TEE 401   ELECTROMECHANICAL ENERGY CONVERSION-I

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Unit – I : Principles of Electro-mechanical Energy Conversion:- Introduction, Flow of Energy in Electromechanical Devices, Energy in magnetic systems (defining energy & Co-energy), Singly Excited Systems; determination of mechanical force, mechanical energy, torque equation, Doubly excited Systems; Energy stored in magnetic field, electromagnetic torque Generated emf in machines; torque in machines with cylindrical air gap .   **(7)**

Unit – 2 : D.C. Machines:- Construction of DC Machines, Armature winding, Emf and torque equation, Armature Reaction, Commutation, Interpoles and   Compensating Windings, Performance Characteristics of D.C. generators.   **(8)**

Unit –3 : D.C. Machines (Contd.):- Performance Characteristics of D.C. motors, Starting of D.C. motors ; 3-point and 4-point starters, Speed control of D.C. motors: Field Control, armature control and Voltage Control (Semiconductor Device Control method, Ward Leonard method); Efficiency and Testing of D.C. machines (Hopkinson's and Swinburne's Test).

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Unit –4 : Single Phase Transformer: Phasor diagram, efficiency and voltage regulation, all day efficiency, Testing of Transformers: O.C. and S.C. tests, Sumpner's test, polarity test. Auto Transformer: Single phase and three phase auto transformers, volt-amp, relation, efficiency, merits & demerits and applications.

                    (8)

Unit –5 : Three Phase Transformers: Construction, three phase transformer phasor groups and their connections, open delta connection, three phase to 2 phase, 6 phase or 12 phase connections, and their applications, parallel operation and load sharing of single phase and three phase transformers, excitation phenomenon and harmonics in transformers, three winding transformers.

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Text Books:
1. Principles of Electric Machines and Power Electronics, El Hawary, Wiley India
2. I.J. Nagrath & D.P.Kothari," Electrical Machines", Tata McGraw Hill
3. Charles Gross, Electric Machines, T & F , Delhi
4. A.E. Fitggerald, C.Kingsley Jr and Umans,"Electric Machinery" 6thEdition McGraw Hill, International Student Edition.
5. Principles of Electric Machines and Power Electronics, 2nd ed, Sen, Wiley India

TEE- 402:   **NETWORK ANALYSIS AND SYNTHESIS**

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Unit – I : Network Functions :
Concept of Complex frequency, Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot, frequency response and Bode Plots **(8)**

Unit – II : Two Port Networks:
Characterization of LTI two port networks ZY, ABCD and h-parameters, reciprocity and symmetry, Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks.
T & ∏ Representation. **(8)**

Unit – III : Network Synthesis :
Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms. **(8)**

Unit – IV : Filters:
Introduction, Classification of filters, introduction of windows, butter wrath filter challenge filter Equation of Ideal filter, Image parameters and characteristics impedance, passive and active filter/ of various filter FCR and CCR filter window matlab fundamentals, low pass, high pass, constant K type, M derived filters and their design. **(8)**

Unit – V : Sampled Data System
Introduction, Spectrum analysis of sampling process, Signal reconstruction, Difference equation,   Z-transform, Z-transform function, Inverse Z-transform, Relation of z- and s-transform, Stability analysis, Application of z-transform **(8)**

Text Books:
1. Kuo, Network Analysis and Synthesis, 2nd ed, Wiley India
2. M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India
3. N.C. Jagan and C. Lakshminarayana, "Nework Analysis & Synthesis" B.S. Publications, 2008.
4. Nagrath and Gopal, "Control System Engineering" Wiley Eastern Ltd.
5. M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis",Wiley Eastern Ltd.

TEE-403:   ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

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UNIT – I : Crystal Structure of Materials:
Bonds in solids, crystal structure, co-ordination number, atomic radius representation of plane distance b/w two planed packing factor, Miller Indices, Bragg's law and x-ray diffraction, structural Imperfections, crystal growth   **(7)**

UNIT – II : Dielectric Materials:
Polarization and Dielectric constant, Dielectric constant of mono-atomic, Poly atomic gases and solids, frequency dependence of electronic and ionic polarisabilities, dipolar relaxation, dielectric loss, piezoelectricity, ferroelectric materials   **(7)**

UNIT – III : Electrical Engineering Material:
Electron theory of metals, factors affecting electrical resistance of materials, thermal conductivity of metals, heat developed in current carrying conductors, Half effect, Drift and Diffusion currents, continuity equation, thermoelectric effect, superconductivity and super conducting materials, optical properties of solids   **(8)**

UNIT – IV : Magnetic Material:
Origin of permanent magnetic dipoles in matters, Classification Diamagnetism, Paramagnetism, Ferromagnetism, Antiferromagnetismand Ferrimagnetism, magnetostriction, Properties of magnetic materials, soft and hard magnetic materials, permanent magnetic materials.

(7)

Text Books :
1   A.J. Dekker,"Electrical Engineering Materials" Prentice Hall of India
2   Solymar, "Electrical Properties of Materials" Oxford University Press.
3.   Ian P. Hones," Material Science for Electrical and Electronic Engineering," Oxford
        University Press.

TEE-404: **MICROPROCESSORS and ITS APPLICATIONS**

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3 1 0

UNIT-I :

Introduction to Microprocessors: Evolution of Microprocessors, history of computers, Timing and control , Memory devices: Semiconductor memory organization, Category of memory

(4)

UNIT-II:

8-bit Microprocessors (8085): Architecture, Instruction Set, Addressing modes, Assembly Language Programming. **(6)**

UNIT-III:

16-bit Microprocessors (8086): Architecture, Physical address, segmentation, memory organization, Bus cycle, Instruction Set, Addressing modes, difference between 8085 & 8086 , Assembler Directives , Assembly Language Programming of 8086 **(10)**

UNIT-IV:

Peripheral Interfacing: Introduction, Types of transmission, 8257 (DMA), 8255 (PPI), Serial Data transfer (8251), Keyboard-display controller (8279), Programmable Priority Controller (8259), 8253, ADC, Application of peripheral devices **(11)**

UNIT-V:

Advanced Microprocessors: Introduction to 80186, 80286, 80386, 80486, Pentium microprocessors, introduction To Microcontroller (8051) **(9)**

Text Books:

1   Gaonkar, Ramesh S, "Microprocessor Architecture, programming and applications with the 8085" Pen ram International Publishing 5th Ed.
2   Uffenbeck, John, "Microcomputers and Microprocessors" PHI/ 3rd Edition.
3   Ray, A.K. & Burchandi, K.M., "Advanced Microprocessors and Peripherals: Architecture, Programaming and Interfacing" Tata Mc. Graw Hill.
4   Hall D.V., "Microprocessors Interfacing" Tata Mc Graw Hill
5   Liu and Gibson G.A., "Microcomputer Systems: The 8086/8088 Family" Prentice   Hall (India)

TEC-401: **ELECTROMAGNETIC FIELD THEORY**

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Unit-I:
Coordinate systems and transformation:
Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals,del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stoke's theorem, Laplacian of a scalar.

9

Unit-II:
Electrostatics: Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gausses's Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields.
Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition.
Electrostatic boundary value problems: Poission's and Laplace's equations, general procedures for soling Poission's or Laplace's equations, resistance and capacitance, method of images.

10

Unit-III
Magneto-statics: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density, Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential. Magnetic forces, materials and devices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy.
10

Unit-IV
Waves and applications: Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, Displacement current, Maxwell's equation in final form.
Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plain waves in good conductors, power and the pointing vector, reflection of a plain wave in a normal incidence.
7

Unit-V
Transmission lines: Transmission line parameters, Transmission line equations, input impedance, standing wave ratio and power, The Smith chart, Some applications of transmission lines.
6
Text Book
1. Kaduskar, Principles of Electromagnetics, Wiley India

2. Hyat, W.H. and Buck, J.A. "Engineering Electromagnetics" Tata McGraw Hill Publishing Co. Ltd.

3. Jorden E.C. and Balmain K.G. "Electromagnetic" wave radiating systems. PHI Second edition.
4. Ramo S, Whinnery T.R and Vanduzer T, Field and Waves in Communication Electronics' JohnWiley and Sons

THU 401:   Industrial Economics

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Unit-I:
Introduction: Nature & Significance of economics. Relationship between economics and science, Engineering & Technology, Contribution of industrial economics to economic development.

Unit-II:
Micro Economics: Basic concept of Micro Economics. Concept of demand, supply & price, the law pertaining to demand, supply & price indifference curve analysis, price effect, income effect & substitution effect.

Unit-III:
Business & Industry Application: Business cycles. Business Fluctuations. Theory of business cycles. Business forecasting .decision tree based on decision analysis case study based on micro economics. Competitions prevailing in the market.

Unit-IV:
Macro Economics: Introduction to macro economics relationship between macro economics & engineering & industry. National (N.I) Income & measurement of N.I. Inflation & deflation. N.I effect on economy. Unemployment & types of Unemployment. Relationship b/w inflation & unemployment measures to control inflation.
.
Unit-5:
Money & Banking: Balance of payment disequilibrium in balance of payment. Functions of money. Value of money. Functions of bank: commercial banks & central banking in India. Monetary & fiscal policy: a brief introduction case study pertaining to macro economics. A brief description of Indian Financial System.

References:

- *Economics as a Science*, (McGraw-Hill, 1970).
- Boulding, Kenneth E. (1966) *Economic Analysis*. New York: Harper and Row. 2 Volumes. vol. 1
- Bruce **Allen**, Neil Doherty, Keith Weigelt, Edwin Mansfield (2005) Managerial Economics
- Bernadette **Andreosso**, David Jacobson (2005) Industrial Economics and Organization
- Ken **Heather** (2002) The Economics of Industries and Firms
- Essentials of Macroeconomics **by** Peter Jochumzen **-** BookBoon **,** 2010

PEE-451:   ELECTROMECHANICAL ENERGY CONVERSION- I LAB

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Note: Minimum eight experiments are to be performed from the following list :

1   To obtain magnetization characteristics of a d.c. shunt generator
2   To obtain load characteristics of a d.c. shunt generator and compound generator (a) Cumulatively compounded (b) Differentially compounded
3   To obtain efficiency of a dc shunt machine using Swinburn's test
4   To perform Hopkinson's test and determine losses and efficiency of DC machine
5   To obtain speed-torque characteristics of a dc shunt motor
6   To obtain speed control of dc shunt motor using (a) armature resistance control (b) field control
7   To obtain speed control of dc separately excited motor using Conventional Ward-Leonard/ Static Ward –Leonard method.
8   To study polarity and ratio test of single phase and 3-phase transformers
9   To obtain equivalent circuit, efficiency and voltage regulation of a single phase transformer using C.C. and S.C. tests.
10   To obtain efficiency and voltage regulation of a single phase transformer by Sumpner's test.
11   To obtain 3-phase to 2-phase conversion by Scott connection.
12   To determine excitation phenomenon (B.H. loop) of single phase transformer using C.R.O.

PEE-452:   **MICROPROCESSORS LAB**

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A. Study Experiments

1   To study 8085 based microprocessor system
2   To study 8086 and 8086A based microprocessor system
3   To study Pentium Processor

B. Programming based Experiments (any four)

4   To develop and run a program for finding out the largest/smallest number from a given set of numbers.
5   To develop and run a program for arranging in ascending/descending order of a set of numbers
6   To perform multiplication/division of given numbers
7   To perform conversion of temperature from 0 F to 0 C and vice-versa
8   To perform computation of square root of a given number
9   To perform floating point mathematical operations (addition, subtraction, multiplication and division)

C. Interfacing based Experiments (any four)

10   To obtain interfacing of RAM chip to 8085/8086 based system
11   To obtain interfacing of keyboard controller
12   To obtain interfacing of DMA controller
13   To obtain interfacing of PPI
14   To obtain interfacing of UART/USART
15   To perform microprocessor based stepper motor operation through 8085 kit
16   To perform microprocessor based traffic light control
17   To perform microprocessor based temperature control of hot water.

PEE-453:   **NETWORK LAB**

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Note: Minimum eight experiments are to be performed from the following list.

1. Verification of principle of superposition with dc and ac sources.
2. Verification of Thevenin, Norton and Maximum power transfer theorems in ac circuits
3. Verification of Tellegin's theorem for two networks of the same topology
4. Determination of transient response of current in RL and RC circuits with step voltage input
5. Determination of transient response of current in RLC circuit with step voltage input for under damp, critically damp and overdamp cases
6. Determination of frequency response of current in RLC circuit with sinusoidal ac input
7. Determination of z and h parameters (dc only) for a network and computation of Y and ABCD parameters
8. Determination of driving point and transfer functions of a two port ladder network and verify with theoretical values
9. Determination of image impedance and characteristic impedance of T and $\prod$ networks, using O. C. and S.C. tests Write Demo for the following (in Ms-Power point)
10. Verification of parameter properties in inter-connected two port networks: series, parallel and cascade also study loading effect in cascade.
11. Determination of frequency response of a Twin – T notch filter.
12. To determine attenuation characteristics of a low pass / high pass active filters.

Note : College may add any three experiments in the above list.