BOARD OF STUDIES IN ELECTRICAL ENGINEERING

SEMESTER V (ELECTRICAL ENGINEERING)

MICROPROCESSORS AND INTERFACING:

Unit 1: (10)

VSLI circuit concept, Approach to integrated system design using microprocessors, Bus concepts, Address Data and control, Organisation

of a computer with MPUBits/ Byts/Words/Longvards-their ranges-accuracy and precision, Memory organisation, Linear/ Absolute

decoding.

Unit 2 : (8)

Introduction to Intel's 8085A Architecture-description, software instructions, Addressing Modes-Advantages, Timing diagrams Assess,

Assemblers and Dissemblers-(By Hand Coding)

Unit 3: (10)

Flag structure, concept of PSW stacks and subroutines, simple and Nested, PUSH,POP instructions and CALL/RETURN instructions,

Stack manipulation, simple programmes.

Unit 4 : (6)

Interrupts-concept and structure in 8085, interrupt service routines, Advanced instructions and Programming of 8085A.

Unit 5 : (8)

Methods of data transfer-serial, parallel, synchronous, asynchronous, IN/OUT instructions, Timing diagrams simple hardware interface to

8085 of standard Latches/Buffers/Keys/display devices as I/O ports, Handshaking concepts, Architecture and interface of 8255 and 8253

to 8085.

Unit 6 : (8)

Hardware considerations- Bus contention, Slow memory interfacing complete, signal description of 8085, Multiplexed, Key board/

Display interface and assembler directives, General awareness about micro-computer system related products.

TEXT BOOKS:

1. Programming & Interfacing 8085A by Gaonkar in Wiley Eastern.

2. Programming Of 8085 By D.V.Hall in McGraw Hill.

3. Goody Intel microprocessor in Tata McGraw Hills.

4. Pal Mrocroprocessor Principals & Applications in Tata McGraw Hills.

5. Gilmore Mrocroprocessor Principals & Applications in Tata McGraw Hills.

INSTRUMENTATION :

Unit-1 : (9)

Generalised instrumentation systems. Active and passive transducers, Digital and analogue mode of operation, Static and Dynamic

characteristics and performance of instruments. Statistical treatment of measurement errors, Gaussian error distribution probability tables,

combination of errors.

Unit–2 : Motion Measurement : (9)

Relative and absolute motion measurement, measurement of velocity and acceleration, Electrical transducers for motion measurement,

LVDT, piezoelectric transducers variable inductance transducers, measurement of shaft torque and power.

Unit-3 : Temperature Measurement :-(9)

Laws of thermo-electric circuits, thermocouples, cold junction compensation, thermistors, radiation thermometry, Broad band narrow

band radiation methods, Two colour pyrometers optical pyrometers, temperature compensation of temperature sensors, heat flux sensors.

Unit-4 : Miscellaneous Measurements :-(8)

Brief treatment of principles used in the measurement of liquid level, flow pressure and pH. Cathode ray oscilloscopes, Introduction to

data acquisition systems.

Unit-5 : Methods of Analogue to Digital conversion :-(5)

Errors in A to D conversion, application in digital voltmeters electronic frequency time period measurement.

Unit-6 : Integrated Circuits in Instrumentation :- (5)

Operational amplifiers (741), comparators(339), X Timers(555), Function generators (2206), Constant Current Source using ICD,

Elementary Idea of Microprocessor based instrumentation.

Note :- Stress should be on electrical/ electronic methods.

TEXT BOOKS:

1. Measurement System Application and Design by E.O. Doeblin in McGraw Hill.

2. Electronic Instrumentation & Measurement Technique By W.D. Cooper in Prentice Hall.

3. Instrumentation for Engineering Measurements By Dalley Railey, Mc Connel in John Wiley & Sons.

4. Electrical & Electronics Measurements & Instrumentation By A. K. Sawhney.

5. Instrunentation Devices & Systemes By Rangan in Tata McGraw Hill.

ELECTRICAL MACHINE DESIGN

Unit 1 : (6)

Review of material used in construction of electrical machines, classification of insulating materials depending upon permissible

temperature rise, properties of transformer oil. Standard specifications, C.M.R. and short time rating of machines, Heating & Cooling

characteristics.

Unit-2 : Transformer Design :- (10)

Specific loading, equation for voltage per turn for power and distribution transformers output equation.

Unit – 3: (8)

Principle of electric and magnetic circuit design method of cooling and cooling circuit design, Estimation of performance characteristics

from the design data

Unit – 4: Induction Motor :- (6)

Main dimensions, output equation, loading constants, estimation of axial lengths, air gap diameter, winding design

Unit – 5: (14)

Air gap length, slot combination for stator and rotor of I.M.cage rotor and would rotor design.Calculation of no load current and other

performance on characteristics for design data.

Unit – 6 : Synchronous Machine :-(8)

Air gap length, methods of obtaining sinusoidal o/p voltage, field coil design for salient pole machine and for turbo generator rotor.

Ventilation of synchronous generator, cooling air circuits, closed ventilation/ quantity of cooling medium hydrogen and water as cooling

media.

TEXT BOOKS:

1. Performance & Design of A.C. Machine By M.G. Say.

2. Electrical Machine Design By A.K.Sawhney in Dhanpatrai & Sons Delhi.

3. Electrical Machine Design By Balbir Singh in Brite Students Publications, Pune.

4. Power Transformer By Vasytinski, P.S.G. College of Technology, Coimbtore.

5.Electrical Machine Design by, M.V. Deshpande.

ELECTRICAL MACHINES-II:

Unit- 1 :Three Phase Synchronous Generators :- (10)

Introductions, constructional features of cylindrical and salient pole rotor, machines introduction to armature winding and field windings,

MMF of armature and field windings, induced EMF.

Unit-2 : Steady State Operation of Three Phase Synchronous Generators :-(8)

Phasor diagram, regulation, steady state performance of three phase synchronous generator.

Unit-3 : (6)

Synchronizing of generator with another generator, parallel operation, experimental determination of parameters, short circuit ratio,

losses and efficiency.

Unit- 4 : Synchronous Machines On Infinite Bus :-(13)

Phasor diagram, expression for torque, load/torque angle, synchronous motor operation, effects of variable excitation and power input on

generator operation and effect of variable excitation and load on motor operation.

Unit-5 : Transient Behaviour :- (8)

Sudden 3 phase short circuit, Transient and sub-transient reactances and their measurements, time constants and equivalent circuit

diagram, damper winding.

Unit-6 : Introduction To Special Machines :-(7)

Repulsion motors, AC series motors, universal motors, reluctance motor, hysteresis motor, schrese motor, power selsyns. Position solving

(only elementary aspects of the above types are expected)

TEXT BOOKS:

1. Electrical Machines by Dr. P.K. Mukherjee and S.Chakarvarti.

2. Electrical Machinery by Fitzegerald and Kingsley and Kusko, MacGraw Hill.

3. Electrical Machinery by Nagrath and Kothari.

4. Electrical Machinery by P.S. Bhimbra.

ELECTRICAL POWER SYSTEM-1:

Unit-1 : (8)

Structure of electrical power system, brief exposition of generation, transmission and distribution aspects, elementary consideration of

economic bulk power supply system, use of high voltage, general system consideration, idea about substation, concept of real, reactive

and complex power unit system, Load and their characteristics, voltage and frequency dependence of loads.

Unit-2 : (8)

Representation of power system elements, models and parameters of generator, transformer and transmission lines.

Unit –3 : Elementary distribution schemes :-(8)

Feeders and distributors, LT and HT cables.

Unit- 4: (8)

Voltage regulation and efficiency of power transmission lines using simple series equivalent representation, and by circle diagram using

generalised constants.

Unit – 5: (8)

Interconnection of system elements to form two bus system, Illustration of active and reactive power transmission, Introduction to load

flow studies in multiuse system(Methods of solution not expected), Introduction of frequency and voltage as system state indicators.

Unit- 6 : (10)

Elementary concepts of real and reactive power control, Steady state performance of turbine governors, load sharing between generators,

preliminary concepts of automatic voltage regulators for turbot generators, Insulation of overhead lines, insulator string, efficiency, types

of insulators.

TEXT BOOKS:

1. Modern Power system Analysis by Nagrath and Kothari.

2. Electrical Energy System Theory by Elegard.

3. Elements of Power System Analysis by Stevenson.

4. Westinghouse Transmission and Distribution Handbooks.

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5. Power System Analysis by Wadhwa C. L.