EB/EC/EE/EI/CE/CS/IT/ME/SE 301 ENGINEERING MATHEMATICS II

Module I

Matrices and Vector spaces: Rank of matrix, Echelon and normal form, Solutions of linear systems of algebraic equations, Eigen values and Eigen vectors, Cayley- Hamilton theorem (no proof). Vector Spaces- Subspaces,-Linear Independence of vectors-Linear span-Dimension and Basis. Linear transformations.

Module II

Fourier series and Fourier integrals: Fourier series of Periodic functions-Euler formulae for Fourier coefficients- functions having period 2π , arbitrary period- even and odd functions-half range expansions, Fourier integral, Fourier cosine and sine transformations, linearity property, transform of derivatives, convolution theorem (no proof)

Module III

Laplace transforms: Linearity property, transforms of elementary functions, Laplace transforms of derivatives and integrals, differentiation and integration of transforms, convolution theorm (no proof), use of Laplace transforms in the solution of initial value problems, unit step function, impulse function - transform of step functions, transforms of periodic functions.

Module IV

Vector calculus : Scalar and Vector point functions-Gradient and directional derivative of a scalar point functions.- Divergence and Curl of a vector point functions- their physical meanings.

Evaluation of line integral, surface integral and volume integrals, Gauss's divergence theorem,. Stoke's theorem (No Proof of these theorem), conservative force fields, scalar potential.

Text books:

1. R.K. Jain, S.R.K Iyengar: Advanced Engineering Mathematics, Narosa publishers.1991
2. C.R. Wilie & L.C. Barrett: Advanced Engineering Mathematics, MGH Co.

References

1. Larry C Andrews, Ronald C Philips: Mathematical Techniques for Engineers & Scientists, PHI
2. M.C. Potter, J.L. Goldberg: Advanced Engineering Mathematics, Oxford university press
3. B. S. Grewal: Higher Engineering Mathematics, Khanna publishers,1986

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

EB/ EC / EI/IT/ ME 302 ELECTRICAL TECHNOLOGY

Module I

Transformers: working principle and elementary theory of an ideal transformer, Constructional features of single phase transformer, emf equation, turns ratio, vector diagram, equivalent circuit, impedance transformation, transformer losses, flux leakage, efficiency, open circuit and short circuit test, load test. Auto transformer - working principle and saving copper, basic idea of current transformer and potential transformer, distribution and power transformer, applications, standard rating, IS specifications.

Module II

Basic principles of electrical machines: Concepts of motoring and generating action,

DC machines- Main constructional features, principles of operation, types of generators, emf equation, characteristics, applications, armature reaction and commutation, types of motors, torque, speed, and power, characteristics, applications, starting losses, and efficiency, speed control, testing, load test of dc machines.

Module III

AC Machines: Alternator- rotating field, speed and frequency, effect of distribution of winding, coil span, characteristics, emf equation, losses and efficiency, regulation (emf method only), applications, synchronous motor- principle of operation, over excited and under excited, starting, applications, synchronous capacitor.

Induction Motor: Three phase induction motor, principles of operation, and constructional features of squirrel cage and slip ring motors, torque-slip characteristics, starting, speed control, losses and efficiency.

Single phase induction motor: Principle of operation, types of single phase induction motors

Module IV

Generation, transmission & distribution of electrical energy:

Different methods of power generation- thermal, hydro-electric, nuclear, diesel, gas turbine stations (general idea only), electrical equipments in power stations, concept of bus bar, load dispatching, methods of transmission, transmission lines, overhead lines and insulators, corona and skin effect of DC & AC distribution, substation (elementary idea only)

Text Books:

1. F. S. Bimbra, *Electrical Machines*, 7th ed., Khanna publications.

References:

1. B. L. Theraja, *Electrical Machines*, vol I & IV, 23rd ed., Khanna Publishers.
2. H. Cotton, *Advanced Electrical Technology*, 6th ed., Wheeler publications.
3. Nagarath & Kothari, *Electrical Machines*, 3rd ed., Tata McGraw Hill.

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

CS/IT 303 DISCRETE COMPUTATIONAL STRUCTURES

Module 1

Logics and Proofs ,propositions, conditional propositions and logical equivalences, quantifiers, proofs resolution, mathematical induction ,sets ,relations ,equivalence relations ,functions.

Module 2

Algorithms introduction, notations, recursive algorithms, complexity of algorithm, counting methods and pigeon hole principle, recurrence relations.

Module 3

Graph theory, paths and cycles, Hamiltonian cycles, representation of graphs, Eulerian paths, traveling sales man problem, trees, characterization, spanning trees, game trees.

Module 4

Algebraic systems semi groups, monoid, subgroups, homomorphism, isomorphism automorphism , rings, sub rings, posets, lattice, hasse diagrams

Text books:

1. Discrete mathematics Richard Johnsonbaugh Pearson Education fifth edition
2. Discrete mathematical structures Satinder Bal Gupta Laxmi publications III edition

References:

1. Bernard Kolman, Robert C Busby, Sharon Cutler Ross, Nadeem-ur-rehman, Discrete mathematical structures , Pearson Education
2. J P Tremblay and Manohar Mc Graw Hill, Discrete mathematical structures with applications to computer science -
3. John Truss Addison , Wesley Discrete mathematical structures for Computer science

Type of questions for University Examination

Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module

Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

CS/IT 304 OBJECT ORIENTED PROGRAMMING USING C++

Module 1

Object oriented technology, comparison with procedural programming (C and C++),key concepts of object programming, input and output in C++, declarations ,control structures, functions

Module 2

Classes and Objects, declaring objects, accessing member variables, defining member functions, inline functions, static member variables and functions, friend function, overloading, constructors and destructors, overloading constructors, copy constructors anonymous objects, dynamic initialization using constructors, dynamic operators and constructors, recursive constructors encapsulation

Module 3

Inheritance, types of inheritance, virtual base class, abstract class, advantages and disadvantages of inheritance, pointers and arrays, C++ and memory

Module 4

Binding, polymorphism and virtual functions, generic programming with templates, exception handling, string handling and file handling

Text Books:

1. Ashok N Kamthane , Object oriented programming with ANSI and TURBO C++ , Pearson education
2. Saurav Sahay , Object oriented programming with C++ Oxford

References:

1. K R Venugopal et. al, Tata McGraw Hill , Mastering C++,
2. Malik , C++ Programming :From Problem Analysis To Program Design, Thomson Learning
3. Forouzan, Computer Science :A Structured Approach Using C++,2nd Ed., Thomson Learning

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

IT 305 ELECTRONIC CIRCUITS AND LOGIC DESIGN

Module I

Amplification: CE amplifier – Low, Medium & high frequency analysis and design of RC coupled amplifier – FET construction & characteristics - classifications class A, Class B, Class C amplifiers – transformer coupled amplifier - Push pull amplifier- Negative & positive feedback.

Module II

Pulse Circuits: Pulse shaping using RC circuits – differentiating integrating circuits-clipping – clamping using diodes and transistors – UJT – construction – characteristics-relaxation oscillator-Tunnel diode, SCR- Theory of operation and characteristics.

Operational Amplifier: - Differential amplifier common mode and difference mode operation – characteristics of ideal opamp block diagram – CMRR – Drift and offset problems.

Module III

Number system – Binary – HEX and other number systems – conversion from one radix to another - Boolean algebra – ASCII – EBCDIC –Grey Code- Excess 3 code – Code Conversion – parity checking. Basic logic gates – positive and negative logic – OR, AND, NAND, NOR, XOR and NOT gates – K map- Half adder –Full adder – subtractor - serial parallel addition- binary multiplication and division. multiplexer – demultiplexer-encoder – decoder -

Module IV

Sequential circuits: Flip-flops – RS, JK, T and D flip flops – conversions – shift registerscounters- asynchronous counter – synchronous counter – up down counter- ring counter. Logic families - TTL, RTL, ECL, CMOS - tristate logic – specification – noise consideration RAM, ROM, PROM, EPROM, BJTRAM CELLS – MOSRAMS.

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References :

1) H.H.Taub and D.Schgilling : Digital Integrated Electronics
2) Yarbrough, Digital LogicApplications and Design
2) R.Sandigi : Digital concepts with standard Integrated circuits
3) H.Blackly and John Viley : Digital Design with standard MSI and LST
4) Milman and Halkias : Electronic devices and circuits, Tata McGraw Hill
5) Milman and Halkias : Integrated Electronics
6) Milman and Taub : Pulse and Digital circuits
7) Boyelstead : Electronic devices & Integrated circuits.

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module
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IT 306 COMPUTER ORGANISATION

Module 1

Basic structure of computers – Functional units – Basic operational concepts – Bus structures – Instructions & instruction sequencing. Hardware and software - Addressing modes – Assembly language – Stacks &Subroutines

Module 2

Processing Unit – Fundamental concepts – Execution of a complete instruction - Hardwired control unit- micro programmed control - control signals - microinstructions- micro program sequencing- Branch address modification- Pre-fetching of micro instructions- Emulation.

Computer arithmetic - logic design for fast adders - multiplication - Booth's algorithm - Fast multiplication - integer division - floating point numbers and operations.

Module 3

Memory organization-Semiconductor RAM memories- internal organization of memory chips- Static and Dynamic memories - cache memories - mapping functions- replacement algorithms - virtual memory - address translations – performance considerations – interleaving - Secondary storage.

Module 4

Input-output organizations - interrupts – Enabling & Disabling interrupts - handling multiple devices - device identification - vectored interrupts - interrupt nesting – Simultaneous requests – DMA - Buses - I/O interface circuits –Standard I/O interfaces.

Text Books:

1. Hamacher C V, "Computer Organisation – International Edition -5th Edition", Mc.Graw Hill, NewYork
2. Stallings William, "Computer Organization and Architecture",6th Edition, Pearson Education.

References:

1. J.L Hennesy and D.A Pattersen,"Computer Architecture", Elsevier
2. Behrooz Parhami, "Computer Architecture", Oxford Univ. Press
3. Parthasarathy, Advanced Computer Architecture, Thomson Learning
4. V. P. Heuring and H. F. Jordan, *Computer System Design and Architecture*, Addison Wesley, New Delhi, 1997
5. Pal Chaudhary P, "Computer Organisation and Design " , Prentice Hall, New Delhi,
6. Hayes J P , "Computer Organisation and Architecture - 2nd Edition ", Mc Graw Hill,
7. Tanenbaum A S , "Structured Computer Organisation - 3rd Edition", Prentice Hall,
8. Kai Hwang & Faye A Briggs "Computer Archtecture and Parallel Processing "Mc.Graw Hill.,NewYork –1985

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

IT 306 LOGIC DESIGN LAB

A. ANALOG

1. Study of Multimeters, Signal Generators, CRO etc and measurement of electrical quantities.
2. Testing of active and passive components – Resistors , Capacitors, Inductors, Transformers, Diodes, Transistors etc.
3. Characteristics of active devices:
    i. Forward and reversed characteristics of a diode measurement of forward resistance .
    ii. Common base characteristics of a transistor – measurements of current gain, input resistance and output resistance , maximum ratings of the transistor.
    iii. Common emitter characteristics of a transistor – measurement of current gain, input resistance and output resistance, relation between and study of the effect of leakage current, maximum ratings of the transistor.
4. Rectifying circuits: FW Rectifier – HW Rectifier – FW Bridge Rectifier
Filter circuits – capacitor filter , inductor filter and FT section filter
(Measurement of ripple factor maximum ratings of the devices)
5. Study of RC and RLC circuits – Frequency response, pulse response, Filter Characteristics, Differentiating circuit and integrating circuit.
6. Clipping and clamping circuits using diodes/transistors

B. DIGITAL

1. Transfer characteristics and specifications of TTL and MOS gate.
2. Design of half adder and Full adder using NAND gates, set up R-S & J-K flip flops using NAND gates.
3. Asynchronous UP/DOWN counter using J-K F/Fs.
4. Study of shift registers and design of Ring counter using it.
5. Study of IC counter 7490,7492,7493 and 74192.
6. Study of MUX & DEMUX

Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.

CS/IT 308 OBJECT ORIENTED PROGRAMMING LABORATORY

Exercises to make the students understand the following concepts

- Difference between struct and class
- Data abstraction
- Data encapsulation and information hiding
- Inheritance
  - Single inheritance
  - Multiple inheritance
  - Multilevel inheritance
  - Hierarchical inheritance
- Abstract class
- Operator overloading
- Function overloading
- Over-riding
- Pointers and arrays
- Files

Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.