UNIVERSITY OF RAJASTHAN, JAIPUR

B.E. Electrical Engineering

Four Year Semesters Scheme

Back

- Scheme of Examination
- Third Semester
- Fourth Semester
- Fifth Semester
- Sixth Semester
- Seventh Semester
- Eighth Semester

SCHEME OF EXAMINATION

BRANCH : B.E. ELECTRICAL Engineering YEAR : II

SEMESTER : III

THEORY PAPERS

S. No.	Code No.	Subject	L	T	MM	Ex. Hrs
1.	3 EE 1	Electronics-I	3	1	100	3
2.	3 EE 2	Mathematics-III	3	1	100	3
3.	3 EE 3	Circuit Analysis-I	2	1	100	3
4.	3 EE 4	Electricals Mechanics	3	1	100	3
5.	3 EE 5	Electrical Measurements	3	1	100	3
6.	3 EE 6 3 EE 6.1 3 EE 6.2 3 EE 6.3 3 EE 6.4	Elective - I: (Any of the following) Object oriented Programming Hydraulic Engineering Thermal power Engineering Electircal Engineering Materials	2	1	100	3
Total			17	6	600	

PRACTICALS & SESSIONALS

S. No	Code No.	Subject	P	MM
1.	3 EE 7	Electronics Lab-I	2	75

2.	3 EE 8	Computer Programming Lab-I	2	75
3.	3 EE 9	Measurements Lab	2	75
4.	3 EE 10	Electrical Machines Lab-I	2	75
5.	3 EE 11	Electrical workshop	2	50
6.	3 EEDC	Discipline and Extra curricular Activities	-	50
		Total	10	400
		Grand Total		1000

BRANCH : Electrical Engineering YEAR : II

SEMESTER : IV

THEORY PAPERS

S. No	Code No.	Subject	L	T	MM	Ex. Hrs
1.	4 EE 1	Eletronics-II	3	1	100	3
2.	4 EE 2	Digital Electronics	3	1	100	3
3.	4 EE 3	Generation of Electrical power	3	1	100	3
4.	4 EE 4	Computer programming	2	1	100	3
5.	4 EE 5	Circuit Analysis-II	3	1	100	3
6.	4 EE 6 4 EE 6.1 4 EE 6.2 4 EE 6.3	Elective - II (Any one of the following) Advanced Mathematics-I Principles of communication systems Data structures	2	1	100	3
		TOTAL	16	6	600	

PRACTICALS & SESSIONALS

S. No	Code No.	Subject	P	MM
1.	4 EE 7	Computer programming Lab-II	2	75
2.	4 EE 8	Eletronics Lab-II	2	75
3.	4 EE 9	Power system Design	2	75
4.	4 EE 10	Digital Electronics Lab	2	75
5.	4 EE 11	Humanities & Social Science	2/2	50
6.	4 EEDC	Discipline and Extra curricular Activities	-	50
		TOTAL	9	400
		GRAND TOTAL		1000

TEACHING AND EXAMINATION SCHEME ELECTRICAL ENGINEERING

BRANCH : Electrical Engineering YEAR : III

SEMESTER : V

THEORY PAPERS

S.	Code	Subject	L	T	MM	Ex.

No	No.					Hrs
1.	5 EE 1	Power Electronics-I	2	1	100	3
2.	5 EE 2	Microprocessors & computer Architecture	2	1	100	3
3.	5 EE 3	Optimization Techniques & its Engineering Applications	2	1	100	3
4.	5 EE 4	Electrical Machines-II	3	1	100	3
5.	5 EE 5	Transmission & Distribution	3	1	100	3
6.	5 EE 6 5 EE 6.1 5 EE 6.2 5 EE 6.3 5 EE 6.4 5EE6.5 5EE6.6	Elective - III (Any one of the following) Web Technology Computer oriented numerical methods Introduction to VLSI Advanced mathematics Engineering materials Generalised theory of electrical machine	2	1	100	3
		TOTAL	14	6	600	

PRACTICALS & SESSIONALS

S. No	Code No.	Subject	P	MM
1.	5 EE 7	Practical training seminar-I	2	50
2.	5 EE 8	Microprocessor Lab-I	2	75
3.	5 EE 9	Power Electronics Lab-I	2	75
4.	5 EE 10	Computer Based power system and PCB Design Lab	3	75
5.	5 EE 11	Electrical Machines Lab-II	3	75
6.	5 EEDC	Discpline & Extra Curricular Activities	-	50
		TOTAL	12	400
		GRAND TOTAL		1000

BRANCH : Electrical Engineering YEAR : III

SEMESTER : VI

THEORY

S. No	Code No.	Subject	L	T	MM	Ex. Hrs
1.	6 EE 1	Advanced Microprocessors	3	1	100	3
2.	6 EE 2	Control system Engineering	3	1	100	3
3.	6 EE 3	Power system instrumentation	3	1	100	3
4.	6 EE 4	Power Electronics-II	3	1	100	3
5.	6 EE 5	Electromagnetic Field Theory	2	1	100	3
6.	6 EE 6 6 EE 6.1	Elective - IV (Any one of the following) Microprocessor Based system Design	2	1	100	3

	6 EE 6.2 6EE 6.3 6 EE 6.4 6 EE 6.5 6 EE 6.6	Digital Hardware Design High voltage Engineering Control system components Microwave Engineering				
		TOTAL	16	6	600	

PRACTICALS & SESSIONALS:

S. No	Code No.	Subject	P	MM
1.	6 EE 7	Instrumentation Lab	2	75
2.	6 EE 8	Microprocessor Lab-II	2	75
3.	6 EE 9	Power Electronics Lab-II	3	100
4.	6 EE 10	Electrical Machines Lab-III	3	100
5.	6 EEDC	Discipline & Extra Curricular Activities	-	50
		TOTAL	10	400
		GRAND TOTAL		1000

TEACHING AND EXAMINATION SCHEME ELECTRICAL ENGINEERING

BRANCH : Electrical Engineering YEAR : IV (Final)

SEMESTER : VII

THEORY PAPERS:

S. No	Code No.	Subject	L	T	MM	Ex. Hrs
1.	7 EE 1	Utilization of Electric power including Traction	3	1	100	3
2.	7 EE 2	Power System Analysis	2	1	100	3
3.	7 EE 3	Switch Gear & Protection	3	1	100	3
4.	7 EE 4	Electric Drives and their control	3	1	100	3
5.	7 EE 5	Power system engineering	2	1	100	3
6.	7 EE 6 7 EE 6.1 7 EE 6.2 7 EE 6.3 7 EE 6.4 7 EE 6.5 7 EE 6.6	Elective - V (Any one of the following) Power system Reliability Computer Networks Digital signal processing Advanced power systems Electric Machine Design Pascal & Data Structure	2	1	100	3
		TOTAL	15	6	600	

PRACTICALS & SESSIONALS:

S. No	Code No.	Subject	L	P	MM
1.	7 EE 7	Practical Training seminar-II	-	2	100
2.	7 EE 8	Power system and High Voltage Lab	-	2	75

3.	7 EE 9	Computer based electric machine design Lab	1	2	75
4.	7 EE 10	Minor Project	-	2	50
5.	7 EE 11	Industrial Economics & Management	-	2	50
6.	7 EEDC	Discpline & Extra Curricular Activities	-	-	50
		TOTAL	1	10	400
		GRAND TOTAL			1000

BRANCH : Electrical Engineering YEAR : IVth year (Final)

SEMESTER : VIII

THEORY PAPERS:

S. No	Code No.	Subject	L	T	MM	Ex. Hrs
1.	8 EE 1	EHV AC/DC Transmission	3	1	100	3
2.	8 EE 2	Artificial Intelligence Techniques	3	1	100	3
3.	8 EE 3	Static Protective Relays	3	1	100	3
4.	8 EE 4 8 EE 4.1 8 EE 4.2 8. EE 4.3 8 EE 4.4	Elective - VI (Any one of the following) Network Operating systems E-commerce and Internet Applications Advanced power Electronics Advanced Electrical Machines	3	1	100	3
		TOTAL	12	4	400	

PRACTICALS & SESSIONALS

S. No	Code No.	Subject	P	MM
1.	8 EE 5	Computer Based power Systems Lab	3	100
2.	8 EE 6	Power Electronics and control Lab	3	100
3.	8 EE 7	Information Technology Lab	2	50
4.	7 EE 8	Project	4	200
5.	8 EE 9	Seminar	2	100
6.	8 EEDC	Discpline & Extra Curricular Activities	-	50
		TOTAL	14	600
		GRAND TOTAL		1000

THIRD SEMESTER

3EE1 ELECTRONICS-I

3L+IT M.M.100 Ex.Hr.:3

1. Semiconductors:Intrinsic and extrinsic semiconductors,Mobility and conductivity, types of doping and its effect on properties of semiconductor, Diffusion, Mass-action Law, Graded semicnoductors.
2.
    a. Theory of PN Junction Diodes:The open circuited junction,space charge region. The biased p-n junction, the volt-ampere characteristics and volt-ampere equation and effect of temperature on V-I characteristic The diode as a circuit element,large signal diode models,small signal diode models,junction diode switching times,diode capacitance.
    b. Diode circuits:Half wave and full wave single-phase rectifiers and their analysis. peak inverse voltage, various types of filters their analysis and applications. Voltage multipliers, Clipping and clamping circuit.
    c. Other Types of Diodes:Zener and avalanche breakdown phenomenon in zener diodes, photo-diodes, light emitting diodes,solar cells, varactor diodes.
3. Bipolar Junction Transistors:The ideal current controlled source, The junction transistor, Ebermoll representation of the BJT, The common base (CB) and common emitter (CE) configuration and their input and output characteristics, current gains alpha & beta, common collector, the forward active, reverse active, cut off and saturation, Modes of BJT. BJT biasing and d.c. models, stabilization techniques. BJT as a switch and as an amplifier. The BJT small signal models; h-parameter and hybrid pie mdel, BJT as a diode, Transistor ratings.
4. Field effect Transistors:Ideal voltage controlled current source, junction field effect transistor and its VI characteristics and its construction. The JFET transfer characteristics. MOSFET:Enhancement and depletion type. Brief idea about construction of MOSFETs. MOSV-I characteristic. DC analysis of FETs./MOSFET as a resistance, FET as a switch and as an amplifier, small signal FET models. CMOS devices.
5. Small signal Amplifiers at Low Frequency:analysis of BJT and FET in various modes; input and output resistance, voltage and current gain, Miller theorem and its dual. Cascaded BJT amplifiers, Differential amplifiers and its analysis, composite transistor stages:Darlington pair and others, Boot strapping.

Text/References:

1. J.Millman & C.C.Halkias-Integrated Electronics:analog & Digital ciruits system, TMH
2. Jacob Millman and Arvin Grabel-Microelectronics, McGraw Hill
3. Robert L.Boyle sted & Louis Nashelshky-Devices and Circuit Theory, PHI

3EE2 MATHEMATICS-III

3L+IT M.M.100 Ex.Hr.:3

1. Differential Equations : Ordinary differential equation of second order with variable coefficients. Homogenous form, exact form solution when a part of C.F. is known, change of dependent variable, change of independent variable. variation of parameter. solution in series (without particular integral). Partial differential equation of first order-Lagrange's method and standard forms. Charpit's method. Method of separation of variables. Application to the solution of wave equation in one dimension, Laplace's equation in two dimensions. Diffusion equation in one dimension.
2. Transform Calculus : Laplace transform with its simple properties, applications to the solution of ordinary and partial differential equations having constant coefficients with special reference to wave and diffusion equations. Fourier transform : complex form of fourier transform and its inverse, Applications of fourier transform to solution of partial differential equations having constant coefficients with special reference to heat equation and wave equation.
3. Fourier series : Expansion of simple functions in fourier series,half range series, change of interval, harmonic analysis.

Text/References:

1. M.Ray, J.C.Chaturvedi & H.C.Sharma-Differential Equations.
2. Chandrika prasad-Mathematics for Engineers.
3. Chandrika prasad-Advanced Mathematics for engineers.
4. B.S.Grewal-Higher engineering mathematics
5. Gokhroo et al; Higher Engg.Maths III (3EE2) Unique Books, Ajmer

3EE3 CIRCUIT ANALYSIS -I

3L+IT M.M.:100 Ex.Hr.:3

1. Introduction : Introduction to circuit elements and their characteristics. Current and voltage referenc. Ideal and physical current and voltage sources. Source transformation. Response of single element, double element and triple element circuits. Resonance, selectivity & Q-factor in a.c. circuits.
2. Network Analysis : Network voltages. Kirchoff's Laws. Mesh and node systems of network equations and their comparison. Network Topology-Graph of network, tree, incidence matrix. fundamental circuit functions, cut sets, f-circuit analysis and f-cut set analysis, node and node-pair analysis. Duality method of obtaining dual network.
3. Network Theorems : Star-delta conversion, Thevenin's, Norton's superposition, Reciprocity, compensation, Millman's tellegen's and maximum power transfer theorem. Miller's theorem.
4. Polyphase circuits : (a)General circuit relations:Three phase star, three phase delta, star and delta combination, four wire star connection, balanced three phase voltages and unbalanced impedances. Apparent or complex power. Power and reactive volt-amperes in a 3-wire system. (b)power relations in AC circuits;

Instantaneous power in AC circuits, power factor, apparent power,reactive power, power triangle, complex power.

5. Non-Sinusoldal waves : Complex periodic waves and their analysis by fourier series. Different kinds of symmetry,determination of coeffidient. Average and effective values of a non-sinusoidal wave, power in a circuit of non-sinusoidal waves of current and voltage, form factor equivalent sinusoidal waves of current and voltage form factor, equvalent sinusoidal wave and equivalent power factor. Response of linear network to non-sinusoidal periodic waves.
6. Transients : (a) Response of single and double energy networks to step, ramp, impulse and sinusoidal inputs. Analysis of the above circuits in time domain and frequency domain. Intial and final value theorems. (b)Special signal waveforms with Laplace transform & applications to circuit operations.

Text/References :

1. Hayt & Kemmerly:Engineering circuit Analysis, TMH
2. A. Chakarvorty :Circuit Theory.
3. J Edminster & M.Nahvi:Theory & Problems of electric circuits, Schaum's series.
4. B.R.Gupta & Vandana singhal-Fundamentals of electrical Networks, Wheeler's Pub.
5. K.A.Gangadhar-Circuit theory.
6. Van Valkenburg-Network Analysis.
7. G.K. Mithal-Network Analysis.

3EE4 ELECTRICAL MACHINES-I

3L+IT M.M.:100 Ex.Hr.:3

1. Electromechanical Energy conversion : Basic principles of electromechanical energy conversion. Basic aspects and physical phenomena involved in energy conversion. Energy balance. Basic principles of operation of electric generators and motors.
2. D.C.Machines : Fundamentals of D.C. machine,construction, armature windings:ring and durm windings.simple lap and wave windings.chording, Equalizing connections.Generated voltage.
3. Armature Reaction : distribution of armature and field mmfs. Cross magnetizing and demagnetizing mmfs and their approximate estimation.
4. Commutation : Introduction to commutation, reactance voltage,resistance commutation, and interpoles.
5. DC Generators : Types of D.C. generators. No load and load characteristics of D.C. generators. Parallel operation.
6. DC Motors : Principles of operation, production of torque, back emf, torque-current and torque-speed characteristics of motors, starting of motors. Speed control by variation of armature voltage,field current and ward Leonard method. Electrical braking of D.C.motors. Losses and efficiency, direct and indirect tests,

Swinburne's test, Hopkinson's test,field test and retardation test, separation of losses. Rosenberg Generator.

7. Cross Field machines : Basic principles of operation of metadyne and amplidyne and their applications.
8. Transformers : Constructional features, emf equation. No load and load conditions. No load current wave shapes. Ideal transformer Equivalent circuit. Vector diagrams. O.C. and S.C. tests. Sumpner's back to back test. Efficiency voltage regulation. Effect of frequency parallel operation,autotransformers switching currents in transformers separation of losses.
9. Polyphase Transformers:single unit or bank of single-phase units,polyphase connections. Open delta and V connections. Phase conversion :3 to 6 phase and 3 to 2 phase conversions. Effect of 3-phase winding conncections on harmonics. 3-phase winding transformers, tertiary winding.

Text/References:

1. P.S.Bimbhra-Electrical Machinery
2. M.G.Say-performance and Design of AC Machines
3. B.R.Gupta-Fundamentals of electrical machines, A New Age International publishers
4. Nagrath & Kothari-Electrical Machines, TMH

3EE5 ELECTRICAL MEASUREMENTS

3L+IT M.M.:100 Ex.Hr.:3

1. Measuring instruments:
   a. Principle of operation, construction, torque equation, scale shapes uses and errors in moving coil, moving iron, electrodynamic and induction instruments for the measurement of voltage, current and power. Errors in wattmeter and their compensation. Single phase and polyphase induction type energy meters. Energy meter errors, adjustment and testing.
   b. Principle and working of cathode ray oscilloscope and C.R.O. probes. D'Arsonval, vibration and Ballistic galvanometers. Dynamic equation of motion and its solution for various. Relative Damping, logarithmic decrement and galvanometer sensitivities.
   c. Theory and construction of Meggar, frquency meter and synchronoscopes.
2. Potentiometers : Theory of operation and construction of D.C. and A.C. potentiometers (polar and coordinate type). Their standardization and applications.
3. Measurement of Resistance : Methods of measurement of medium,low and high resistances. Loss of charge method. Measurement of earth resistance and soil resistivity.
4. A.C.Bridges : Generalized treatment of four-arm a.e. bridges. Sources and detectors. Maxwell's inductance and capacitance bridges, Hay's bridge,Anderson

bridge. Heaviside mutual inductance bridge, schering bridge,De sauty bridge and wein's bridge. Sources of errors and their minimization in bridge measurement.Screens and wagner earth device.

5. Polyphase metering : Blondel's theorem for n-phase, p-wire system Measurement of power and reactive KVA in 3-phase balanced and unbalanced systems.
6. Instrument Transformers : Theory and construction of current and potential transformers. Ratio and phase angle errors and their minimization. Effects of variation of power factor, secondary burden and frequency on errors. Testing of CTs and PTs.
7. Magnetic Measurements : Determination of B-H curve and hysteresis loop of ring and bar specimens. Measurement and separation of losses.

Text/References:

1. A.K.Sawhney:Electrical and electronic measurements and measuring instruments,Dhanpat Rai & Sons.
2. E.W.Golding:electrical Measurements.

3EE 6.1 OBJECT ORIENTED PROGRAMMING

2L+IT M.M.:100 Ex.Hr.:3

1. Programming in C : Review of basics of C, structure & pointer type, variables, singly and doubly linked lists,I/O and text file handling command line arguments.
2. OOP Fundamentals : Concept of class and object,attributes,public, private and protected members, derived classes, single & multiple inheritance.
3. Programming IN C++ : Enhancements in C++ over C in data types, operators and functions,Inline functions, constructors and destructors. Friend function,function and operator overloading. Working with class and derived classes. Single, multiple and multilevel inheritances and their combinations, virtual functions, pointers to objects.Input output flags and formatting operations. Working with text files.

Text/References:

1. C.Gottfried :Programming in C, Schaum series
2. E. Balaguruswamy:Programming in C
3. E. Balaguruswamy:Object oriented programming in C++

3EE 6.2 HYDRAULIC ENGINEERING

2L+IT M.M.:100 Ex.Hr:3

1. Hydrostatics : Fluids and their properties. Units and dimensions. Pressure of liquid at a point. Absolute gauges and vacuum pressure. Manometes and pressure gauge. Total pressure and centre of pressure on plane and curved surfaces.
2. Fluid Kinematics : Steady and unsteady, uniform and non-uniform flows. Streamlines and stream tubes. Equation of continuity. Momentum and Bernoups (energy) equation.
3. Flow measurement : Pilot tube and venturimeter, orifices and external cylindrical mouthpieces. Rectangluar and triangular notches and weirs.
4. Flow Through Pipes : Hydraulic gradient and total energy lines.Losses due to sudden expansion and contraction, entry, exit bends obstruction etc. Darcy-Weisbach formula,friction coefficient,pipes in parallel and series, simple branched pipes.
5. Flow through open channels : Steady uniform flow characteristics, Chezy's and Maning's equations.
6. Impact of Free Jet : Pressure of jet on stationary and moving flat plates,Pressure on curved vanes. Velocity triangles. Efficiency of vane.
7. Water Turbines : Classification and characteristics of various turbines. Pelton wheel, Francis,propellor and kaplan turbines. Vector diagrams and efficiencies. Draft tubes. Governing of turbines. Principles of similarity and specific speed. Problems of cavitation. Selection of turbines for a hydropower scheme.
8. Centrifugal Pumps : Classification and descriptive information. selection of pumps and characteristics.

Text/References:

1. Modi and Seth:Hydraulics & Hydraulic Machines.
2. K.R. Arora:Fluid Mechanics, Hydraulics & Hydraulic Machines.
3. A.K. Garde and Miraj Gaoker:Fluid Mechanics.
4. H.M. Ragunath:Functions of fluid Mehanics.

3EE 6.3 THERMAL POWER ENGINEERING

2L+IT M.M.:100 Ex.Hr.:3

1. Basic Concepts : Systems, first law analysis applied to open systems, sfee.
2. High pressure Boilers : Natural and forced circulation boilers; ssupercritical boilers,special features of high pressure boilers water walls. Bensonal Mont,loeffler boilers. Schmidt Hartman boiler, Ramsin boiler, Heat balance sheet.
3. Thermodynamic properties of steam : Use of steam tables and Mollier charts for various thermodynamic processes. Vapour power cycles:Carnot cycle, Rankine cycle, Modified Rankine cycle, Reheat cycle, Multistaging, feed heating, Regenerative feed heating, thermal efficiency.
4. Steam Turbines : Types : Impulse and reaction turbines, compounding of steam turbines. Losses in steam turbines. Radial flow turbines Governing of steam turbines. Radial throttle. Nozzle control and Bypass governing. Constructional

details, blades, rotors, glands, lubrication. Steam for heating and process work, back pressure. Pass-out or extraction turbines. Mixed pressure turbines (no velocity diagram).

5. Steam power Plants : Selection of site, general layout of buildings, plant and its accessories. Supply, storage and handling of coal, stoker and pulverised fired boilers, Ash handling and dust collectors. Cooling and circulation of cooling water. Commissioning and testing of plants. Modern developments in steam power plants. Power station pumps,service water pumps. Fuel oil pumps. Ash handling pumps(elementary idea about their functions).
6. Diesel and Gas Turbine Plants : Air intakes fuel. Exhaust, engine cooling. Lubrication and starting systems for a diesel plant. Working of a gas turbine plant. Gas turbine cycles-open and closed. Rotary compressors.
7. Nuclear Power Plant : Basic concept of generating nuclear energy. Nuclear fuels. Nuclear relationship and constructional details.

Text/References:

1. Domkundwar:Thermal power Engineering
2. Mathur and Mehta:Thermal power engineering

3EE 6.4 ELECTRICAL ENGINEERING MATERIALS

2L+IT M.M.:100 Ex.Hr.:3

1. Conductor Materials : Electrical, thermal and mechanical properties of conductive and resistive materials. Important characteristics and applications of specific conductor materials like copper, aluminium, AAC,ACSR, silver, gold, platinum and tungsten, study of important resistance materials,carbon and nicrome, standard resistance materials. Soldering alloys.
2. Superconducting Materials : Introduction, critical field and critical current density, type I and type II superconductors,intermediate state, penetration depth and thin films. Superconductivity at high frequencies,application of superconductivity. Advancements in superconducting materials.
3. Dielectric materials : Dielectric behaviour of materials under static and dynamic field. Polarisation,induced and permanent dipole moments. Surface resistivity. Breakdown processes. Thermal properties Electrical properties of important dielectric materials including plastics and ceramics, ferroelectric and piezo-electric materials.
4. Magnetic Materials : characteristics of diamagnetic,paramagnetic,ferro-magnetic, ferrimagnetic and anti-ferromagnetic materials. Properties and applications of common nonretentive and retentive magnetic materials including various alloys, ferrites and powder cores. Eddy current and hysteresis losses, Curie point.
5.
    a. Semiconductor materials : Electric properties of semiconducting elements and compounds and their application. Zone refining and crystal growth.

b. Miscellaneous materials : important electronic properties of electron emitting materials, photosensitive materials and luminescent materials.

Text/References:

1. C.S Indulkar & S. Thriuvengadam-An introduction to Electrical Engineering Materials,S.Chand.
2. S.P.Seth & P.V.Gupta-A course in Electrical Engineering Materials,Dhanpat Rai & Sons.
3. B.D.Indu:Electrical Engineering Materials,Jain Brothers.
4. A.J.Dekkar-Electrical Engineering Materials.
5. R.M.Rose et al-Structure and properties of Materials, Wiley Eastern Ltd.

3EE7 ELECTRONICS LAB-I

2P M.M.:75

1. Study the following devices:
   a. Analog & Digital multimeters
   b. Function/singal generators
   c. Regulated d.c. power supplies (constant voltage and constant current operations)
2. Study of digital storage CRO and store a transient on it.
3. Study of analong CRO, measurement of time period, amplitude, frequency & phase using Lessajous figures.
4. Plot V-I characteristic of P-N junction diode & calculate cut-in voltage,reverse saturation current an static and dynamic resistances.
5. Plot V-I characteristic of zener diode and study zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
6. Plot frequency response curve for audio amplifier and to determine gain bandwidth product.
7. Plot drain current-drain voltage and drain current-gate bias characteristics of field effect transistor and measurement of Idss & Vp.
8. Plot gain-frequency characteristic of two stage RC coupled amplifier & calculate its bandwidth and compare it with theoretical value.
9. Plot gain-frequency characteristic of emitter follower & find out its input and output impedance.
   PERFORM THE FOLLOWING EXPERIMENTS ON BREADBOARD:
10. Plot input and output characateristics of BJT in CB, CC and CE configurations. Find their h-parameters.
11. Study half wave rectifier and effects of filters on wave form also calculate ripple factor.
12. Study bridge rectifier and measure the effect of filter network on D.C. voltage output and ripple factor.

3EE8 COMPUTER PROGRAMMING LAB-I

2P M.M.:75

1. Write a program to find the greatest between four numbers.
2. Write a program to prepare mark sheet of students using structures.
3. Write a C program to read several different names and addresses,rearrange the names in alphabetical order and print name in atphabetical order using structures.
4. Write a program to implement concatenation of two strings using pointers.
5. write a program to create a singly link list of ten students names and implement add node, delete node and isemptylist operations.

PROGRAMMING IN C++

1. Write a program to search a pattern in a string.
2. Write a program to print the following output using FOR loop.

   1

   1

   22

   2 2

   333

   3 3 3

   4444

   4 4 4 4

   55555

   5 5 5 5 5

3. Write a program to add,subtract and multiply integer matrics.
4. Write a program to calculate the power function (m^n)using the function overloading technique;implement it for power of integer and double.
5. Implement file creating and operate it in different modes:seek, tell, read,write and close operations.

6. Using multiple inheritance,prepare student's mark sheet. Three classes containing marks for every student in three subjects.The inherited class generate mark sheet.

3EE9 MEASUREMENT LAB

2P M.M.:75

1. Measure the low resistance by Kelvin's double bridge.
2. Calibrate an ammeter using D.C. slide wire potentiometer.
3. Calibrate a voltmeter using crompton potentiometer.
4. Measure the power in 3-phase star connected load by two-wattmeter method at different values of load power factor.
5. Calibrate a wattmeter using D.C. potentiometer.
6. Calibrate a single-phase energy meter by phantom loading at different power factor by (i)phase shifting transformer (ii)Auto transformer.
7. Measure earth resistance using fall of potential method.
8. Plot the characteristics of solar panel.
9. Measure low resistance using cromption's potentiometer.
10. Measure unknown inductance using Anderson's bridge.
11. Measure unknown frequency using wein's bridge.
12. Measure unknown capacitance using DeSauty Bridge.

3EE10 ELECTRICAL MACHINES LAB-I

2P M.M.:75

1. Speed control of D.C. Shunt motor by
    a. Field control method and plot the curve for speed v/s field current.
    b. Armature control method and plot the curve for speed v/s armature voltage.
2. Speed control of a D.C. motor by ward Leonard method and to plot the curve for speed v/s applied armature voltage.
3. To determine the efficiency of D.C. Shunt motor by loss summation (swinburn's)
4. To determine the efficiency of two identical D.C. machine by Hopkinson's regenerative test.
5. To perform O.C. and S.C. test on a 1-phase transformer and find their effeicency & parameters of its equivalent circuit.
6. To perform parallel operation of two 1-phase transformer and their load sharing.
7. To make scott connection and measure the phase difference of secondary voltage by (a)voltmeter method (b)CRO method.

Text/References:

1. D.R. Kohli & S.K. Jain-A Laboratory Course in electrical machines.
2. S.G Tarnekar & P.K. Kharbanda-Laboratory course in electrical engineering

3. V.N. Mittal & A.K. Mittal
4. IIT Delhi-S.S.Murthy

3EE11 ELECTRICAL WORKSHOP

2P M.M.:50

1. Study the construction, working & circuit of the following: Fluores lamp (tube light), Sodium vapour lamp. Murcury vapour Halogen lamp and Neon lamp
2. Make the tube light connection and to measure the following factor of the circuit, Voltage across the tube, Voltage across the power drawn by the circuit from the supply to drawn phasor for the circuit.
3. Importance of wire joints. mechnism of failure of joint, method minimizing joint failures. Importance of lugs in joints and methods of reducing the contact/joint resistance. How to join dissimilar metal joints. Use of multimeter and meggar.
4. Study the different types of wires and wiring accessories
   To make the house wiring for the following : House wiring having 3 fans, 2 tube lights, one - 3 pin socket, and one lamp showing the earthing of each appliance.
5. Make the circuit for staircase wiring.
6. Assemble and disessemble a table fan & ceiling fan. To learn about their nature of winding, No. of poles and starting capacitor. To draw winding diagram & phasor diagram.
7. Study the various types of earthing for electrical applinces/systems. Practice of earthing.
8. Study the construction & working of a I-phase transformer & design a small I-phase transformer of given rating.

FOURTH SEMESTER

4EE1 ELECTRONICS-II

3L+IT M.M.:100 Ex.Hr.:3

1. High Frequency Amplifiers : Hybrid pi model of common emitter transistor, Hybrid pi conductance and capacitances. Variation of hybrid pi parameters. CE short circuit current gain, current gain with resistance load .single stage CE transistor amplifier-response, gain bandwidth product. Emitter follower at high frequencies.
2. Feedback Amplifiers:Classification, Feedback concept,transfer gain with feedback. General characteristics of negative feedback amplifiers. Analysis of voltage series, voltage shunt, current series and current shunt feedback amplifiers .Stability criterion.

3. Oscillators : classification, Criterion for oscillation, RC-phase shift, Hartley-Colpitts,tuned collector,wein bridge and crystal oscillators. Astble, monostable and bistable multibrators. Schmitt trigger.
4. Linear Integrated circuits : Operational amplifier-inverting and non-inverting modes. Characteristics of ideal op-amp. offset voltage and currents. Basic op-amp applications. Differential DC amplifiers,stable ac coupled amplifiers. Integrator and differentiator. Analog computation,comparators, sample and hold circuits, logarithmic and antilog amplifiers. Analog multipliers, precision AC/DC converters-precision limiting,fast half wave and full wave rectifiers. Active average and peak detectors. IC 555 timer and its applications.
5. Power Amplifiers : Class-A large signal amplifiers,second harmonic distortion,higher order harmonic generation, Transformer coupled audio power amplifier,collector efficiency.
6. Push Pull Amplifiers : Class A, Class B and Class AB operations.comparison of performance with single ended amplifiers, Regulted power supplies, series and shunt voltage regulators, Brief idea of Monolithic regulator.

Text/References:

1. J.Millman & C.C.Halkias:Integrated electronics:analog and Digital circuits systems (TMH)
2. Jacob Millman and Arvin Grabel:Micro electronics.(McGraw Hill).
3. Robert L.Boyle sted and Louis Nashleshky:Electronic devices and circuit theory (PHI)

4EE2 DIGITAL ELECTRONICS

3L+IT M.M.:100 Ex.Hr.:3

1. Number systems and codes : Radix and radix conversions, sign, magnitude & Complement notation. Weighted and non-weighted codes, BCD codes, self-complementing codes, cyclic codes, error detecting and correcting codes, ASCII & EBCDIC codes. (alphanumric codes). Fixed point and floating point arithmetic.BCD arithmetic.
2. Boolean Algebra and Digital Logic Gates : Features of Boolean algebra, postulates of boolean algebra, theorems of boolean algebra. Fundamental logic gates, derived logic gates, logic diagrams and boolean expressions. Converting logic diagrams to universal logic. Positive,negative and mixed logic.
3. Minimization Techniques : Miniterm, Maxterm, Karnaugh's maps, simplification of logic functions with K-map, conversions of truth tables in SOP & POS form, incompletely specified functions, variable mapping, Quinn-Mcklusky Technique.
4. Switching circuits and Logic Families : diode, BJT, FET as switch. Different types of logic families:RTL, TTL, open collector TTL, three state output logic, TTL subfamilies, MOS, CMOS,ECL, IIL & realization of logic gates in RTL, DTL, EDL, CMOS & Interracing of logic families.

5. Combination Systems : Combinational logic circuit design, Half and full adder & subtractors. Binary serial and parallel addres, BCD adder. Binary multiplier, comparator, decoders, encoders, multiplexer, demultiplexers, diode switching matrix.
6. Sequential Systems : Latches, Flip-Flops: R-S, D, J-K, T, Master slave. Flip-Flop conversions. Counters:asynchronous & synchronous counters. Counters design, counter applications. Registers:buffer & shift register.

Text/References:

1. Malvino and Leach-Digital principles and Applications.
2. M.Morris Mano-Digital Logic and computer Design.
3. S.Salivahnan, S.Anvazhagar-Digital circuits and design.

4EE3 GENERATION OF ELECTRICAL POWER

3L+IT M.M.:100 Ex.Hr.:3

1. Method of Bulk energy Generation : Introduction to thermal, hydel, nuclear and gas power plants with their layouts. Concept of co-generation. Impact of thermal, hydro and nuclear stations on environment.
2. New Energy sources : Elementary ideas of electric energy generation by wind, solar, tidal and geothermal energy. Open and closed cycle M.H.D. power generation.
3. Load and Load curves : Types of load, chronological load curves, load duration curve, energy load curve, mass curve Maximum demand, demand factor, load factor, capacity factor, utilization factor, diversity factor.
4. Power Plant Economics : Capital cost of plants, annual fixed and operating costs of plants, generation cost and deperciation. Effect of load factor on unit energy cost. Role of load diversity in power system economics. Off peak energy utilization energy cost reduction.
5. Tariffs : Objectives of tariffs. General tariff form. Flat demand rate, straight meter rate, block meter rate, two part tariffs, power factor dependent tariffs. three parts tariff. Spot (time differentiated) pricing.
6. Power Factor Improvement : Causes and effects of low power factor, advantages of power factor improvement,power factor improvement using shunt capacitors and synchronous condensers. Calculation of most economic power factor when (a) KW demand is constant (b) KVA demand is constant.
7. Selection of power plant : Comparative study of thermal, hydel, nuclear and gas power plants. Base load and peak load plants. Size of generating units,types of reserve and size of plant. Selection and location of power plants.

Text/References :

1. B.R. Gupta-Generation of electrical energy
2. Soni, Gupta and Bhatnagar-Generation of electrical power.
3. S.L. Uppal-Electrical power.
4. M.V. Deshande:Elements of electrical power station design.

4EE4 COMPUTER PROGRAMMING

2L+IT M.M.:100 Ex.Hr.:3

1. Unix : Introduction to following basic commands (excluding shell programming):who, touch, cat, cp, rm, mv, is, unmask, pwd, mkdir, rmdir, bc, expr, factor, logname, id, uname, try, date, banner, dtspace, du, ulimit, passwd, cal, wc, sort, cut, grep, dd, head, pg, lp, tail, compress, man, tee.
2. VI Editor : Text entry and command modes,cursor movement commands, string replacement commands and set commands.
3. Java : Variation from C++ to java. Introduction to java bytecode, virtual machine, application and applets of java,integer, floating point, characters, boolean, literals,and array declarations.
4. Operators and control statements : arithmetic operators, bit wise operators,relational operators, boolean logic operators,the assignment operators,? : operators, operator precedence. Switch and loop statements.
5. Package and Interfaces; Packages, access protection, importing and defining packages. Defining and implementing interfaces.
6. I/O Applets : I/O basics, reading console I/O. Input and print stream classes, applet fundamental and string handling.

Text/References :

1. Yashwant Kanithkar:Unix & Shell programming
2. Patric Naughton:Java 2

4EE5 CIRCUIT ANALYSIS-II

3L+IT M.M.:100 Ex.Hr.:3

1. Impedance and Admittance Functions : The concept of complex frequency, transform impedance and admittance, series and parallel combinations.
2. Network Functions : Terminals and terminal pairs,driving point impedance tarnfer functions, poles and zeros. Restrictions on pole and zero location in s-plane. Time domain behaviour from pole and zero plot. Procedure for finding network functions for general two terminal pair networks.
3. Network Synthesis : Hurwitz polynomial, positive real functions, reactive networks. Separation property for reactive networks. The fourreactance fonction forms, specfication for rectance function. Foster form of reactance networks.

Cauer form of reactance networks. Synthesis of R-L and R-C networks in foster and cauer forms.

4. Two P0rt General Networks : Two port parameters (impedance,admittance,hybrid,ABCD parameters) and their inter relations. Equivalence of two ports. Transformer equivalent, inter connection of two port networks. The ladder network image impedance, image transfer function, application to L-C network, attenuation and phase shift in symmctrical T and pi networks.
5. Two port reactive network (Filters):Constant K filters. The mderived filter. Image impedance of m-derived half (or L) sections, composite filters. Band pass and band elimination filters.The problem of termination, lattice filters, Barlett's bisection theorem. Introduction to active filters.
6. Coupled Circuits : Conductively coupled circuits. Mutual impedance, magnetic coupling, mutual inductance, co-efficient of magnetic coupling, circuit directions and sign of mutual inductance, mutual inductance between portions of the same circuit, mutual inductance between parallel branches, transferred impedance. Transformer equivalent inductively and conductively coupled circuits.

Text/References:

1. Hayt & Kemmerly-Circuit Analysis
2. A.Chakarvculy-Circuit Theory.
3. J.Edminster & M.Nahvi-Theory & problems of electric circuits,Scaum's out line.
4. B.R. Gupta & V.Singhal-Fundamentals of Electrical networks,Wheeler's Pub.
5. K.A. Gangadhar-Circuit theory.
6. Van Valkenburg-Network Analysis.
7. G.K.Mithal-Network analysis.

4EE 6.1 ADVANCED MATHEMATICS-I

2L+IT M.M.:100 Ex.Hr.:3

1. Numerical Analysis : Finite differences-forward backward and central difference.Newton's forward and backward differences interpolation formulae. Sterling's formulae,Lagrange's interpolation formula.solution of non-linear equations in one variable by Newton Raphson of simultaneous algebraic equation by Gauss and Regula Falsi method.Solution of simultaneous equation by Gauss elimination and Gauss Seidel methods. Fitting of curves (straight line and parabola of second degree) by method of least squares. Numerical differentiation numerical integration, trapezoidal rule, Simpsons's one-third and one eighth rule.Numerical education of ordinary differential equations of first order,Picard's method. Euler's & modified Euler's methods. Miline's method and Runga kutta fourth order method. Simple linear difference equations with constant coefficients. Z-transforms, its inverse, simple properties and application of difference equations.

2. Probability and Statistics : Elementary theory of probability Bay's theoren with simple applications. Random variables. Theoretical probability distribution, Binomial, passion distribution and normal distribution.

Text/References :

1. Chandrika Prasad-Advanced methematics for engineering.
2. B.S.Grewal-Higher engineering mathematics.
3. Gokhroo and Mehta-Advanced Engg. Maths IV (4EE6.1) Unique Books,Ajmer

4EE 6.2 PRINCIPLES OF COMMUNICATION SYSTEM

2L+IT M.M.:100 Ex.Hr.:3

1. Singal and systems : Classification of singal singularity functions, review of fourier series, Fourier Transform, Convolution, correlation and spectral density system representation and classification. Impulse response and frequency response. Filter characteristic of linear systems. Filters Bandwidth relationship between input and output spectral densities.
2. Amplitude Modulation : Introduction, Amplitude Modulation, Double sided and modulation, single sided and modulation, vestigial sided and modulation, frequency translation and mixing. Frequency division multiplexing, Receivers (superhetrodyne)
3. Angle Modulation : Angle modulation & Instantaneous frequency, phase and frequency modulation, fourier spectra of angle-modulated signals. Narrow band Angle Modulation, Bandwidth of Angle modulated signals. Generation and demodulation of angle modulated signals. FM demodulation using PLL, Stereophonic FM Transmission.
4. Digital Transmission of Analog signals : Pulse code modulation, sampling theorem, sampling, pulse amplitude modulation, Quantizing, Encoding, Bandwidth requirements of PCM, Delta modulation, Signalling formats, Time division multiplexing, Bandwidth requirement of TDM, Pulse sharing and Interference, Digital carrier modulation systems, Differential PCM, Adaptive delta modulation, PWM and PPM.
5. Inroduction to Data Transmission : Amplitude shift keying (ASK),Frequency shift keying (FSK),phase shift keying (PSK), Differential phase shift keying (DPSK), Baseboard signal receiver, optimum filter matched filter. M-aray keying Techniques.

Text/References :

1. Taub and Schilling:Principles of communication system,TMH
2. B.P.Lathi:Modern communication system (Analog & Digital), Oxford university press

3. Simon Hykin:Communication system.
4. R.P. Singh and S.D. Sapre communication system, TMH.

4EE 6.3 DATA STRUCTURES

2L+IT M.M.:100 Ex.Hr.:3

1. PERFORMANCE MEASUREMENT : Space complexity and Time complexity, big oh, omega and theta notations and their significance.
2. LINEAR LISTS : Array and linked representation,singly,double linked lists. Concept of circular and multiply linked lists.
3. ARRAY & MATRICES : Row and column Major mapping & representation, irregular 2D array, Matric operations. Special matrices. diagonal, tridiagonal, triangular, symmetric, sparse matrices representtation and its transpose.
4. STACKS : ADT, representation in array & linked lists, basic operation, Applications of stacks in parenthesis matching, towers of Hanoi etc.
5. QUEUES : ADT, representation in array & linked list, applications circular queues.
6. TREES : Binary Tree, representation in array & linked lists, basic operation on binary trees, binary tree traversal (preorder, postorder, inorder). Single source shortest path algorithm, minimum cost spanning tree.
7. GRAPHS : Representation of unweighted graphs, BFS, DFS, Files.
8. SORTING : Buble sort, insertion sort, merge sort, selection sort. shell, quick sort, and heap sort.

Recommended books:

1. Havowitz & Sawn:Data structures in pascal (BPB Publication)
2. Havowitz & Sawhni:Data structures in C & C++ (BPB Publication)
3. Tannenbaum:Data structures in C (PHI)
4. Trembly & Sovensen:Data structures (Mc Graw Hill International)
5. AnoAV,JE Hoproft,JD Vilman-Data structures*Algorithms (Addision Wesley)

4EE7 COMPUTER PROGRAMMING LAB-II

2P M.M.:75

Use Unix Commands:

1. Exercising Vi advanced commands.
2. Experiments (four experiments)using Unix advanced commands and their combinations.

   Writer programs in Java on:
3. Package creation and importing.
4. Implementing interfaces.

5. String computation.
6. Stream classes.
7. Applets.

4EE8 ELECTRONICS LAB-II

2P M.M.:75

1. Plot gain-frequency characteristics of BJT amplifier with and without negative feedback in the emitter circuit and determine bandwidths,gain bandwidth products and gains at 1kHz with and without negative feedback.
2. Study of series and shunt voltage regulators and measure line and regulation and ripple factor.
3. Plot and study the characteristics of small amplifier using FET.
4. Study of push pull amlifier. To study variation of output power & distortion with load.

PERFORM THE EXPERIMENTS ON BREADBOARD :

5. Study bridge oscillator and observe the effect of variation in R & C on oscillartor frequency.
6. Study transistor phase shift oscillator and observe the effect of variation in R & C on oscillator frequency and compare with theoretical value.
7. Study the following oscillators and observe the effect of variation of C on oscillator frequency:
    a. Hartley
    b. Colpitts
8.
    a. Study op-omp in invertingand non-inverting modes.
    b. Use op-amp as scalar, summer and voltage follower.
9. Use of op-amp as differentiator and integrator.
10. Study op-amp characteristies and get data for input bias current,measure the output-offset voltage and reduce it to zero and calculate show rate.

4EE9 POWER SYSTEM DESIGN

2P M.M.:75

1. GENERATING STATION DESIGN : Design consideration of hydro & thermal generating stations, Basic schemes of hydro, thermal, nuclear & gas power plants. Auxiliary power supply scheme for thermal power plant. Electrical equipment for power stations.
2. DISTRIBUTION SYSTEM DESIGN : Design of feeders & distributors. Types of primary and secondary distribution systems, voltage drops in distributors. Types of primary and secondary distribution system, voltage drop in distributors fed from one end both ends. Kelvin's law. Radial and ring distribution systems. Distribution substations.

3. SUBSTATIONS : Basic network of power system, Types of substations, bus-bar arrangements, Electrical equipment for substations.
4. INSTRIUMENT TRANSFORMERS : Design consideration of CTs & PTs for measurement & protection. Measurement of power using CTs & PTs.

RECOMMENDED BOOKS :

1. M.V. Deshpande-Elements of electrical power station design.
2. B.R. Gupta-Power system Analysis & Design.
3. A.S. Pabla-Electrical Power Distribution.

4EE10 DIGITAL ELECTRONICS LAB

2P M.M.:75

1. Study of following combinational circuits:Multiplexer,Demultimplexer and Encoder. Verify truth tables of various logic functions.
2. Study of various combinational circuits based on:AND/NAND Logic blocks and OR/NOR Logic blocks.
3. To study various waveforms at different points of a transistor bistable multivibrator and its frequency variation with different parameters.
4. To design a frequency divider using IC-555 timer.
5. To study various types of registers and counters.
6. To study schmitt trigger circuit.
7. To study transistor astable multivibrator.
8. Experimental study of characteristics of CMOS integrated circuits.
9. Interfacing of CMOS to TTL and TTL to CMOS.
10. BCD to binary conversion on digital IC trainer.
11. Testing of digital IC by automatic digital IC trainer.
12. To study OP-AMp as current to voltage & voltage to current converter,comparator.

4EE11 HUMANITIES AND SOCIAL SCIENCES

2/2P M.M.:50

1. FORM OF GOVERNMENT : Democracy, Dictatorship.
2. INDIA : Brief history of Indian Constitution, History of Indian National Movement, After independence: socio-economic growth.
3. SOCIETY : Social groups - concept and types, Socialization - concept, types and theory Social control: concept, types and means, Social problem : concept and types.
4. THE FUNDAMENTALS OF ECONOMICS : The Logic of economics, Fundamentals, definitions of economics, basic terminology.

5. MICRO ECONOMICS : Consumer's behaviour, utility, demand, supply, elasticity of demand and supply. Theory of production, production function, factors of production.
6. MACRO ECONOMICS : National income, Business cycles, Aggregate term, inflation economic growth, International Trade, Exchange rates.
7. INDIAN ECONOMY : Basic features, infrastructure, occupation natural and human resources, unemployment, (Industrial Sector, India and Globlisation).

FIFTH SEMESTER

5EE1 POWER ELECTRONICS-I

2L+IT M.M. : 100 Exam. Hrs. : 3

1. SEMICONDUCTOR POWER DEVICES : Characteristics of power Diodes. power Transistor. Diac and UJT
2. SCR : Construction and characteristics, specification and ratings, pulse transformer, optical isolators, methods of turn on: R, RC, UJT relaxation oscillator, blocking oscillator and flipflop firing. Rating extension by series and parallel connections, string efficiency. Protection of SCR protection against over voltage, over current,dv/dt, di/dt,switching surges, over heating. Gate protection.
3. CONVERTERS : Half wave converters for single, two, three, six phase. Single phase and three phase full wave converrtor with R,RL and RLE loads. Performance factors for line commutated coverters. Firing circuits for line commutated converters. Inversion operation. Semi converters, dual converter. Effect of source impedance. Microprocessor based firing scheme for three phase fully controlled bridge converter.
4. CHOPPERS : Principle of chopper operation. control strategies. stepup/Down chopper. choppercongifuration. chopper commutation. AC Chopper. Source filter.Multiphase chopper. chopper firing circuit.

RECOMMENDED BOOKS :

1. M.H Rashid:Power Electronics, circuits devices and applications, PHI,1988.
2. V Subrahmanyam:Power electronics, New Age Inc.Publishers,New Delhi,1996
3. P.C. Sen:Power electronics Tata McGraw-Hill 1987
4. CW Lander:Power electronics,2nd edition, McGrawHill 1987
5. P.S Bimbhra:Power electronics, 2nd Ed. Khanna Publishers,1987
6. M.D.Singh and K.B. Khanchandani:Power electronics, TMH,1998.

5EE2 MICROPROCESSORS AND COMPUTER ARCHITECHTURE

2L+IT M.M.:100 Exam.Hrs.:3

1. THE 8085 MICROPROCESSOR : Block diagram, pins and their description, demultiplexing of buses, control signals and flags. Introduction to 8085 based microcomputer system.
2. INSTRUCTIONS AND TIMINGS : Instruction classification, Instruction format, addressing modes, instruction timings and status. Interupts.
3. PROGRAMMING THE 8085 : 8085 instruction set, Data transfer instruction Arithmetic, logic and branch operation. Rotate and compare Instructions related to the stack operations.
4. PROGRAMMING TECHNIQUES : Looping, Counting and indexing counters and time delays subroutines.
5. INTERFACING CONCEPTS : Basic interfacing concepts, memory mapped and peripheral mapped I/O. Interrupt controlled I/O
6. INTERFACING PERIPHERALS : Description,programming and interfacing of 8255,8253 and 8259 A with 8085. Design of simple systems using above chips.
7. BASIC COMPUTER ARCHITECTURE : Central processing unit, memory, I/O Basic memory elements. Magnetic core memory,binary cell, ROM and its realization of RAM using binary cell, ROM and its realization.
8. REGISTER ORGANIZATION : Register transfer and micro operations, register transfer language,arithmetic,logic & shift micro operations.
9. BASIC COMPUTER ORGANIZATION AND DESIGN : central processing unit, arithmetic and logic unit, CPU bus architecture, stack organization.
10. MEMORY AND STORAGE : Processor vs memory speed, memory hierarchy, cache memory. associative memory, virtual memory mapping.

RECOMMENDED BOOKS :

1. Gaonkar:Microprocessors.
2. Douglas Hall:Digital Electronics & Microprocessors
3. B.Ram.Microprocessors.
4. Morris Mono:digital electronics.

5EE3 OPTIMIZATION TECHNIQUES AND ITS ENGINEERING APPLICATIONS

2L+IT M.M.:100 Ex.Hrs.:3

1. INTRODUCTION : Introduction, Engineering application of optimization,statement of an optimization,problem, classification of optimization problems.
2. CLASSIFICATION OPTIMIZATION TECHNIQUES : Single variable and multivariable optimization with and without constraints.
3. LINEAR PROGRAMMING : Single and multivariable optimazation. Graphical interpretation pivotat reduction of general systems of equations. Simplex method.
4. NON_LINEAR PROGRAMMING : Unimodel function quadratic inerpolation method Unconstrained Optimization techniques:Direct search method, random

search method,univariate method and pattern search method. Basic idea of Hooks & Heaves, Simplex powell and Newton methods. Constrained Optimization:Characteristics of constrained problem. The complex method,method of feasible directions, transformation techniques. Interior penalty function and exterior penalty function method.

RECOMMENDED BOOKS :

1. H.A Taha:Operation Research an Introduction, Macmillan Co.
2. S.S Rao:Optimization theory and application,wiley eastern limited
3. L R Foulds:Optimization Techniques an Introduction.
4. A L Fox:Optimization methods for engineering Design,Addison wesley,1972.
5. A O Converse:Optimization, Holt Rinchort Inc, 1970

5EE4 ELECTRICAL MACHINES-II

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : General equation of inducted emf. Effect of distribution,chording and skewing on induced emf. Armature emf. Armature and field mmfs-Effect of power factor and magnitudes of current on armature mmf.Harmonics caused by winding,distribution and saturation. Rotating fields.
2. INDUCTION MOTORS : Construction, basic principles, flux and mmf waves, induction motor as a transformer. Equivalent circuits. Circle diagram. Calculation of performance. Torque-slip curves. Effect of rotor resistance.Cogging crawling. Starting, speed control and braking of induction motors.Losses and efficiency. Testing Induction Generator. Induction regulator. Single-phase induction motor. Revolving field theory. Starting methods.
3. SYNCHRONOUS MACHINES:Construction.Basic principles. Flux and EMF waves. Theory of cylindrical rotor and salient pole machines. Two-reactance theory. O.C. and S.C. and zero power factor characteristics. Potier triangle and ASA method of finding regulation. V-curves, O corves and power angle characteristics. Parallel operation. Sychronizing. Hunting and its prevention. Starting of synchronous motors. Single phase synchronous motor. Single-phase series and repulsion motor.

RECOMMENDED BOOKS :

1. Dr. P.S. Bimbhra-Electrical Machinery
2. H Cotton-Advance Electrical Technologies
3. M.G.Say-Performance and Design of AC machines
4. I J Nagrath and D P Kothari:electircal machines.

5EE5 TRANSMISSION & DISTRIBUTION

3L+IT M.M.:100 Exam.Hrs.:3

1. SUPPLY SYSTEMS : Basic network of power systems, Effect of system voltage on size of conductor and losses, comparison of de 2-wire, de-3 wire, 1-phase ac and 3-phase (3 wire and 4 wire) ac systems, transmission voltages.
2. DISTRIBUTION AUTOMATION : Types of primary & secondary distribution system,voltage drop, Kelvin's law, Lamp flicker, Distribution automation, project planning, communication, sensors,supervisory control and data acquisition consumer information service, introduction to automation systems.
3. INSULATORS : Pin shackle, suspension,post and strain insulators, bushing, voltage distribution over an insulator string, grading and methods of improving string efficiency, pollution flashower.
4. MECHANICAL FEATURES OF OVERHEAD LINES : Different types of conductor materials with special reference to their mechanical properties. Line support, cross-arms and stays,spacing and arrangement of conductors. Conductors' vibration and its prevention sag tension calculation for various conditions. Sag templates. conductor erection and stringing.
5. PARAMETERS OF TRANSMISSION LINES : Resistance inductance and capacitance of overhead lines. Effect of earth. Line transposition. geometric mean radius and distance. Inductance and capacitance of line with symmetrical an unsymmetrical spacing. Inductance and capacitance of double circuit lines. Skin and proximity effects.
6. PERFORMANCE OF TRANSMISSION LINES : Steady state analysis short, medium and long lines. Generalized ABCD line constant. Receiving end & sending end power circle diagrams. Ferranti effect. Interference with communication circuits.
7. CORONA : Electric stress between parallel conductors. Disruptive critical voltage and visul critical voltage. Calculation for 3-phase overhead line corona power loss. Factors affecting corona. Effect of corona.
8. UNDERGROUND CABLES : Conductor, insulating, sheathing and armouring maaterials. Types of cables. Insulation resistance and capacitance calculation. Reduction of maximum stresses. Causes of breakdown, idea about oil filled and gas filled cables, Thermal rating of cable.
9. TRAVELLING WAVES : Travelling waves on transmission lines. Wave equation, specification of travelling waves. Reflection and refraction of travelling waves. Typical cases of line terminations.

RECOMMENDED BOOKS :

1. A.S. Pabla:Electric power distribution.
2. B.R. gupta:Power system analysis and design
3. Soni, Gupta and Bhatnagar:A course in electrical power.
4. C.L. Wadhwa:Electrical power systems
5. Nagrath kothan:Modern power system analysis

6. J.J. Grainger & W.D. Stevenson:Power system analysis

5EE 6.1 WEB TECHNOLOGY

2L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : What is Internet? Introducing web browsers with specific reference to netscapce and internet explorer, http, ftp, file type URLs, Image,audio or video formats like jpeg,gif,png,avi, mpeg,mp3.Markup concept and its use in markup languages.
2. BASIC HTML 4.0 ELEMENTS : Basic structure of an HTML document, doctype,Meta data, Link, displaying images, various fonts, colors, sizes and alignments of texts. Lists and Tags.
3. STYLE SHEET, TABLES : CSSI standard, including style sheets. Applying styles to specific groups of elements, creating overall look for the web page. Basic Table elements, combining the tables and CSSI style sheet.
4. CREATING FORMS;FRAMES & FRAMESETS : What are forms? Buttons, Text field,selection list, Radio button and check boxes on a web page submitting and resetting forms with submit and reset button. Creating and working with frames,accessing external reference from frames, Inline frames with Iframes.
5. EVENT DRIVEN PROGRAMMING IN JAVA APPLET : Applet Architecture and its start,stop,in it,paint,update and repaint methods, drawing string,lines,polygons Ellipses and circles using abstract windows tool kit package and its classes. Working with colors and fonts. Runnint Applets from HTML with/without PARAM Tag. Using button, check box group, choice, List point, Text field, Text area classes, Border Layout, card layout and Grid layout. Layout managers.

RECOMMENDED BOOKS :

1. Dynamic web publishing 2nd Edition by shelly powers, Techmedia pub. Java 2-The complete reference 4th Edition by Herbert Schildt, Tata McGraw Hill.

5EE 6.2 COMPUTER ORIENTED NUMERICAL METHODS

2L+IT M.M.:100 Exam.Hrs.:3

1. MATRIX COMPUTATION : Algebra of matrix,inverse of a matrix, rank of matrix,matrix inversion by Gauss elimination,computer programs for matrix inversion.
2. SOLUTION OF-LINEAR EQUATIONS : Cramer's rule, Gauss elimination, Gauss Jordan elimination and Gauss Seidal iterative method and their computer programming in C.
3. SOLUTION OF NON-LINEAR EQUATIONS : Interval bisection method, secant method, Regula-Falsi method, curve fitting,method of least squares and their computer programming in C.

4. SOLUTION OF DIFFERENTIAL EQUATIONS : EULER'S method modified Euler's method,Runge Kutta method of fourth order,solution of partial differential equation with special referene to heat equation, Laplace equation and wave equation Milne's and their computer programming in C.

RECOMMENDED BOOKS :

1. B.S. Grewal-Higher engineering Mathematics.
2. J.L. Bansal-Numerical Analysis
3. V Rajaraman-Numerical methods
4. Balasubramanyam-Numerical Methods

5EE 6.3 INTRODUCTION TO VLSI

2L+IT M.M.:100 Exam.Hrs.:3

1. IC FABRICATION AND THEIR CHARACTERSTICS : Basic monolathic integrated circuits. General IC processing steps:Epitaxial growth, diffusion, photo litho, graphic process,and metallization. Concepts of SSI, LSI, VLSI. Characteristies of linear ICs. Biasing considerations in linear ICs, power requirements and power supplies for linear ICs. Standard bipolar NMOS & CMOS process sequences techniques for process evaluation analysis. In-process measurements.
2. GENERAL PURPOSE IC : (i)Four-quadrant multiplier and its simple applications, CMOS multiplier; voltage regulator IC with feedback. Positive and negative voltage IC regulators. (ii)Linear PLL : Basic theory of first, second and higher order loops, Lock in and lock out process, tracking performance,noise in linear PLL. systems. Important application of linear PLL, measurement of PLL parameters. Digital PLL with intermediate analog signals, all digital and software based PLL.
3. VLSI DESIGN : Relationship between design of IC technology and device models. Symbolic representations. Array and other design approaches. Topic in design-yield and redundancy. Power dissipation & CMOS design, test ability and fault tolerance.

RECOMMENDED BOOKS :

1. S.M. Zee VLSI Technology
2. Stephen A Compbell : The science & Engineering of microelectronic fabrication.
3. James D Plummer; Micheal Deal, and petter B Griffin: Silicon VLSI Technology Fundamental, Practice & Modeling.

5EE 6.4 ADVANCED MATHEMATICS-II

2L+IT M.M.:100 Exam.Hrs.:3

1. COMPLEX VARIABLES : Analysis functions, cauchy-riemann equations. Elementary conformal mapping with simple applications. Line-integral in complex domain, cauchy's theorem. Cauchy's integral formula,Tayler's series Laurent's series, Poles residues, evaluation of simple definite real integrals using theorem of residues simple contour integratin.
2. SPECIAL FUNCTIONS : Bessel's functions of first and second kind. simple recurrence relations, orghogonal property of Bessel functions transformation, Generating function. Legendre's function of first kind, simple recurrence relations, Rodrigues formula, orthogonaoal property of Pn (x), Generating function.
3. CALCULUS OF VARIATIONS : Functional strong and weak variation, simple variation problems of Euler's equation.

RECOMMENDED BOOKS :

1. B.S. Grewal-Higher Engineering Mathematics.
2. Ervin Kreyzig-Advanced engineering maths.
3. Chardrika prasad-Advanced Maths for Engineering.
4. Gaur & Kaul-Higher Engineering Mathematics.

5EE 6.5 NON-CONVENTIONAL ENERGY SORUCES

2L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : Energy crisis demand and generation gap; energy management systems, alternative resources of energy and their utilization.
2. SOLAR ENERGY : Principles, scope and applications, solar radiation. its measurement and prediction, flat plate collectors-design and theory. solar water heating, solar-dryers, solar stills; solar cooling and refrigeration. solar cells,thermal storage,street lighting solar power generation

MISS PRINTING

3. WIND ENERGY:Wind energy potential measurement suitable sites, aerofoil design, and windmill and wind electrical generator.
4. GEOTHERMAL ENERGY:Hot spring and steam ejection. site selection, power plant, advanced concepts

MISS PRINTING

RECOMMENDED BOOKS

MISS PRINTING

3. Dr. A.N. Mathur-Non-Conventional Resources of energy.
4. B.R. Gupta Generation of electrical energy.

5EE 6.6 GENERALISED THEORY OF ELECTRICAL MACHINES.

2L+IT M.M.:100 Exam.Hrs.:3

1. ELEMENTS OF GENERALISED THEORY : Essentials of rotating electrical machines. Basic two pole machines, Kron's primitive machine.
2. LINEAR TRANSFORMATIONS IN MACHINES : Invariance power, Transformation from three phase two phases, tansformation from rotating axes to stationary axes, Physical concept of park's transformations, Transformed impedance matrix.
3. APPLICATION OF GENERALISED THEORY TO : DC Machines : DC Generators motors and their transfer functions. poly phase synchronous Machines : Basic parameters, machine equation. poly phase induction machines: Representation of induction machine performance equations.

RECOMMENDED BOOKS :

1. P S Bimphra Generalised theory of electrical machines,khanna Pub.
2. AE Fitzerald, charles kingsley,Jr.and SD Umans, Electrical machinery 4th ED., MGH Pub.
3. C V Jones Unified Theory of Electrical Machines,Butterworths,London 1967.
4. O C White and H H Woodson, Electromechanical Energy Conversion,John Wiley and sons, New York,1659.
5. A.E. Fitzgerald,Jr, C Kinglsey, Electrical machines,McGraw Hill Pub.

5EE8 MICROPROCESOR LAB-I

2P M.M.:75

1. Study the hardware, function, memory structure and operation of DYNA-8085 microprocessor dit.
2. Program to perform integer division (i) 8-bit (ii)16-bit by 8-bit.
3. Transfer of a block of data in memory to another place in memory.
4. Transfer of block to another location in reverse order.
5. Searching a number in an array.
6. Sorting of array in: (i)Ascending (ii)Descending order
7. Finding parity of a 32 bit no.
8. Programme to perform following conversion:(i)BCD to ASCII (ii) BCD to Hexadecimal.
9. Programme to multiply two 8-bit numbers.
10. Programme to generate and sum 15 fabonicci numbers.
11. Programme for rolling display of message "INDIAN"

12. To insert a number at correct place in a sorted array.
13. Reversing bits of an 8-bit no.
14. Fabrication of 8-bit LED interfaces for 8085 kit though 8155 and 8255
15. Data transfer on output port 8155 & 8255 & designing of discolignt, running light, and sequential lights on off by above hardware.
16. Parallel data transfer between two DYNA-85 kits using 8253 ports.
17. Generation of different waveform on 8253/8254 programmable timer.

5EE9 POWER ELECTRONICS LAB-I

2P M.M.:75

1. Study the characteristics of SCR: Observe the terminal configuration, Measure the breakdown voltage,Measure latching and holding current and V-I characteristics.
2. Study the different triggering circuits for SCR:R-triggering circuit,R-C triggering circuit and UJT triggering circuit.
3. Study the firing circuit for single-phase converters using ramp comparator scheme.
4. Study the firing circuit for single-phase converters using cosine wave comparator scheme.
5. Study the firing circuit for single-phase converters using op-amps and gates.
6. Study and obtain the characterstics of Diac.
7. Study and obtain the waveforms for single-phase half wave controlled converter.
8. study and obtain the wave forms for single-phase fully controled bridge converter.
9. Study and show the effect of freewheling diode in single-phase fully controlled bridge converter.
10. Study and obtain the waveforms for voltage-commutated chopper.
11. Study and obtain the waveforms for current-commutated chopper.

RECOMMENDED BOOKS :

1. O.P Arora power Electronics Labroratory-Experiments and Organization,wheeler publishing house,1993.
2. P B Zbar:Industrial Electronics-A Text-Lab Manual, 2nd Ed., Dhanpat Rai and company,New Delhi,1998.

5EE10 COMPUTER BASED POWER SYSTEM AND PCB DESIGN LAB

3P M.M.:75

1. Methods of short term, medium term and long term load forecasting
2. Planning and designing of distribution system.
3. Planning and designing of transmission system
4. Sending end and receiving end power circle diagrams.
5. Real and reactive power control of generator using power circle diagram.

6. Use of electronics work bench for power system analysis.
7. Application of fuzzy logic for power system analysis
8. Study the design rules for PCBs in power electronics applications
9. Design a PCB for firing circuit of single-phase bridge converter using available computer software.
10. Based on designed PCB prepare the PCB.

5EE11 ELECTRICAL MACHINE LAB-II

3P M.M.:75

1. To perform OC & SC test on a 3 phase transformer & find its efficiency and parameters for its equivalent circuit.
2. To perform parallel operation of two 3-phase transformer and determine their load sharing.
3. To study the performance of 3-phase transformer for its various connections, i.e. star/star delta delta/star and delta/delta and find the magnitude of 3rd harmonic current.
4. To make scott connection and measure the phase difference of secondary voltage by (i)voltmeter method (ii) CRO method.
5. Separation of transformer core losses and to determine the hysteresis and eddy current loss at rated voltage and frequency.
6. To plot the O. C. C & S.C.C of an alternator and to determine its regulation by syncoronous impedance method.
7. To synchronise an alternator across the infinite bus RSEB & summerise the effects of variation of excitation on load sharing.
8. To plot the V-curve for a synchronous motor for different values of loads.

RECOMMENDED BOOKS :

1. Kohli Jain-Experiments in electrical engineering.
2. Tarnekar/Kharbanda-A laboratory course in electrical engineering.

SIXTH SEMESTER

6EE1 ADVANCED MICROPROCESSORS

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION TO 8086/8088 : Internal architecture of 8086/8088, The Bus interface unit, the execution unit. Pin diagram, Addressing modes concepts of virtual memory.
2. ASSEMBLY LANGUAGE PROGRAMMEING OF 8086 : Construction of the machine codes for 8086 instructions,Data transfer Instructions, Airthmetic Instructions. Writing simple assembly Language programmes. Bit manipulation and starting instructions. Implementation of WHILEDO, REPEAT-UNTIL and IF-THEN structures.
3. MICROPROCESSOR SYSTEM PERIPHERALS : Description, programming and interfacing of 8279 display and key board controller, 8275 programmable CRT controller, DMA controller 8257.
4. SERIAL COMMUNICATION : Basic idea of serial communication. Description,programming and interfacing of 8251 USART. Serial port RS-232C
5. ADVANCED MICROPROCESSORS : Basic idea and architecture of 80186, 80286 and 80386, 68010, 68020, Z-8000 microprocessors.
6. INTRODUCTION TO PCS : Memory map of IBM compatible PC/PC-XT-PC-AT. Layout of motherboard. Technical details of parallel and serial ports.

RECOMMENDED BOOKS :

1. John Freer-System design with advance microprocessors, A.H. Wheeler
2. Avtar singh & Walther A Treebel-16-bit and 32-bit Microprocessors, Architecture, software and Interfacing Techniques, prentice Hall career & Technology.
3. Gibson-16-Bit Microprocessor.
4. Brey-16 Bit Microprocessor.

6EE2 CONTROL SYSTEM ENGINEERING

3L+IT M.M.:100 Exam.Hrs.:3

1. CONCEPTS OF OPEN AND CLOSED LOOP SYSTEMS : Example and application of open loop and close loop system. Brief idea of multivariable control system.
2. REPRESENTATION OF PHYSICAL SYSTEMS (ELECTRO-MECHANICAL) : Different equations determination of transfer function by block diagram reduction technique and signal flow graph method.
3. FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS : Feedback and non-feedback systems, Reductions of parameter variations by use of feedback, control over system dynamics by use of feedback, control of effects of disturbance signals by use of feedback, Linearizing effect of feedback, Regenerative feedback.
4. TIME RESPONSE ANALYSIS OF FIRST ORDER & SECOND ORDER SYSTEMS : Transientresponse analysis. Steady state error & error constants. Dynamic error and dynamic error coeffieient, performance Indices.

5. STABILITY OF THE SYSTEM : Absolute stability and relative stability. Routh's stability criterion, Hurwitz criterion. Root locus methods of analysis. Polar plots, Nyquist stability criterion. M and N loci, Nicholas charts.
6. FREQUENCY DOMAIN METHODS : Bode plot design specification in frequency domain and their co-relation with time domain.
7. DIGITAL CONTROL SYSTEMS : Instroduction, spectrum analysis of sampling process, signal reconstruction, Difference equations, The z-Transform, Z-Transfer function (Pulse transferfunction), Inverse z-Transform and response of liner discreate systems, z-Transform analysis of sampled-data control system, The z- and s-relationship, stability analysis, compensation techniques.
8. STATE VARIABLE ANALYSIS : Concepts of state, state variable and state model, state models for linear continuous time systems, state variables and linear discrete time systems. Brief idea of state variable analysis in discrete time domain. Transfer functions. Solution of state equation. Concepts of controllability & observability, pole-placement using state variable feedback.
9. ELEMENTARY IDEAS OF COMPENSATING NETWORKS : Lag lead and lag lead networks, Brief idea of proportional, derivative & integral controllers.
10. ADVANCES IN CONTROL SYSTEMS : Adaptive control, Fuzzy logic control, Neural networks.

RECOMMENDED BOOKS.

1. I J Nagrath and M Gopal : Control systems Engineering, 3rd Ed, New Age Publication.
2. K Atsuhiko Ogata:Modern control engineering. PHI

6EE3 POWER SYSTEM INSTRUMENTATION

3L+IT M.M.:100 Exam.Hrs.:3

1. THEORY OF ERRORS : Accuracy and precision, systematic and random errors, limits of error, probable error and standard deviation Gaussian error curves, combination of errors.
2. TRANSDUCERS : Constructional features. operating charactics and selection of active and digital transducers. Block diagram representation for the instrumentation of strain of strain, displacement, velocity, acceleration, force, torce, flow, pressure and temperature.
3. SIGAL CONDITIONING : AC and Dc bridges, analysis of unbalanced amplifiers, analog multipliers, analog dividers, function generators, timers, analog multiplexer, sample and hold optical and magnetic isolators, A/D and D/A converters frequency to voltage converters, temerrature to current converters. Phase sensitive detectors. Shyielding and grounding.
4. SINGAL RECOVERY : Singal filtering averaging correlation and coding.
5. SINGAL TRANMISSION AND TELENMETRY : Modulation and encoding method Transmission media. Time division and frequency division, multiplexing.

6. COMPUTER BASED INSTRUMENTATION : Data logging, data acquisition and data processing. Introducing to intelligent instrumentation system.

RECOMMENDED BOOKS :

1. R.HC erni and L.E. Foster: Instrumentation for Engineering Measurements, John Wiley and Sons.
2. H.N. Norton : Handbook of Transducers for Electrical Measuring System, Prentice Hall.
3. Curtis and D.Hohnson : Process Control Instrumentation Technology, John Wiley and sons, Inc.
4. A Aarrilliaga and D.A. Bradley and PS Bodger, Power System Harmonics john Wiley and Sons.
5. R. Morrison : Instrumentation Fundamental and Applications, John Wiley and sons, 1984.
6. R. Morrison : Grounding and shielding Techniques in Instrumentation, 3rd., Ed. John Wiley.

6EE4 POWER ELECTRONICS-II

3L+IT M.M. : 100 Exam. Hrs. : 3

1. CONVERTERS : Performance measures of single and three-phase converters, discontinuous conduction in two quadrant converters, power factor improvements:Extinction angle control, symmetrical angle control, pulse width modulation control, and sinusoidal pulse width modulation control.
2. SWITCHING MODE REGULATORS : Buck, boost, buck-boost and Cuk regulators.
3. AC VOLTAGE CONTROLLERS : Single-phase AC controllers with R and RL load, sequence control of AC controllers, three phase AC controllers.
4. INVERTERS : Inverter classification, series and parallel inverters, self commutated inverters, single and three phase bridge inverters, voltage and current source inverter, pulse width modulated inverter. Voltage control of inverters.
5. CYCLOCONVERRTERS : Basic principle of operation,single phase to single phase, three phase to three phase and three phase to single phase cycloconverters. Output equation, control unit.

RECOMMENDED BOOKS :

1. M H Rashid:Power Electronics, circuits Devices and Application, Prentice-Hall, 1988.
2. V Subrahmanyam:Power Electronics, New Age Inc.Publishers,New Delhi,1996.
3. P C Sen:Power electronics, Tata McGraw-Hill, india.
4. C W lander:Power electronics, 2nd Ed, McGraw Hill 1987.
5. P S Bimbhra:Power electronics,2nd Ed. Khanna Publishers, New Delhi, 1998.

6. M D Singh and K B Khanchandani:Power electronics, Tata McGraw Hill Publishing Company, New Delhi, 1998.

6EE5 ELECTROMAGNETIC FIELD THEORY

2L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : Vector-Relation in rectangular, cylindrical, spherical and general curvilinear coordinate system. Concept and physical interpretation of gradient, Divergence and curl, Green's Stoke's and Helmholz theorems.
2. ELECTROSTATICS : Electric field vectors-electric field intensity, flux density & polarization electric field due to various charge configurations. The potential functions and displacement vector. Gauss's law. Poisson's and Laplace's equation and their solution. Uniqueness theorem. Continuity equation. Capacitance and electrostatics energy, field determination by method of images. boundary conditions. Field mappings and concept of field cells.
3. MAGNETOSTATICS : Magnetic field vector:Magnetic field intensity,flux density & magnetization, Bio-Savart's law,Ampere's law, Magnetic scaler and vector potential, self & mutual inductance, Energy stored in magnetic field, Boundary conditions, Analogy between electric and magnetic field mapping and concept of field cells.
4. TIME VARYING FIELDS : Faraday's law. Displacement currents and equation of continuity. Maxwell's equations,Uniform plane wave in free space, dielectrics and conductors, skin effect sinusoidal time variations, reflections, refraction & polarization of UPW, standing wave ratio pointing vector and power considerations.
5. RADIATION & TRANSMISSION : Retarded potentials and concepts of radiation, Radiation from small current element. Transmission line parameters, Calculation of resistance, capacitance & inductances.
6. EMI & EMC : Introduction to Electromagnetic Interference and Electromagnetic compatibility, EMI coupling modes, Methods of eliminating interference, shielding, grounding, conducted EMI, EMI testing:emission testing, susceptibility testing.

RECOMMENDED BOOKS :

1. David K Cheng-Field and Vave Electromagnetic 2nd Ed. Wesley Publishing company.
2. Griffith-Introduction to Electrodynamics. 2nd Ed., Prentice Hall of India.
3. J D Kraus, Electromagnetic. 5th, Mc Graw Hill Book company.
4. P Lorrain, D R Corson-Electromagnetic field and waves. Willey Eastern Ltd.
5. V.V. Sarwate-Electromagnetic field and waves,willey estern Ltd.
6. T.he Feynman Lectures on physics, Vol-II Narosa Publishing House.
7. J.K. Kraus-Applied Electromagnetic, 5th Ed.

6EE 6.1 MICROPROCESSOR BASED SYSTEM DESIGN.

2L+IT M.M.:100 Exam.Hrs.:3

1. MICRO CONTROLLERS : Introduction and Architecture of Micro controllers-Intel 8044, 8051, 8096, 8048.
2. INPUT-OUTPUT PROCESSORS AND CO-PROCESSORS : Introduction and Architecture of Input-output processor-UPI-452, UPI-41, 42 Co-processors-8087 and 80287.
3. MICROPROCESSOR BASED CONTROL SYSTEM DESIGN : Digital quantization,positional control system, Temp-control system, Stepper motor drive control of a manipuitor alarm, Annunciation system based on microprocessor.
4. APPLICATION TO POWER SYSTEMS:Design and development of various systems for monitoring and control of frequency,phase difference and power factor of High voltage & EHV systems. Hardware and software development for measurement of resistance, reactance, KVA, KW, KWH, KVAR, Maximum demand etc. Microprocessor and Micro controller based energy meter Auto reclosing system for EHV systems.

RECOMMENDED BOOKS :

1. Gaonkar-Microprocessors & Archiecture.
2. Intel data sheets and applications nots.
3. Microprocessor peripheral Devices part I & II intel.

6EE 6.2 DIGITAL HARDWARE DESIGN

2L+IT M.M.:100 Exam.Hrs.:3

1. SEMICONDUCTOR MEMORIES : Memory diarchy, different mapping schemes, memory design & memory expansion. Memory organisation, cache, associative memory visual memory, memory management. Status registers, design of shifter, ripple counters synchronous counters, timing sequences. Example of RAM.
2. PROGRAMMABLELOGIC ARRAYS : Design of PLA, Implementation of logic circuits by PLA,micro programmed & PLA based control logic design.
3. CPU Design : (i) Execution unit: Registers, ALU Design ALU Organisation,concept of bit-slice processor use of co-processors & interfacing. (ii)Control Units:Concepts,Design methods hard wired & Macro programmed Design & CPU (iii) Arithmetic Processor Organisation.

RECOMMENDED BOOKS :

1. Mohammed Raffiqazzaman & Rajan Chandra-Modern Computer Architecture, Galgotia Publications.
2. morris Mano-Digital Logic & Computer Design.

6EE 6.3 HIGH VOLTAGE ENGINEERING

2L+IT M.M.:100 Exam.Hrs.:3

1. BREAKDOWN IN GASES : Mechanism of breakdown in gases, Townsend's or kenal mechanism of spark, Paschen's law.
2. BREAKDOWN IN LIQUID AND SOLID DIELECTRICS : Mechanism of breakdown in liquids suspended particle theory cavitation and bubble mechanism, stressed oil volume mechanism, mechanism of breakdown in solids:Intrinsic break dwon. Electromechanical break down, break down due to treeing and tracking, thermal break down, thermal breakdown time.
3. GENERATION OF HIGN VOLTAGE : Methods of generation of power frequency high voltage:cascaded transformers and resonance transformers Generation of high voltage DC, voltage multiplier circuits. Electrostatic Generation:Van de Graff machine and its voltage stabilisation. Impulse voltage generation.:Basic impulse circuit,single stage impulse generator, multistage impulse generator (Marx circuit)
4. MEASUREMENT OF HIGH VOLTAGE : Potential dividers:resistive,capacitive and mixed dividers for high voltage, sphere gap:construction mounting, effect of nearby earth objects, effect of humidity and atmospheric conditions,effect of irradiation and polarity. Ryall crest voltmeter, Electrostatic voltmeter:Principle and classification.Constructional details of an absolute electrostatic voltmeter. Measurement of dc high voltage. Measurement of impulse voltage:Klydonograph. Oscilloscope and its application in high voltage measurement.
5. OVER VOLTAGES : Accumulation of charge in clouds. Direct & Indirect strokes, isokeraunic level, switching surges.
6. PROTECTION OF SYSTEM AGAINST SURGES : Ground wires, protective angle,tower footing resistance,surge diverters. Gap type and gapless lightning arresters. Insulation coordination, basic insulation levels. Voltage-time curve, impulse ratio.

RECOMMENDED BOOKS :

1. Thaper, High voltage Engg.
   2. Wadhwa:High voltage Engg.
   3. Kamaraj Naidu:High voltage Engg.
   4. Richjovij:High voltage Engg.

6EE 6.4 CONTROL SYSTEM COMPONENTS

2L+IT M.M.:100 Exam.Hrs.:3

1. ERROR SENSING DEVICES : Principle of operation of variable resistance, potentiometer, variable inductance & variable capacitance, synchros, synchro-differential transformer, Etransformer and induction resolver.
2. SERVOMOTORS : A.C. servomotor, D.C. servomotor field controlled & Armature controlled mode of operation of D.C. servomotor. Technogenerator and stepper motor.
3. ROTARY AMPLIFIER : D.C. generator as an amplifier. Amplidyne (Selsyn, Autosyn), Rotorol & Regulex.
4. MAGNETIC AMPLIFIER : Serial and parallel connection, self-saturated amplifier. Amplifier with feedback.
5. HYDRAULIC AND PNEUMATIC CONTROL COMPONENTS : Variable displacement pumps and motors, control values, actuators and amplifiers.

RECOMMENDED BOOKS :

1. R.K. Jaim Mechanical and Industrialk Measurements, Khanna Pub.
2. A.K. Sawhney:A course in Electrical and Electronic Measurements, Dhanpat Rai and Sons.
3. Bela G.Liptek:Instrumentation in process Industries.4 peter Harriot:Process control systems.
4. I.J. Nagrath:Control system Engineering, New Age Pub.

6EE 6.5 MICROWAVE ENGINEERING

2L+IT M.M.:100 Exam.Hrs.:3

1. MICROWAVE TRANSMISSION LINES : Microwave frequency range, Transmission line equations and solutions,Reflection coefficient & Transmission coefficients, Standing wave & standing wave ratio,Line Impedance and admittance, Smith chart, Impedance matching.
2. MICROWAVE WAVE GUIDES & COMPONENTS : (i)Introduction (ii) Rectangular Waveguides:Solution of wave equations in Rectangular coordinates,TE,TM modes,power transmission,power losses,excitation of modes, characteristics of standard rectangular waveguides. (iii) Circular Waveguides:Solution of waveguides:Solution of wave equation in cylindrical coordinates, TE, TM mode, power transmission, power loss, Excitation of modes, characteristics of standard circular waveguides. (iv)Microwave cavities : Rectangular cavity resonator, circular-cavity resonator and semicircular cavity resonator, Q factor of a cavity resonator,Re-entrant cavities. (v) Microwave Hybrid circuits: S-Matrix, Wave guide tees, Magic Tees (Hybrid Tees) Hybrid rings (rat-Raco Circuits) (vi) Directional Couplers:2 hole directional coupler and brief ideas of others.
3. MICROWAVE TUNNEL DIODES : principle of operations, Microwave characterstics.
4. TRANSFERRED ELECTRON DEVICES (TEDS) : Gunn Effect Diodes-GaAs diode, Gunn effect, Ridley-Watkins-Hilsum (RWH) theory,Modes of operation.

5. AVALANCHE TRANSIT-TIME DEVICES : Physical structure and principle of operation of the following devices:IMPATT diode, TRAPATT diode, BARITT diode, PIN diode.
6. MICROWAVE LINEAR-BEAM TUBES (O-TYPE) : Brief Idea of triodes, Tetrodoes Pentodes and their Limitation. Klystrons, Multicavity Klystron Amplifier (examples of 2 and 4 cavity Klystrons)-, Reflex-klystons, Helix Traveling wave Tube (TWT):Construction and theory of operation of each of these devices.
7. MICROWAVE CROSS-FIELD TUBES (M-TYPE) : Construction and theory of operation of Cylindrical Magnetrons. Brief idea of (i) Micrstrip & parallel striplines, (ii) MMIC's.

RECOMMENDED BOOKS :

1. Samuel Y.Liao-Microwave Device & Circuits, PHI
2. Kiran C.Gupta-Microwaves New Age Publishers.
3. Reich et al-Microwave Principles, EWP.
4. M. Kulkami-Microwave & Radar Engg. Umesh Publication.
5. Monojit Mitra-Microwave Engg. Dhanpat Rai & Co.
6. R.E. Collin-Foundations of Microwave Engg. Mc-Graw Hill.

6EE7 INSTRUMENTATION LAB

2P M.M.:75

1. Study of following parameters of operational amplifiers : Input Impedance, output impedance, input and output offset voltage,Input bias current slew rate,supply voltage rejection ratio (SVRR), Common mode rejection ratio (CMRR), Gain bandwidth product, Gainband width consumption, Transient response.
2. Design and fabricate the following using op-am on breadboard. (i)Inverter (ii)Non inverter (iii) Scalar (iv)summer (v) Differentiator (vi) Integrator
3. Wein bridge oscillator.
4. Filters for first order response. (i)High pass filters (ii) Low pass filters (iii)Notch filter
5. Study an instrumentation amplifier.
6. Study of cathode ray oscilloscope.
7. Draw the characteristics of LVDT
8. Measurement of distance by ultrasonic transducers.
9. Draw the characteristics of RTD, Thermo couple and Thermistor.

6EE8 MICROPROCESSORS LAB-II

2P M.M.:75

1. Connect star-86 a PC and use it as a terminal in serial mode.

2. Use an EPROM programmer to program 2716/2732/2764/27128 EPROM & run various programs through EPROM.
3. Write an 8086 routin to test the system RAM.
4. Study of IEEE-488 interface card for message transmission.
5. to develop assembly language programmes for 8086.
6. Prepare a Hardware interface-LED Matrix display to be used with microprocessor kit.
7. Display a given massage on the above hardware interface & show various modes of display such as Rolling (left, right, up, down) reverse rolling speed variation etc.)
8. Store the look up Book table for a given message display message in EPROM and use it to display the given message on above hardware interface.
9. Design a digital thermometer using thermocouple input card.
10. Design a milli voltmeter/mili ammeter, which continuously display the measured value (PCL 213/214) card.
11. Write a program to operate different relays/stepper motor/ a level detector for translucent liquid.
12. write a program in assembly language to read a memory buffer and identify. (i)Repeating consecutive characters,their position and repeat count (ii) Identify unique words, numbers and sentences.
13. Write a program in Assembly Language, (i) To read keyboard input and store it as scan code starting and ASCII starting (ii) Identify control, aplhanumeric, symbolic character (iii) Convert numeric string to 16 bit signed integer or 32 bit real number.

6EE9 POWER ELECTRONICS LAB-II

3P M.M.:100

1. Study the single-phase inverter.
2. Study ac regulator using triac, anti parallel thyristor and triac & diac.
3. Study single-phase PWM inverter.
4. Study buck, boost and buck-boost regulators.
5. Study the forced commutated circuits.
6. Determine the dv/dt limitation of given SCR.
7. Study and test the triggering circuit of three phase half controlled bridge converter.
8. Study and test three phase half controlled bridge converter.
9. Study and test the triggering circuit of three-phase fully controlled bridge converter.
10. Study and test three-phase filly controlled bridge converter.

6EE10 ELECTRICAL MACHINE LAB-II

3P M.M.:100

1. To perform sumpner's back-to-back test on 3 phase transformers, find its efficiency & parameters for its equivalent circuits.
2. to perform the heat run test on a delta/delta connceted 3 phase transformer and determine the parameters for its equivalent circuit.
3. To perform no load and blocked rotor test on a 3 phase induction motor and to determine the parameters of its equivalent circuits. Draw the circle diagram and compute the following (i) Max Torque (ii)Current (iii)slip (iv) p.f & (v)Efficiency.
4. To perform the load test on a 3 phase induction motor and determine its performance characteristics (a)Speed vs load curve (b)p.f. vs load curve (c) Efficiency vs load curve (d)Speed Vs torque curve.
5. Reversal & speed control of 3-phase induction motor by using variable frequency supply and hence to plot a graph for speed Vs frequency of supply voltage.
6. Determination of losses & efficiency of an alternator.
7. To find Xd and Xq of a salient pole synchronous machine by slip test.
8. Determination of potier reactance by zero power factor saturation curves

RECOMMENDED BOOKS :

1. Kohli & Jain-Experiments in electrical engineering.
2. Tarnekar/Kharbanda-A Laboratory course in Electrical Engineering.

SEVENTH SEMESTER

7EE1 UTILIZATION OF ELECTRIC POWER INCLUDING TRACTION

3L+IT M.M.:100 Exam.Hrs.:3

1. ELECTRICAL HEATING & WELDING : Different methods of electirc heating. Principle of high frequency induction and dielectric heating construction, operation, performance and applications of are furnace and induction furnance. Classification of electric welding Electric are welding. Electric supply for are welding: welding transformers Resistance welding.
2. ELECTRIC DRIVES : Characteristics of load, Reviews of starting and running characterstics of various D.C. A.C. industrial motors. Relative study of efficiency, power factor, size and costs, starting and speed control of motors. Electric braking, Plugging, Rheostatic braking,regenerative braking. Behaviour of motor during starting, acceleration, braking and reversing operations. Speed-time relations, Load equalization. Use of flywheels. Determination of motor rating for

intermittent loads. Drives for machine tools, lift and cranes, paper mills, printing machinery, rolling for intermittent loads.

3. ELECTRIC TRACTION : Systems of electric traction, power supply systems for track electrification-comparison and application of different systems.
4. TRACTION METHODS : Types of services, speed time and speed distance curves, average and schedule speed. Tractive effort.Estimation of power and energy requirements: specific energy consumption. Mechanics of train movement coefficient of adhesion, Adhesive weight,effective weight.
5. TRACTION MOTOR CONTROL : D.C. and A.C. traction motors, special requirements of selection of type. Speed torque/current characteristics. Various methods of starting and speed control and D.C. A.C. dirves used in traction. Series parallel starting. Shunt and bridge transition,drum and contacted type controllers,Metadyne control Multiple unit control,Master controlers Methods of electric braking of traction motors.
6. MEANS OF SUPLYING POWER AND TRAIN LIGHTING : Substation equipment and layout. Feeding and distribution systems. Overhead equipment,current collection, gear, negative boosters. System of train lighting, special requirements, methods of obtaining unidirectional polarity and constant output voltage.

RECOMMENDED BOOKS :

1. H Pratap-Art & Science of Utilization of Electric
2. H. Pratap-Modern Electric Traction.
3. C.L. Wadhwa-Utilization of electric traction electric power.
4. G.K. Dubey-Electric Drives.
5. Vedam and Subrahmanyam-Concept & Application of Electric Drives.

7EE2 POWER SYSTEM ANALYSIS

2L+IT M.M.:100 Exam.Hrs.:3

1. Percent and per Unit Quantities. Single line diagram for a balanced 3-phase system.
2. SYMMETRICAL FAULT ANALYSIS : Transient in R-L Circuit. Symmetrical and asymmetrical short circuit currents in synchronous generator. Equivalent circuits of synchronous machine under sub transient, transient and steady state conditions. Analysis of three phase faults.
3. SYMMETRICAL COMPONENTS : Fortescue theorem, symmetrical component transformation phase shift in star-delta transformer. Sequence impedances of synchronous machine, transformers and transmission lines. Zero sequence network of transformers and transmission lines construction of sequence networks of a power system.

4. UNSYMMETRICAL FAULT ANALYSIS : Signal line to ground, line-to-line and double line to ground faults connection of sequence networks under fault conditions. Analysis of unsymmetrical faults using symmetrical components.
5. LOAD FLOW ANALYSIS : Static load low equations (SLFE). System variables solution of SLFE, Bus admittance matrix. Bus classification Load flow problems. Gauss seidel newton Raphson decoupled and fast decoupled methods for load flow analysis comparison of methods.

RECOMMENDED BOOKS :

1. J.J. Grainger,William, D.Stevenson Jr Power system Analysis.
2. C L Wadhwa, Electrical power system.
3. Nagrath and kotari, power system engineering

7EE3 SWITCHGEAR & PROTECTION

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : Causes and consequences of dangerous currents;fault over loads and switching overcurrents. Basic idea of an over current relay as a level detector selectivity, discrimination sensitivity reliability of relay fastness of operation. Upper and lower limits for the time of relay operation current grading Time grading and inverse time operation. Primary and backup protection. Pickup and reset values.
2. CONSTRUCTION AND OPERATION OF REALAY : construction and operation of eletromagnetic over current and directional relays. Directional element to be realized from rectifier bridge circuits. Connection of directional element and their operating characteristics. Directional relay connections 30 deg, 60 deg and 90 deg. connections Directional Earth fault relay. Directional Relay connections 30 deg, 60 deg and 90 deg connections. Directional earth fault relay.
3. DISTANCE PROTECTION OF TRANSMISSION LINES : Construction and characteristics of impedance relay, C.T. and P.T. connection for performance Reactance and mho relay characteristics Transmission line protection.
4. CARRIER CURRENT PROTECTION OF TRANSMISSION LINES : Basic apparatus used for power line carrier system. Principle of operation of directional comparison and phase comparison carrier protection,carrier assisted distance protection.
5. PROTECTION OF SYNCHRONOUS GENERATORS AND TRANSFORMERS : faults in stator winding of alternators, differential protection Effect of resistance in the star point earthing single and multiple ground faults on the rotor. Protection against excitation failure and prime mover failure. Negative sequence protection. Differential protection of generator transformer unit. Differential protection of 3-phase transformers; effect of magnetizine inrush currents,methods for minimizine the effects. Buchholtz protection. CT connections.
6. BUS BAR PROTECTION : Frame leakage and circulating current protection.

7. CIRCUIT BREAKERS : Electric are, are characteristics, theories of current interuption, energy balance and recovery rate theory, transient recovery voltage in simple three phase circuits, rate of rise of restriking voltage, resistance switching, current chopping, interruption of capacitive currents circuit breaker ratings,practical systems of are quenching in air and oil. Construction and operation of bulk oil, minimum oil and air blast circuit breakers. Recent trends in HV circuit breakers, sulpher hexa fluoride, vacuum circuit breakers, principle of DC circuit breaking, testing of circuit breakers.

RECOMMENDED BOOKS :

1. M Chander:Switchgear protection
2. S S Rao:Switchgear & protection
3. T M S Rao:Static Relays

7EE4 ELECTRIC DRIVES AND THEIR CONTROL

3L+IT M.M.:100 Exam.Hrs.:3

1. CHARACTERISTICS OF ELECTRIC MOTORS : Characteristic of dc motors, three phase induction motors and synchronous motors.
2. DYNAMICS OF ELECTRIC DRIVES : Fundamental torque equations, speed-torque conventions and multiquadrant operation, equivalent values of drive parameters, components of load torques, nature and classification of load torques,calculation of time and energy loss in transient operation, steady state stability,load equalization.
3. CONTROL OF AC DRIVES : Induction motor drives: Basic principle of operation, stator voltage control,rotor voltage control, frequency control,voltage and frequency control, current control. Voltage, current and frequency control. Close-loop control. Synchronous motor drive: Cylindrical rotor, salient pole, reluctance, permanent magnet and switch reluctance motors. Close loop control of synchronous motors. Brushless de and ac drives.

RECOMMENDED BOOKS :

1. G K Dubey Fundamentals of Electrical Drives,Narosa Publishing House, New Delhi,1995.
2. V Subrahmanyam:Thyristor control of electric Drives,Tata McGraw Hill, New Delhi, 1988.
3. V Subrahmanyam:Electric Drives-Concepts and Applications,Tata McGraw Hill,New Delhi.
4. S K Pillai:A first course on electrical Drives,Wiley Eastern limited,India.
5. B K Bose:Power electronics and A. C. Drives,Prentice Hall.

7EE5 SYSTEM ENGINEERING

2L+IT M.M.:100 Exam.Hrs.:3

1. ECONOMIC OPERATION OF POWER SYSTEMS : Input-Output curves, heat rate and incremental rate curves of generating units. Economic distribution of load between generating units with in a plant. Economic distribution of load between power stations, transmission loss equation. Unit commitment and dynamic programming method introduction to power system security.
2. POWER SYSTEM STABILITY : Power angle equations and power angle curves under steady state and transient conditions. Rotor dynamic and swing equation (solution of swing equation not included). Steady state,dynamic and transient stability.Synchronizing power coefficient and stability limits. Introductory explanation of equal area criterion and its application. Critical clearing angle and critical cleaning time of circuit breaker use of auto-reclosing circuit breakers. Factors affecting stability and methods to improve stability.
3. EXCITATION SYSTEMS : Types of excitation systems D.C. excitation system, automatic voltage regulator, use of amplidyne and magnetic amplifier. A. C. excitation systems. Shunt excitation system, separate excitation system and brush less excitation system.Solid-state automatic voltage regulator (description of block deagram only).
4. INTERCONNECTED POWER SYSTEMS : Reserve capacity of power station, spinning and maintenance reserves. Advantages and problems of interconnected power systems. Power system interconnection in India.
5. VOLTAGE CONTROL : Tap changing transformer,phase angle control and phase shifting transformers. Series compensation of transmission lines, Location and protection of series capacitors, advantages and problems.

RECOMMENDED BOOKS :

1. I.J. Nagrath and D.P. Kothari:Power system engineering.
2. J.J. Grainger and W.D. Stevenson:Power system Analysis.
3. B.R. Gupta:Generation of electrical energy
4. C.L. Wadhwa:Electrical power systems 5. C.M. Aroa:Power system Engineering

7EE 6.1 POWER SYSTEM RELIABILITY

2L+IT M.M.:100 Exam.Hrs.:3

1. SYSTEM RELIABILITY : Introduction, difinition of reliability, failure, probability, concepts, power quality variation, reliability measurements, power supply quality survey, Reliability aids, and recent development.
2. RELIABILITY CONCEPTS : Measure of reliability rules for combining probabilities, Mathematical expectation. Distributions, reliability theory series and parallel systems, Markov processes. static generating capacity reliability.

3. OUTAGE DEFINITION : Loss of load probability methods, loss of energy probability method.Load forecast,System Design and planning, Strategies for generation, Transmission & Distribution networks. transmission system reliability evaluation-Average interruption rate method. The frequency and duration method.
4. INTERCONNECTED SYSTEM : Generating capacity reliability evaluation introduction. The loss of load approach, reliability evaluation in two and more than two interconnected systems, Interconnection benefits.
5. LOAD FORECASTING : Necessity short-term forecasting by preliminary analysis control,medium term forecasting by field survey method, long-time forecasting by statistical method. Regression analysis. Analysis of time series. Factors in power system loading.

RECOMMENDED BOOKS :

1. Roy Billinton & Ronald N.Allan-Reliability Evaluation of power system volume-I
2. Roy Billinton & Ronald N.Allan-Reliability evaluation of power System volume-II
3. J Endreny-Reliability modelling in electric power system.
4. A.S. Pabla-Electric power distribution.

7EE 6.2 COMPUTER NETWORKS

2L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : Uses of computer networks, network hardware network software, Reference Models, Example networks, Example Data communication services and Network standardization.
2. PHYSICAL LAYER TRANSMISSION SYSTEM : The Theoretic basis for data communication-Fourier Analysis, Bandwidth Limited Signals, the maximum data rate of a channel. Transmission Media magnetic media,Twisted pair, Baseband coaxial cable, Broadband coaxial cable and fiber optics. Wireless Transmission-The electronic spectrum,Radio transmission,microwave transmission, Infrared and Millimeter wave and light wave transmission. The Telephone system-structure of the telephone system. The politics of telephone the local loop, Trunks and multiplexing switching.
3. THE PHYSICAL LAYER ISDN : Narrow Band ISDN-ISDN service ISDN system Architecture. The ISDN interface and the perspective on N-ISDN. Broad band ISDN and ATM. Virtual circuit and circuit switching. Transmission in ATM Networks, ATM Switches.
4. THE PHYSICAL LAYER : RADIO AND SATELLITIES : Cellua Radio-Paging systems, cordless telephones, analog and digital cellular telephone, personal communication services. Communication satellites-Geosynchronous satellites, Low-orbit satellites, satellites versus fiber.
5. THE DATA LINK LAYER : Design Issues-services provided to the network layer, framing, error control and flow control issues error detection and

correction-error-correcting codes and error detecting codes. Elementary data link protocols-unrestricted simple protocol, simple stop and wait protocols-one bit sliding window protocol, go bck to N protocol, selective repeat protocol, protocol specification and verification-Finite state machine models, petri Net Models. Example date link protocol-HDLC-High Level Data Link control, Data Link Layer in the Internet, Data Link Layer in ATM.

RECOMMENDED BOOKS :

1. Computer Network by Tanenaum, PHI
2. Data and computer communication by W.Stalling PHI

7EE 6.3 DIGITAL SIGNAL PROCESSING

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION TO DIGITAL SIGNALS : Sampled data and digital signals,sampling theorem, data reconstruction,zero and first order hold, Z and inverse Z transform, relation between Z, Laplace and fourier transforms. Discrete fourier transform, fast fourier transform. stability, realization and frequency response.
2. FILTERS:Analog filters and transformations, IIR and FIR digital filters, bilinear transformation, impulse and step variance,Fourier series and window functions.
3. APPLICATIONS : Signal recovery in wideband and narrow band noise, signal averaging and detection.
4. INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS : Definition, architecture, input,hidden and output layers, weights and biases,learning mechanisms, training, comparison in different models, applications.
5. FUZZY:logic and fuzzy set theory, crisp and fuzzy classifiers, rule base designs and applications.

RECOMMENDED BOOKS :

1. L R Rabiner and B Gold : Theory and application of digital signal processing, PHI
2. A V Oppenheim and R W Schafer : Digital signal processing,prentice Hall of India,1991.
3. A Papoulis:Signal Analysis, McGraw-Hill International.

7EE 6.4 ADVANCED POWER SYSTEMS

2L+IT M.M.:100 Exam.Hrs.:3

1. POWER SYSTEM STATE ESTIMATION : Method of least squares. Identification of bad introduction to power system state estimation.
2. SECURITY ANALYSIS : Introduction and system state classification. Basic iea about data acquisition system, contigency analysis, security assessment and security control.
3. LOAD FORECASTING : Preliminary load survey. Long, medium and short term load forecasting methods.
4. FACTS : Problems of AC transmission lines. Basic features of FACTS controllers. Basic schemes and operations of thyristor controlled series compensator phase angle regulator and dynamic brake. Introduction to static synchronous compensator (STATCOM) and unified power flow controller (UPFC) Application of FACTS controller to power systems.
5. SUPERCONDUCTIVITY : Basic characteristic of superconductors Introduction to application to superconductivity to electric power systems-superconducting generators, motors, transformers, transmission cables and magnetic storage.

RECOMMENDED BOOKS :

1. J J Grainger and W D Stevenson, power system analysis, McGraw Hill Pub.
2. I J Nagrath and D P Kothari, power system Engineering. TMH
3. Wooden Woollen Berg, power system analysis, John wiley and sons.
4. R Bergen, power system analysis.
5. B R Gupta, Generation of Electric Energy.
6. A S Pabla, Electric power Distribution, 4th Ed. TMH Pub.
7. K. R. Padiyar-Flexible AC transmission systems-A status review summer school on "Recent Advances in power Electronics". August 10-21, 1998, IISc Bangalore, Page 10.1 to 10.16.
8. A Adris, FACTS Technology Development. An Update, IEEE Power Engineering Review,March 2000, pp 4-9.
9. Superconductivity :

i. IEEE Power Engineering Review, May 2000, (pp 4-15),June 2000 (pp 4-6)
ii. IEEE Transaction on Magnetics. Vol. 25, No. 2, March 1989, pp 750-758.

7EE 6.5 ELECTRICAL MACHINE DESIGN

2L+IT M.M.:100 Exam.Hrs.:3

1. GENERAL : Basic principles of electrical machine design. Factors and limitations in design, Main dimensions, output equations and output co-efficient, classification of magnetic materials and allowable flux densities. Calculation of magnetic circuits, magnetizine, current, coils for given ampere-turns. Real and apparent flux densities. Tapered teeth. Carter's coefficient, leakage fluxes reactances. Classification of insulation materials and their temperature ranges.

2. ARMATURE WINDING : General features of armature windings, single layer and double layer and commutator windings,integral and fractional slot wingdings, winding factors.
3. HEATING COOLING AND VENTILATION : Heat dissipation, heat flow, heating cooling curves. Heating cooling media. Quantity of cooling media. Types of enclosures. Ratings, heat dissipation. Methods of ventilation.
4. APPLICATION OF ABOVE DESIGN PRINCIPLES TO THE FOLLOWING DESIGN : Power transformers & Distribution Transformer, Induction machines and synchronous machies.

RECOMMENDED BOOKS :

1. A.K. Sachney electrical machine design 2.V.N. Mittle Electrical Machine Design
2. R.K. Agrawal-Electrical machine Design

7EE8 POWER SYSTEM & HIGH VOLTAGE LAB

2P M.M.:75

1. (i) Measurement of flashower voltage of 11 KV in type insulator and string type insulator (ii) Calculator of string efficiency of the string of suspension insulators (iii) Measurement of High Voltage using electrostatic voltmeter (iv) Improvement of string efficiency by connecting guard ring.
2. Find out the dielectric strength of the transformer oil.
3. Perform puncture voltage testing on (i)Healthy cable (ii)cable having pinhole in the insulation.
4. Study of zero sequence current in three phase transformers.
5. To find out the sequence component of synchronous machines.
6. To see the burden effect on the performance of CT and measure the phase angle and ratio error.
7. (i) Study of over current relay. (ii)to draw the current/time characteristics of an over current relay for TMS=1 & 0.5 and PSM=1.25 & 1.0.
8. (i)Study of percentage bias differential relay (ii)To plot the characteristics of a percentage bias differential relay for 30%, 40% and 20%.
9. Study of Gas actuated Buchholz relay.
10. Study of under frequency relay and checking it's setting experimentally.
11. Study of over flux relay and auxiliary relays.
12. Study of auxiliary relays.

7EE9 COMPUTER BASED ELECTRICAL MACHINE DESIGN LAB

1L+2P M.M.:75

1. GENERAL : Calculation of magnetic circuits-Determine of magnetizing current for transformer & 3-Ã˜ Induction motors, Determine of mmf required for air gap of rotating electrical machines.
2. ARMATURE WINDINGS : Design of armature windings of AC rotating machines, Integral & fractional slot windings.
3. HEATING & COOLING : Estimation of maximum temperature rises in electrical machines during their operation.
4. Design of distribution & power transformer.
5. Design of synchronous alternators.
6. Design of 3-phase induction motor.

RECOMMENDED BOOKS :

1. A K Sahney-Electrical Machine Design
2. V N Mittle-Electrical Machine Design.
3. R.K. Agarwal-Electrical machine Design.

7EE11 INDUSTRIAL ECONOMICS & MANAGEMENT

2P M.M.:50

1. MONEY, CREDIT AND FINANCE : Functions of money, types: coins, notes,cheques, Bill of Exchange. The banking Mechanism and government control. The Reserve bank of india, nationalized banks, money market. Hire purchase finance. The stock exchange and issuing houses.
2. MANAGEMENT : Evaluation of management thought,principles and functions of management,motivation. Types of business forms and organization.
3. FINANCE AND FINANCIAL STATEMENTS : Needs of finance, kinds of capital sources, working capital cycle. Financial statements: basic concepts, balance sheet, profit and loss account sources and uses of funds statement-working capital, cash and total resource basis. Ratio analysis liquidity ratios, capital structure ratios, profitability ratios, turnover ratios.
4. INTEREST AND ANNUITY : Capital recovery annuity present worth annuity, sinking fund annuity, compound amount annuity. Nominal and effective rate of interest. Depreciation:need of depreciation, methods of depreciation.
5. OPERATIONS MANAGEMENT : An overview, systems concepts, objectives, operation management decisions, productivity concepts and improvement, types of production systems.
6. QUALITY : Conception, quality of design, quality of conformance, value of quality & cost of quality. Evaluation of TQM concepts and philosophy, TQM and traditional management.Introduction to ISO-9000, ISO-14000, Just in time, BPR.
7. PROJECT PLANNING : Network analysis, PERT & CPM, Project evaluation. Labour Legislation plant location, investment decisiions. Concept of industrial economics and its importance. Industrial & cost theory, Optimum size, Market structure.

RECOMMENDED BOOKS :

1. Prasana chandra-Financial management TMH.
2. Zaidi-statistical process, THM.
3. Buffa-Operation management, WE

EIGHTH SEMESTER

8EE1 EHV AC/DC TRANSMISSION

3L+IT M.M.:100 Exam.Hrs.:3

1. EHV AC TRANSMISSION : Need of EHV transmission lines,power handling capacity and surge impedance loading. Problems of EHV transmission, bundled conductors geometric mean radius of bundle,properties of bundle conductors. Electrostatic fields of EHV lines and their effects, corona effects:Corona loss,audio and radio noise.
2. LOAD FREQUENCY CONTROL : Introduction to control of active and reactive power flow,trubin speed governing system. Speed governing characteristic of generating unit and parllel operation of generations.Element of load frequency control. Flat frequency, flat tie line and tie line load bias control.Automatic generation control (description of block diagram only)
3. VOLTAGE CONTROL : No load receiving end voltage and reactive power generation. Methods of voltage control. Synchronous phase modifier, shunt capacitors and reators,saturable reactors, Thynstorised static VAR compensators.
4. FACTS : Introduction to FACTS controllers.
5. HVDC TRANSMISSION : Types of D.C. links, advantages and disadvantages of HVDC transmission. Basic scheme and enquipment of converter station. Ground return. Basic principles of DC link control and basic converter control characteristics. Introduction to multiterminal HVDC systems. Application of HVDC transmission.

RECOMMENDED BOOKS :

1. R.D. Begamudre-EHV AC Transmission Engineering.
2. K.R. Padiyar-HVDC Power Transmission System
3. J.J. Grainger and W.D. Stevenson-Power system analysis.
4. B.R. Gupta-Generation of Electrical Engineering.

5. K.R. Padiyar-Flexible AC transmission systems-A status review, summer school on "Recent Advances in power electronics", August 10-21, 1988, IISc Bangalore, Page 10.1 to 10.16

8EE2 ARTIFICIAL INTELLIGENCE TECHNIQUES

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION TO AI : Definition, Applications. Components of an AI program; production system, problem characteristics. Overview of searching techniques. Knowledge representation Knowledge representation issues, an overview. Representing knowledge using rules, procedural varsus declarative knowledge. Logic programming Forward versus backward reasoning, MATCHING control knowledge.
2. STATISTICAL REASONING : Introduction to probability and Baye's theorem, certainty factor and rule based systems.
3. ARTIFICIAL NEURAL NETWORKS : Biological Neuron, Neural Net, use of neural nets,applications. Perception,idea of single layer and multiplayer neural nets, back propagation, Hopfield nets, suppervised and unsupervised learning.
4. EXPERT SYSTEMS : Basic idea of expert system. Expert system building tools and shells. Components of expert systems.

RECOMMENDED BOOKS :

1. Elaine Rich and Kevin Knight, Artificial Intelligence, TMH Pub.
2. James A Anderson, An introduction to Neural Networks.
3. Dan. W Patterson, Artificial Intelligence and Expert Systems.

8EE3 STATIC PROTECTIVE RELAYS

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : Basic for static relay development,classification of static relays, microprocessor based relays, Digital protection, advantages of digital protection. Basic protection scheme using microcomputer.
2. STATIC RELAY COMPONENTS : Semi conductor devices, static switching, logic circuits and relay logic. Integrated circuits, transducers and interface devices, replica impedances, time delay devices, sequence filters, voltage regulators.
3. STATIC COMPARATORS : Single input multi-input comparators. Amplitude comparator-integrating, instantaneous and sampling techniques ;phase comparators-vector product & coincidence techniques. Direct phase comparison, phase splitting technique, integrating phase comparison. Duality of amplitude and phase comparison.

4. STATIC RELAYS : Over current elays, diectional over current relays using Hall crystal, rectifier bridge, instantaneous since comparator. Distance relay, impendence Reactance admittance, offset mho, trapezoidal and elliptical characteristics. Differential relays.
5. SCHEMES OF PROTECTION : Static switching scheme of distance relays. Polyphase distance relays. Static differential protection for generators, transformer and Bus zone. static protection for motors,single-phase preventer.
6. MODERN TRENDS IN POWER SYSTEM PROTECTION : Auto recolsing,frequency relay-under frequency ,over freqyency and rate of change of frequency relay, static ultra high speed directional comparison line protection, reliability-dependability, security, redundancy, factors affecting the performance of relays, design reliability of complete protection schemes; improving techincal reliability; routine tests, type tests and reliability tests of relays.

RECOMMENDED BOOKS :

1. TMS Rao-Static Relays
2. M. Chander-Switchgear protection
3. S.S. Rao-Switchgear and protection

8EE 4.1 NETWORK OPERATING SYSTEMS

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION : What is an operating system? Distinctive features of simple batch, multi programmed batch and Time-sharing systems.
2. OPERATING SYSTEM STRUCTURE : System components- (a) Management issues of process, main memory, file I/O systems and secondary storage, (b) Networking and protection isues. Operating systems services system calls-(a) process and job control (b)File Manipulation (c) Device management (d) Information Maintenance (e)Communication.
3. CPU SCHEDULING : Basic Concepts-I/O Burst cycle, CPU Scheduler, pre-emptive scheduling and dispatcher. Scheduling criteria. Scheduling Algorithms-First come first served (FCFS), shortest job first, priority based and round Robin scheduling.
4. MEMORY MANAGEMENT : Background-Address Binding, Dynamic Loading. Dynamic linking-overlays Logical vs. Physical address space and swapping. Continuous Allocation single vs multiple partition allocation, External and Internal Fragmentation. Paging-Basic virtual memory concept and,Demand paging. Page replacement algorithms-FIFO and LRU only.
5. FILE STRUCTURE INTERFACE : File concept-File attributes, file operations,file types,file structure and internal files structure. Access methods sequential, direct and index based access methods. Directory structure-single and two level directory, tree structured directory. Acyclic graph directory and general graph directory. Protection types of access, access list and groups.

6. NETWORK STRUCTURES : Background and advantages of Networks, Network Topologies Network Types-Local Area Networks and wide Area Networks. Communication-Namming and Name resolution, Routing strategies, packet strategies and connection strategies.
7. DISTRIBUTED SYSTEM STRUCTURES : Network operating system operations, Remote login, remote file transfer (ftp and its get, put, Is, dir, mget, mput, bin commands with syntax only). Distrubuted resource usage by Data migration,Computation migration and process migration. Remote services-Remote procedure calls and Threads. Robustness-failure detection and reconfiguration, and recovery from failure. Design issues-Transparecy, fault Tolerance and scalability.
8. CASE STUDY : Linux design principles-Kernel, system libraries and system utilities of Linux system scheduling-Kernel synchronization and process scheduling. Management of physical memory,Virtual Memory-Virtual memory regions,Lifetime of virtual address space, swapping and pagin. Execution and loading of user program-mapping of program into memory and static and dynamic linking Ext2fs file system.

RECOMMENDED BOOKS :

1. abraham Silberschatz and peter Baer Galvin-Operating system concepts,Addition-wesley,Vth,
2. A.S. Tannenbaum-Operating systems, PHI
3. Davind Pitts and Bill Ball, anenbaum Red Hat Linux 6 unleashed,Techmedia SAMS.

8EE 4.2 E-COMMERCE AND INTERNET APPLICATIONS

3L+IT M.M.:100 Exam.Hrs.:3

1. INTRODUCTION AND CONCEPTS : Network and Electronic Transmissions, Models for commercial Transactions; internet Environment online commercial solutions
2. SECUIRTY TECHNOLOGIES : why the internet is unsccure? What and where the risks are? Introduction to cryptography-Codes, Ciphers, securing algorithms. Public key solutions-Modular arthmetic, factoring and large numbers, public key encryption. Trusted key distribution and verifications. Cryptography Applications-Encryptions, Digital signature and Nonrepudiation and Message Integrity.
3. ELECTRONIC PAYMENT METHODS : Updating Traditional Transactions, Secure online Transaction modules-secure web servers.online secure processing.
4. PROTOCOLS FOR THE PUBLIC TRANSPORT OF PRIVATE INFORMATION : Security protocols, secure Hypertext Transfer protocol-S-HTTP security features,secure http data transport, shttp header and message. Secure socket layer-SSL record specification, initiating and SSL session and other

SSL options. Integrating security protocols into the web. Credit card business basics. Early SER trials-Visa, American Express, Certificate, Insurance.

5. ELECTRONIC PAYMENT SYSTEM : Digital payment system, first virtual internet payment fundamental assumptions, Account setup and costs, Confirming transaction and reducing Merchant Risk. Cybercash Model cybercash security and availability. Cybercash client application, selling through cybercash.
6. E-COM PROJECT ON INTERNET : Introduction to E-Commerce Vs E-Business, B2B and B2C, Auctions and E-Cards. Distributed applications-Connecting to distributed application, 3-Tier development (Presentation tier, Business Tier and Database Tier) Scalability.
7. BUILDING THE OBJECT MODEL : Object behaviour and classes. Objects vs. components. The capabilities of active X and active scripting (No programming). Designing the object model infrastructure, service and data. Scalability in application, adding the configuration method, connecting to database, Versioning.

RECOMMENDED BOOKS :

1. Pete Loshin-Electronic commerce, 2nd Ed., Jaico publishing Hous."
2. Mathew Raynolds-Beginning E-Commerce with Visual Basic,ASP, SQL Server 7.0 and MTS, Shroff publishers and distributors Pvt. Ltd., Kolkata.

8EE 4.3 ADVANCED POWER ELECTRONICS

3L+IT M.M.:100 Exam.Hrs.:3

1. MODERN POWER SEMICONDUCTOR DEVICES : ASCR, RCT, GATT, DIAC, Traic SUS, SBS, SCS, LASCR, Power Transistors,Power MOSFETS, IGBT, GTO, FCT, SITSITH and MCT Comparison of power Devices.
2. PWM INVERTERS : Principle of operation performance perameters. Single pulse, multiple pulse and sinusoidal PWM inverters. Advanced Modulation Techniques: Tapezooidal, staircase, stepped, harmonic injected and delta modulation. Harmonic reductions.
3. RESONANT CONVERTERS : Series resonant inverters, parallel resonant inverters, class E resonant converter, zero voltage switching resenant converter, zero current switching, resonant converter, Two-quadrant ZVS converter and resonant dc link inverter.
4. INDUCTION MOTOR DRIVE : Scalar and vector control, voltgertz control, torque-flux control, current controller, PWM operation with block diagram. Operation and block diagram of vector control of current fed inverter drive.
5. UNIPOLAR AND BIPOLAR BRUSHLESS MOTOR DRIVE : Drive circuit for stepper motor unipolar and bipolar drive, switched reluctance motor drive.
6. POWER SUPPLIES : de power supplies switched mode dc power supplies, resonant dc power supplies and bi-directional dc power supplies AC power supplies switched-mode ac power supplies, resonant ac power supplies and bi-directional ac power supplies.

RECOMMENDED BOOKS :

1. M.H. Rashd:Power Electronics, Circuits Devices and applications, prentice-Hall, 1988.
2. V Subrahmanysm:Power Electronics, New Age Inc.Publishers, New Delhi,1996.
3. P.C. Sen:Power Electronics, Tata McGraw-Hill, India.
4. C W Lander Power Electronics,2nd Ed.Mc Graw-Hill,1987.
5. M D Singh and KB Khanchandani Power Electronics, TMH Publishing Company, New Delhi.

8EE 4.4 ADVANCED ELECTRICAL MACHINES

3L+IT M.M.:100 Exam.Hrs.:3

1. SYNCHRONOUS MACHINE : Transient behaviour, Reactances and time constants, symetric short circuit concept of stability and equal area criteria.
2. SPECIAL MACHINES :Linear induction motor, Reluctance motor, hystersis moter, stepper motor, homopolar machines, Brushless motor. Concept of Vector Controlled Motors.
3. TRANSFORMERS : There phase transformers connections and phasor groups, three phase to 6 phase and twelve phase conversion, excitation phenomenon in transformers, transformer transients, over voltages in transformers.

RECOMMENDED BOOKS :

1. P S Bimbhra Generalised Theory of Electrical Machines, Khanna Pub.
2. A E Fitzgerald. Charles Kingsley, Jr. and S D Umans, Electrical Machinery, 4th Ed., MGH Pub.
3. C V Jones Unified Theory of Electrical Machines,Butterworths, London 1967.

8EE5 COMPUTER BASES POWER SYSTEM LAB

3P M.M.:100

1. Fault Analysis; LG Fault, LLG Fault, LL Fault 3-phase Fault.
2. Load Flow Analysis : Development of flow charts for load flow analysis by Gauss Seidal, Newton Raphson and Fast Decoupled Method.
3. Security Analysis : Voltage security Analysis and over Load Security Analysis.
4. Study the load flow for a given system using power system softwares such as ETAP power station and MATLAB software.
5. Transientstability study using power system softwares.
6. Simulate simple power electronics circuits using PSPICE.
7. Simulate simple power electronics circuits using power system softwares.

8EE6 POWER ELECTRONICS AND CONTROL LAB

3P M.M.:100

1. Study the modern power semiconductor devices and compare them.
2. Study the SCR regulated power supply.
3. Study the lamp flasher.
4. Study the SCR ring counter.
5. Study the SCR dc circuit breaker.
6. Study the zero volt switching.
7. Study the thyristor alarms.
8. Control the speed of dc motor using single-phase bridge converter.
9. Control the speed of dc motor usnign three-phase bridge converter.
10. Control the speed of dc motor using chopper.
11. Control the speed of ac motor using inverter.
12. Control the speed of ac motor using ac controller.

8EE7 INFORMATION TECHNOLOGY LAB

2P M.M.:50

1. Create a Bio-Data of self using HTML with a photograph on the page and containing marks in a table.
2. Develop your web page with the following properties. (1) 2 Photographs display at the same place built flip on mouse over
   (2) Link to separate HTML file for academics, sports and other interests.
3. Enhance your web page using style sheets, frames and setup a hyper link to yout friend's page.
4. Make a form for submission of Quaerying about the interest rates of bank (use Text fields of HTML) and submit buttons of HTML.
5. Make a local query form, which takes in the input the range of marks through Text fields (of Java) and display the list of students having marks in that range in another window.
6. Enhance the above query through password protection.
7. Build a shopping Cart page in which items of 10 types are picked and quantity and a bill is generated by the web page.
8. Enhance the above page for making a payment through electronic billing system.
9. Associate guest book in your web page.
10. Setup a counter to count the number of visitors on your web page.