EE 343: Advanced Computer Programming

L   T   P
(3 – 1 – 3)
Theory Marks =100
Sessional Marks = 50
Laboratory Marks = 50

Time = 3 hours

1. **Introduction to Linux:**

Components and versions, description of files and directories, file operations, general line commands, Batch files, configuring the system, administrative mode of operation.

2. **Review of 1st semester IC course:**

Control structure, decision control structure, case control structure.

3. **File operations:**

Opening a file, File opening modes, Closing a file, Reading data from a file, writing data to a file, EOF.

4. **Functions:**

What is function, passing values between functions, call by value, call by reference,

5. **Arrays and pointers**:

Array definition, array initialization, bound checking, passing an array element to a function, passing an entire array to a function, 2-dimenational array, 3-dimentional array, pointer definition, array of pointers.

6. **Structures:**

Use of structure, Declaration of a structure, accessing structure elements, Storing of structure elements. Array of structures.

7. **Strings:**

Definitions, Standard library string functions *strlen(), strcpy(), strcat(), strcmp(),* 2-dimentinal array of characters.

8. **Introduction to Object Oriented Programming:**

   Books:
   1. Let Us C: Yashavant Kanetkar (BPB)
   2. Let Us C++ : Yashavant Kanetkar (BPB)
   3. Programming in C: E Balaguruswamy (TMG)
   4. Programming in C – Gotterfried (TMG)

EE 342: Electrical Engineering Material & Devices

L   T   P
(3 – 1 – 0)
Theory Marks

=100

Sessional Mark
Time = 3 hours

2. **Structure of solids:**

   Crystalline state of solids, systems & classes, unit cell and space lattice, BCC, DC structure, Bragg's law, Miller indices, Crystal imperfections, grain boundaries.

3. **Dielectrics :**

   (I): Properties of static field. Static dielectric constant, polarization, dielectric constant of mono atomic gases & poly atomic molecules, internal fields in solids & liquids, ferroelectric materials, spontaneous polarization, piezo electricity.
   (II) Properties in alternating fields: Frequency dependence of electronic, ionic polarizability, complex dielectric constant, dielectric loss, dipolar relaxation, breakdown in dielectrics. General properties of common dielectrics (Electrical, mechanical chemical and thermal). Gaseous dielectrics, liquid insulating materials, solid insulating materials, films.

4. **Magnetic properties of materials:**

   Magnetization, origin of permanent magnetic dipole moment, classification of Magnetic of materials, dia, para, ferro, antiferro & ferromagnetism, magnetic anisotropy, magnetostriction, soft & hard magnetic materials for electrical applications.

5. **Conductors**:

   Electron gas model of a metal, Relaxation time, collision time, mean free path, electron scattering & resistivity, heating effect of current, thermal conductivity, superconductivity, electrical conducting materials (Cu, Al) & their application. Mechanical properties like corrosion, solid curability, contact resistance.

6. **Semiconductors and Devices:**

   Density of carriers in intrinsic semiconductor & in n-type & p-type semiconductor, conductivity, Hall effect, drift & diffusion current, Einstein relation.

6. **Semiconductor Device Fabrication:**

Books:

1. Electrical Engineering Material---Dekker A.J. (PHI)
2. A course in Electrical Engineering Material—Seth & Gupta
3. Electrical Engineering Material---Rajput A.K.
4. Electrical Engineering Material---C.S. Indulkar & S. Thiruvengadam.

EE 341: Network Analysis   L   T   P
                                                                (3 – 1 – 0)
                                                        Theory Marks = 100
                                                        Sessional Marks =
                                                                        50
                                                            Time = 3 hours

1. **Elements of electric circuits:**

   The resistor: Practical engineering devices. Solid & wire frame of common resistive materials, carbon film and metal film resistors. Heat dissipating area (wattage), tolerance and temperature stability of resistors. Mathematical models, the capacitor: Comparison of properties of different traditional & modern dielectric materials (e.g. paper, ceramic, polystyrene polycarbonates etc.) Short description of electrolytic capacitor- wet & solid dielectrics, solid tantalum & aluminum capacitors, Mathematical models, the inductors: Mutual inductance, Properties of core materials. Brief studies of iron & ferrite cores, Mathematical models (only assignments).

2. **Transient phenomenon:**

   Forcing functions-impulse, step and ramp functions Study and solution of simple circuits undergoing transient disturbances, A.C. transients, Time domain equations and solutions by Lap lace transforms.

3. **Network topology:**

   Elementary graph theory as applied to electrical networks. Matrices of graph: Incidence matrix, circuit matrix, cut set matrix. Advanced techniques of equation formulation for numerical solutions.

4. **Matrix methods for the solution of circuit equations:**

   Solution of network equations by matrix methods. Methods suitable for simulating electric circuits on digital computers.

5. **Network theorems:**

   Millman's theorem, Reciprocity theorem, Compensation & Tellegen's theorems...etc. Analysis of coupled circuits. The dot rule & equivalent conductivity coupled forms of magnetically coupled circuits.

6. **Two port Network:**

   General principles, ABCD, Z, Y and hybrid parameters, Analysis of networks in tandem. Transmission lines. Lumped and distributed models. Characteristic impedance, Wave propagation constant, Reflection and terminations, attenuation and phase constants.

7. **Introduction to Network Synthesis:**

   Foster and Cour forms of realization of network for given driving point impedance function

   BOOKS:

   1. A user's guide to selecting Electronic components---Gerald L. Sinsoutg   (John Wiley)
   2. Engineering Circuit analysis---- W. H. Hayt Jr. & J.E. Kemmerly   (Mcgraw hill)
   3. Electric Circuit----J.A. Edwinster. (Mcgraw hill)
   4. Computer aided Network Design—Donald A. Calahan (Tata Mcgraw hill)
   5. A course in Electric Circuit Analysis—Soni & Gupta

EE 343: Advanced Computer Programming

9. Introduction to Linux:

Components and versions, description of files and directories, file operations, general line commands, Batch files, configuring the system, administrative mode of operation.

10.   Review of 1st semester IC course:

Control structure, decision control structure, case control structure.

11.   File operations:

Opening a file, File opening modes, Closing a file, Reading data from a file, writing data to a file, EOF.

12.   Functions:

What is function, passing values between functions, call by value, call by reference,

13.   Arrays and pointers:

Array definition, array initialization, bound checking, passing an array element to a function, passing an entire array to a function, 2-dimenational array, 3-dimential array, pointer definition, array of pointers.

14.   Structures:

Use of structure, Declaration of a structure, accessing structure elements, Storing of structure elements. Array of structures.

15.   Strings:

Definitions, Standard library string functions *strlen(), strcpy(), strcat(), strcmp(),* 2-dimentinal array of characters.

16.   Introduction to Object Oriented Programming:

Books:
1. Let Us C: Yashavant Kanetkar (BPB)
2. Let Us C++ : Yashavant Kanetkar (BPB)
3. Programming in C: E Balaguruswamy (TMG)
4. Programming in C – Gotterfried (TMG)

EE 342: Electrical Engineering Material & Devices

L   T   P
(3 – 1 – 0)
Theory Marks

=100

Sessional Mark
Time = 3 hours

7. **Structure of solids:**

   Crystalline state of solids, systems & classes, unit cell and space lattice, BCC, DC structure, Bragg's law, Miller indices, Crystal imperfections, grain boundaries.

8. **Dielectrics :**

   (I): Properties of static field. Static dielectric constant, polarization, dielectric constant of mono atomic gases & poly atomic molecules, internal fields in solids & liquids, ferroelectric materials, spontaneous polarization, piezo electricity.
   (II) Properties in alternating fields: Frequency dependence of electronic, ionic polarizability, complex dielectric constant, dielectric loss, dipolar relaxation, breakdown in dielectrics. General properties of common dielectrics (Electrical, mechanical chemical and thermal). Gaseous dielectrics, liquid insulating materials, solid insulating materials, films.

9. **Magnetic properties of materials:**

   Magnetization, origin of permanent magnetic dipole moment, classification of Magnetic of materials, dia, para, ferro, antiferro & ferromagnetism, magnetic anisotropy, magnetostriction, soft & hard magnetic materials for electrical applications.

10. **Conductors**:

    Electron gas model of a metal, Relaxation time, collision time, mean free path, electron scattering & resistivity, heating effect of current, thermal conductivity, superconductivity, electrical conducting materials (Cu, Al) & their application. Mechanical properties like corrosion, solid curability, contact resistance.

11. **Semiconductors and Devices:**

    Density of carriers in intrinsic semiconductor & in n-type & p-type semiconductor, conductivity, Hall effect, drift & diffusion current, Einstein relation.

6. **Semiconductor Device Fabrication:**

Books:

5. Electrical Engineering Material---Dekker A.J. (PHI)
6. A course in Electrical Engineering Material—Seth & Gupta
7. Electrical Engineering Material---Rajput A.K.
8. Electrical Engineering Material---C.S. Indulkar & S. Thiruvengadam.

IE 352: Instrumentation Engineering Drawing (0-0-3)

<div align="right">

Max Marks: 50 (Sessional)
Pass Marks: 18

</div>

1) Basic Components:-
   Power Sources, Resistors, Capacitors, Inductors, Switches, Connectors, Diode, Transistors, Thyristors, Integrated Circuits.

2) Measuring Instruments:-
   MI, PMMC, Hot-Wire, Induction Type & Electrostatic type Instruments, Analog Multimeter

3) System Components:-
   Resistive Potentiometers, strain gauge, LVDT, RVDT, Load-cell, Tachometers, Synchros, Stepper Motor, Seismic Sensors.

4) Basics of Control System:-
   Symbols, Open loop, Closed-loop systems block diagram.

5) Analytical & Industrial Instruments: -
   Humidity & Moisture sensors, Spectrometers, Pressure sensors, Flow Meters, Temperature Sensors.

5) Process Instruments & Biomedical Equipments: -
   Hydraulic & Pneumatic valves-pitot, flapper, slide & two stage valves, ECG, EMG, EEG, Pacemaker, Sphygmomanometer.

Reference Books:
1) Industrial Instrumentation by D. Patranabis, TataMcgraw.

EE 341: Network Analysis

3. **Elements of electric circuits:**

The resistor: Practical engineering devices. Solid & wire frame of common resistive materials, carbon film and metal film resistors. Heat dissipating area (wattage), tolerance and temperature stability of resistors. Mathematical models, the capacitor: Comparison of properties of different traditional & modern dielectric materials (e.g. paper, ceramic, polystyrene polycarbonates etc.) Short description of electrolytic capacitor- wet & solid dielectrics, solid tantalum & aluminum capacitors, Mathematical models, the inductors: Mutual inductance, Properties of core materials. Brief studies of iron & ferrite cores, Mathematical models (only assignments).

4. **Transient phenomenon:**

Forcing functions-impulse, step and ramp functions Study and solution of simple circuits undergoing transient disturbances, A.C. transients, Time domain equations and solutions by Lap lace transforms.

8. **Network topology:**

Elementary graph theory as applied to electrical networks. Matrices of graph: Incidence matrix, circuit matrix, cut set matrix. Advanced techniques of equation formulation for numerical solutions.

9. **Matrix methods for the solution of circuit equations:**

Solution of network equations by matrix methods. Methods suitable for simulating electric circuits on digital computers.

10. **Network theorems:**

Millman's theorem, Reciprocity theorem, Compensation & Tellegen's theorems...etc. Analysis of coupled circuits. The dot rule & equivalent conductivity coupled forms of magnetically coupled circuits.

11. **Two port Network:**

General principles, ABCD, Z, Y and hybrid parameters, Analysis of networks in tandem. Transmission lines. Lumped and distributed models. Characteristic impedance, Wave propagation constant, Reflection and terminations, attenuation and phase constants.

12. **Introduction to Network Synthesis:**

Foster and Cour forms of realization of network for given driving point impedance function

BOOKS:

1. A user's guide to selecting Electronic components---Gerald L. Sinsoutg   (John Wiley)
2. Engineering Circuit analysis---- W. H. Hayt Jr. & J.E. Kemmerly   (Mcgraw hill)
3. Electric Circuit----J.A. Edwinster. (Mcgraw hill)
4. Computer aided Network Design—Donald A. Calahan (Tata Mcgraw hill)
5. A course in Electric Circuit Analysis—Soni & Gupta