Electrical Engineering (Subject Code - 09)

PAPER – I

Network :

Steady state analysis of d.c. and a.c. networks, network theorems. Matrix Algebra, network functions, transient response, frequency response, Laplace transform, Fourier series and Fourier transform, frequency spectral polezero concept, elementary network synthesis.

Statics and Magnetics :

Analysis of electrostatic and magnetostatic fields: Laplace and Poisson Equations, solution of boundary value problems, Maxwell's equations, electromagnetic wave propagation, ground and space waves, propagation between earth station and satellites:

Measurements :

Basic methods of measurements, standards, error analysis, indicating instruments cathode ray oscilloscope; measurement of voltage current, power, resistance, inductance, capacitance time, frequency and flux; electronic meters.

Electronics :

Vaccum and semiconductor devices; equivalent circuits transistor parameters, determination of current and voltage gain, input and output impedances biasing technique, single and multistage, audio and radio small signal and large signal amplifiers and their analysis; feedback amplifiers and oscillators; wave shaping circuits and time base generators, analysis of different types of multivibrator and their uses; digital circuits.

Electrical Machines :

Generation of e.m.f.,m.m.f. and forque in rotating machines; motar and generator characteristics of d.c., synchronous and induction machines, equivalent circuits, Commutation parallel Operation, phase or diagram and equivalent circuits of power transformer, determination of performances and efficiency, autotransformers, 3-phase transformers.

Electrical Engineering

PAPER – II

Section – A : Control Systems

Mathematical modeling of dynamic linear control systems, block diagrams and signal flow graphs, transient reponse steady state error, stability, frequency response Techniques, root locus techniques series compensation.

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Industrial Electronics

Principles and design of single phase and polyphase rectifiers controlled rectification, smoothing filters; regulated power supplies, speed control circuits for drivers, inverters, a.c. to d.c. conversion, Choppers; timers and welding circuits.

Section – B (Heavy Currents)

Electrical Machines :

Induction Machines – Rotating magnetic field; poly phase, motor; principle of operation; Phasor diagram; Torque slip characteristic; Equivalent circuit and determination of its parameters; circle diagram; starters; speed control, Double cage motor; Induction generator; Theory; Phasor diagram, characteristics and application of single phase motors, Application of two-phase induction motor.

Synchronous Machines – e.m.f. equation phasor and circle diagrams; operation on infinite bus; synchronizing power, operating characteristic and performance by different methods; sudden short circuit and anlysis of oscillogram to determine machine reactances and time constants, motor characteristics and performance methods of starting applications, Special Machines-Amplidyne and metadyne operating characteristics and their applications.

Power Systems and Protection – General layout and economics of different types of power stations; Baseload, peakload and pumped-storage plants; Economics of different systems of d.c. and a.c. power distribution, Transmission line parameter calculation; concept of G.M.D. Short, medium and long transmission Time; Insulators, Voltage distribution in a string of insulators and grading; Environmental effects on insulators, fault calculation by symmetrical components; load flow analysis and economic operation; Steady state and transient stability; Switch-gear methods of are extinction; Restricting and recovery voltage; Testing of circuit breaker, protective relay;s protective schemes for power systems equipment; C.T. and P.T. Surges in transmission lines; Travelling waves and protection.

Utilisation : Industrial drives, electric motors for various drives and estimates of their rating; Behaviors of motor during starting acceleration, braking and reversing operation; Schemes of speed control for d.c. and induction motors.

Economic and other aspects of different systems of railtraction; mechanics of train movement and estimation of power and energy requirements and motor rating characteristics of traction motors, Dielectric and induction heating.

Section – C (Light Currents)

Communication Systems – Generation and detection of amplitude frequency-phase- and pulse-modulate signals using oscillators, modulators and demodulators, Comparison of modulated systems, noise, problem, channel efficiency sampling theorem, sound and vision broadcast transmitting and receiving system, antennas, feeders and receiving circuits, transmission line at audit radio and ultra high frequencies.

Microwaves – Electromagnetic wave in guided media, wave guide components cavity resonators, microwaves tubes and solid-state devices; microwave generators and amplifiers, filters microwave measuring techniques, micro-wave radiation pattern, Communication and antenna systems. Radio aids to navigation.

D.C. Amplifiers – Direct coupled amplifiers, difference Amplifiers, choppers and analog computation.