

1. Features of 'C' language, character set, tokens, identifiers, keywords, constants, variables, storage class (auto, static, register, extern)
2. Data types and sizes (char, int, float, shortint, long int, unsigned, double, enumerated), Operations and expressions (Arithmetic, logical, relational, bit – wise, compound, assignment, increment and decrement.
3. Header files, library files, preprocessor directives (#include, #define), linking and compilation process.
4. Control flow –
   statements and blocks, if, if-else, nested if-else, goto switch, break, continue, while loop, do-while loop, for loop
5. Library Functions -
   I/O functions:
   getc( ), putc( ), getchar( ), putchar( ), gets( ), scanf( ), printf( ), getch( ), fflush( ).
   String functions : strcpy( ), strcmp( ), strcat( ), strlen( )
   Charcter functions : isupper(), islower(), isalpha(),
   isdigit( ), ispunct( ), isalnum( ), isspace( ), tolower( ), toupper( ).
   Mathematical functions : abs( ), atof ( ), rand ( ) atio ( ), exp ( )call by reference), recursive function return data type, parameter passing (call by value, call by reference), recursive functions, storage class (local variables, global variables).
6. Arrays –
   operations on arrays, single and multi dimensional arrays, passing array to function.
7. Structure and union-
   structure declaration and definition, accessing, nesting of structure, array of structure, structures and functions unions, difference between structure and union.
8. Pointer and its operator &, *, pointer arithmetic, pointers to constants, constant pointers, array of pointers, pointer to function, pointer to structure.
9. Command line arguments *argv[] & argc
10. Creation of Linked List, Traversing, ~~printing~~ and Deletion,
11. Files opening modes, FILE, fread ( ), fopen ( ), fwrite ( ), feof ( ), fgetc ( ), fputc ( ), fgets, fputs ( ), rewind ( ), fscanf ( ), fprintf ( ), fclose ( ), ftell ( ), fseek( )

Books referred :

1. Ansi C
   - E. Balaguruswamy
2. Let us C
   - Yashwant Kanetar

PAPER IV

BUSINESS DATA PROCESSING :

INFORMATION & MANAGEMENT
DATA PROCESSING METHODS
DATA INPUT METHODS
BUSINESS FILES : FIELDS AND RECORDS
FILE ORGANIZATION
OVERVIEW OF VARIOUS BUSINESS APPLICATIONS AND THEIR CHARACATERISTICS
COBAL PROGRAMMING

Details Covered :

1. Introduction to data processing, data collection, preparation, verification, editing and validation. Types of information, qualities of information, various ways of collecting information, Data input methods (on-line & off-line), Data processing methods (on-line & batch processing).
2. Business files-Elements, Fields and Records. Classification of files: Master files, Transaction files, Work files, Audit files.
3. File organization-serial file, Sequential file, Indexed sequential file, Direct or Random file, Hashing techniques for direct files, Addressing techniques.
4. Overview of various Business Applications:
   Characteristics of business organisations, Use of computer in various areas of business: Sales control and accounting, Cost accounting, Inventory control, Payroll etc. COBOL Programming.

1. Introduction to Cobol, Structure of a COBOL Program, DIVISIONS, SECTIONS, PARAGRAPHS etc.
   COBOL Character set, Digits, Letter & Special Characters Words, Literals, Figurative constants, Identifiers, PICTURE clause, edit characters (Z, *, +, -, CR, DB, / etc).
2. IDENTIFICATION DIVISION
3. ENVIRONMENT DIVISION
   Configuration Section
   Input-output Section
   File-control
   select – assign – organization – access
4. DATA DIVISION
   File Section (Sequential, Line sequential & Indexed file)
   Screen section
   Working-Storage Section
   Table Handling, Index Data Items
   Condition Names Linkage Section
   Other clauses like VALUE, USAGE, SIGN IS, BLANK WHEN ZERO, JUSTIFIED, REDEFINES, OCCURS.
   Levels of data – 01 to 49, 77 & 88.
5. PROCEDURE DIVISION

6. Input/Output Statements
Data Movement
Arithmetic Operators
Computer Statement

CONTROL STATEMENTS :

PERFORM
IF and ELSE
SORT, MERGE and SEARCH
Interprogram Communication
CALL USING

Books referred :

1. Structured COBOL Programming
- Stem & Stern
2. Cobol Programming
- M.K. Roy & D. Ghosh Dastidar
3. Analysis and Design Of Information System
- V. Rajaraman
4. OLEVE (Module III)
System Design and Business Application
- V.K.Jain

PAPER V

Programming Lab I

Writing 'C' program and COBOL program.
Using mail merge or any other tools of MS-WORD;
Creating charts or data handling in EXCEL;
Preparing slides and importing files like chart from EXCEL POWERPOINT etc.

SEMESTER- II
PAPER VI
ADVANCED TOPICS

VISUAL BASIC

1. Form and controls, Toolbox objects, System objects, Property, method, event, statement.
2. Project window, Different files and their extensions, File commands, Concept of focus, Caption, form name, border style, minbutton, maxbutton, control box, window state, back color, font properties, fore color, code window.
3. Text controls, container, buttons, scroll bars, adding control to a form and setting its properties, event procedure for a control, naming conventions, coded statements and methods, print method, assigning text to a text box, multilane property, label auto size property, label wordwrap and borderstyle property.
4. Design- and run-time properties to manipulate list and combo boxes :- list box properties, combo box style properties, additem method, form-load ( ) event, manipulating items in a list box and combo box, tab order, control option buttons with a frame, tabindex property, tabstop, enable or disable a control, menu bar, code for a menu control, scroll bar basics-scroll and change procedures.
5. Visual basic coordinate system, shape controls, manipulating shape controls in design-time and run-time, image control and it's special properties, load picture function.
6. Variables and constants :- types of variables and naming convention, option explicit, integer, long integer, single precision and double precision, currency, Boolean variables, fixed and variable length string variables, string concatenation, vartype, typename length string variables, string concatenation, vartype, type name, time date, now and datediff functions.
7. Math operators and formulas :- operators and operands, seven types of operators, val() and str functions
8. Defining variable and procedure scope:- dim, public, static keywork: local, module and global scope. Load and show more than one form, load and show statement, benefits of sub main () code and standard module procedures, cell statement, adding own procedure.
9. Inputting values and printing results :- Inputbox function, Messagebox function, Pop-up menu, formatting numbers, dates and time If-then-else logic, And, Or, Xor, Not, Eqv, Imp logical Operators.
10. For-next loops and control arrays, Doevents and Exit For statements, Do-Loops, While-Loops, and Timer Control, The select-Case statement, Go To and GoSub..Return statements
11. List and arrays :- select an element from a list box, the selected property, select an element from a combo box, select multiple items from a list, Dim and Radium statements, Ubound and Lbound functions, Declaring and

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accessing arrays, Multi-dimensional Arrays, Tables, and the Grid control:- Design a multicolumn list, use the grid control, User-defined type.

12. Numeric functions and String functions.

PAPER VII

SYSTEM ANALYSIS AND DESIGN

Features of structured systems analysis and design. Different stages of the system life cycle and the forms generated at each level-conception, initiation, analysis, design, construction (project request form, system proposal, functional specifications, information requirement table) system acceptance criteria, role of the systems analyst.

Context Analysis diagram

Data flow diagram

External entity, data flow, data store, process

Data dictionary and its organization

Data structure, data element, data flows, data stores & process (decision tree, decision table, structured English)

Levelled data flow diagrams.

Balancing of levelled DFD'S, local data stores, current physical DFD, Current logical DFD, proposed logical DFD, proposed physical DFD, Automation boundary Normalization – 1st, 2nd & 3rd normal form.

Structured charts

Couples:

Data coupling, control coupling, stamp coupling, common coupling, Content coupling.

Cohesion:

functional cohesion, sequential cohesion, communicational chhesion, temporal cohesion, procedural cohesion, logical cohesion Transform analysis & transaction analysis Factoring, span of control, system shape, scope of effect, scope of control, scope of effect, scope of control conflicts System packaging & the factors considered while packaging – batch / on-line boundaries, frequency boundaries, output requirements, safety and defensive requirements, two-in-one reports, library routines, interfaces, menus Need for different controls in handling errors-control totals, hash totals

Handling erroneous data-

screen design as a means of reducing errors, coding scheme-serial, block serial, hierarchical Storage media considerations Parameters considered for deciding upon a language volume of data, complexity of processing, compatibility with other systems, development effort Implementation-methods used and difficulties faced during implementation.

PAPER VIII

DATABASE MANAGEMENT SYSTEMS

Introduction to DBMS :

Purpose of Database Systems
Data abstraction
Data Models
Instances and Schemas
Data Independence
Data Definition Language
Data Manipulation Language
Database Manager
Database Administrator
Database Users
Overall System Structure
Basic concepts of
- Relational Model
- Network Model
- Heirarchical Model

Programming in Fox Pro :

- Introduction to FoxPro
- Commands
- Memory Variables in FoxPro
- Programming Structures
- Indexing
- File Updation Programs
- Procedures
- Reports
- FoxPro Report Writer
- multiple File Handling
- Windows and Menus
- Popups
- Trapping Keys
- Memo Field Handling
- UDF's

Details covered in FoxPro :

Tables, Catalog manager, Menu Options, Command Window, CREATE, USE, CLOSE DATA, CLOSE ALL, LIST, APPEND, APPEND BLANK, CHANGE, BROWSE, GOTO, DELETE, RECALL, PACK, ZAP, Changing Fonts, Modify Structure, Index files, IDX, CDX, SET INDEX TO, SET ORDER TO, LIST FOR/ WHILE, Relational & Logical Operators, Indexing, Sorting,?, Upper( ), Substrata( ) Memory Variables, STORE, Assignment Statement, Arithmetic Operators, Input Out in FoxPro, Picture Templates & Functions.

Writing Programs : MODIFY COMMAND, DISPLAY MEMORY, DISPLAY STRUCTURE, SPACE (N), Field Type Conversion, SET DATE BRITISH.
Simple Programs of IF...ELSE...ENDIF and CASE... ENDCASE, DO...WHILE, FOR... ENDFOR. Drawing Lines & Boxes, @.. TO, @CLEAR TO, EXIT, Validating Input : VALID, RANGE, WHEN, ERROR, DEAFAULT, MESSAGE. SET MESSAGE TO, Trapping keys, READKEY, SEEK, LOCATE...CONTINUE, FIND, REPLACE, COPY STRUCTURE TO, COPY TO DELIMITED/SDF, COPY FILE ... TO ..., SET SAFETY OFF, EMPTY ( ), CLEAR GETS.

Addition, Modification, Deletion in a database using programs. Procedures, Usage of Procedures in a records deletion program.
SET DELETED ON, SET ESCAPE OFF, DELETED

Mathematical Commands and Functions :

SET DECIMAL TO, SQRT( ), LOG, LOG10, INT, FLOOR( ), CEILING, ABS( ), ROUND( ), MIN( ), MAX( ), BETWEEN( ), MOD( ), EXP(n), SIGN( ), LEN( ), LEN( ), SUM, AVERAGE, COUNT, RECNO( ), RECCOUNT( ), CALCULATE, SET PROCEDURE TO, SUSPEND, RESUME, PUBLIC, PRIVATE, CLEARALL, CLEAR MEMORY, Passing information to called Procedures.

String Functions :

LEFT( ), RIGHT( ), STRTRAN( ), STUFF, REPLICATE, LTRIM( ), RTRIM( ), ALLTRIM( ), SUBSTR( ), ISUPPER( ), ISLOWER( ),ISALPHA( ), ISDIGIT( ), LOWR( ), UPPER( ), AT( ), ATC( ), STR( ).

Arrays, COPY TO, APPEND FROM, SCATTER TO, GATHER FROM.

CHANGE/EDIT with Options.
REPORTS : SCAN... ENDSCAN, ?, ??, System Memory Variables : _PLENGTH, PLINENO,
ALIGNMENT, _PCOLNO, _WRAP, _LMARGIN, _RMARGIN. ON PAGE AT LINE, PRINT JOB... ENDPRINT JOB Control. Break Programs, Multiple file handling, SELECT,->... SET RELATION TO, CLOSE ALL, SET SKIP TO.

POPUPS : DEFINE POPUP, DEFINE BAR, ON SELECTION POPUP, ON SELECTION BAR, BAR, BAR( ), PROMPT( ), DEACTIVATE POPUP, HIDE POPUP, SHOW POPUP, RELEASE POPUP, ON PAD.

$ Operator, MODIFY MEMO, CLOSE MEMO, ON KEY LABEL, SET MEMO WIDTH TO, MEMLINES( ), MLINE( ), ATLINE( ), ATCLINE( ), APPEND MEMO, COPY MEMO.

CREATE REPORT, MODIFY REPORT, REPORT FORM, Using the report builder tool, Using the Report Wizard. SYS(1), SYS (3), SYS (9), SYS (13), SYS(2017), GETFILE( ), UDF'S, Macro Substitution.

Using the Screen Builder Tool
Using RQBE in FoxPro.

PAPER IX
OPERATING SYSTEM

OPERATING SYSTEM

Introduction to various categories of software
Various components of operating system
Device management. Introduction to memory management techniques.
Process Management.

UNIX

-UNIX as a MULTIUSER, MULTITASKING OS
- Time Sharing (a review)
- UNIX Kernel & Shell (Functions)
-The DIRECTORY STRUCTRE (inodes)
- The UNIX File
- Basic Commands such as –
- ls (with options), cp, mv, cat, sort, cd, mkdir, rmdir, rm, banner, dte/time, pwd, chmod, ps, kill, and other basic commands
- The UNIX Editor (vi commands)
- Other Commands (Wall, Who, Write etc.)
- Grep
- Shell Programming
- Redirection
- Pipes & Filters

Details Covered :

OPERATING SYSTEM

1. Introduction to Operating system – Various categories of software, Different functions of Operating System, Types of Operating system (Simple batch system, multiprogrammed batched system, Time sharing System, Real Time System, Network System), Components of Operating System.
2. Process Management – Process Concepts, Process Scheduling, Scheduling Criteria Scheduling and Evaluation, Algorithms (First Come First Served, Shortest Job First, Remaining Time, Priority Scheduling, Round Robin, Multilevel Feedback Queue Scheduling), Deadlocks, its prevention, detection and avoidance.
3. Memory Management – Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with paging.

4. Virtual Memory – Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Allocations of frames
5. Secondary Storage Structures- Disk Structure, Disk scheduling, Disk Management, Swap-space Management.
6. Input/Output Management- I/O Hardware (Polling, Interrupts, Direct Memory Access), Application I/O Interface.

UNIX

Introduction to UNIX

History of UNIX, Features, Structure, Booting process, UNIX File System (etc, bin, dev, usr, lib, tmp) Pathnames (relative & absolute, single dot, double dot), Redirection symbols & pipe, Type of files (ordinary, special – blick special and character special, and directory files) File system components-boot block, super block, ilist, data block, i-number, wild card characters (*,?,[a...z]) Standard files – stderr, stdin, stdout.

Environment variables – HOME, PATH, PATH, MAIL, TERM, IFS, LOGNAME, PSI, PS2

Files opened by UNIX – stdin(0), stdout(1), stderr(2)

UNIX Commands

Is [optins-a,d,F,i,l,R,t,u,x] [files..]
wild card characters *, ?, [a..z]
cat, cd, cd.., cd /, mkdir, rmdir, rm [options –i, r][files..],
cat, tee, date [m, h, a, D, x, d, H, M, S], banner, passwd, pwd, echo,
who [options – H,u], ln
tput [clear, cup, smso, rmso], mkdir, cd, rmdir,
comm, diff, cmp,
chmod, chgrp, chown
Redirection symbols & pipes (<,>,>>,|)
cp [options –i,r][files..], tee, ln, mv,
wc [options-l,w,c] [files..], grep [options-c,i,i,n,v]
cut, paste, head, tail
passd, pg, more, sleep, sort, find
mail, write, mesg, wall, talk
pack, unpack, pcat, split,
lp [-d, -t], cancel <print job nuber>, pr,
ps [options-a,e,u], kill [-9] <pid>.

vi ddition

Modes of vi – command mode 7 edit mode.
vi +n file, vi +/pattern file, vi –R filename
Exiting – ZZ, :wq,:q!,:q,:x
Window movement-^d, ^u, ^f, ^b, z., z-
Text entry –a, i, o, A, O, |
Cursor movement - |, k, j, h, ^, $, [n]b,[n]e,[n]e, (,) {,}, nG,
return, H, M,L
Deletion of text – [n]x, [n] X, [n]r, R, [n]s, d$, d^

undo- u & U, redraw screen - ^|
Pattern searching -/pattern, ?pattern, /^pattern, ?pattern$,
?^pattern, ?pattern$,/.?,n, N
Rearranging text – J,P,p
Operators- d, c, y (dd,dw, d$,d^,cw, c$,cc,yy,yw, y$) [n] dd, [n]yy, ccvi options
- :set, :set all, ai, ic, nu, eb, wm, showmode, lines, columns, tabstops
Last line commands contd...
:w <filename>, :w! <!filename>, :w, :r <filname, :! <command >

PROGRAMMING THE BOURNE SHELL

echo, /c, /t, /n, read <variable>, expr
Executing a shell script test <expression>, [expression]
files :- r,w,x,f,d,e,s
String :- z,n,s 1=s2,s1=s2
numerics :-n1 [opt] n2
opt: -gt,-eg,-ne,-ge,-le,-a, -o, !

Programming constructs:
if.. then..fi, if...then.. elif..else...fi,
case...esac, while...do...doen, until... do... done, for...do... done.
$#, $*, $$, $!, $?, $@

Books Referred:

-UNIX Concepts and Applications by Sumitabha Das
- Operating System by Silberchatz

PAPER X

Practical exam based o paper VI, VIII &IX.
Viva based on the project work.