ELECTRICAL ENGINEERING

PAPER -II

SECTION A

Control Systems :

Mathematical modelling of dynamic linear control systems, block diagrams and signal flow graphs, transient response steady state error, stability, frequency response techniques, rootlocus rechniqes series compensation.

Industrial Electronics :

Principles and design of single phase and polyphase rectifires controlled retification, smoothing, Filters, regulated power supplies, speed control circuits for drivers, inverters, d.c. conversion, choppers, timers and welding circuits.

SECTION B

(Heavy Currents)

Electrical Machines :

Induction Machines - Rotating Magnetic filed polyphase motor, principle of operaton, phasor diagram, torque slip characteristic, Equivalent circuit and determination of its parameters, cirlce diagram, starters, speed control, Double cage motor, Induction generator, Theory, Phasor diagram, Charcteristics 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, synchroizing power operating characteristic and performace by different methods sudden short cicuit and analysis of oscillogram to determine machine reactances and time constants, motor characteristics and performance methods of starting application.

Special Machines. Amplidyne and metadyne operating characteristics and their applications.

Power systems and protections, General layout and economics of different types of power stations, Baseload, peak-load and pumped storage plants, Economics of differant systems of d.c. and a.c. power distribution. Transmission line paerameter calculation, concept of G.M.D. short, medium and long transmission line, Insulators, Voltage distribuion in a string of insulators and garding, Enviromental effect on insulators, Fault calculation by symmetrical components, load flow analysis and economic opeation steady and transient stability, Switchgear Methods of arc extinction, Re-striking and recovery voltage, Testing of circuit breaker, Protective relays, protective schemes for power system equipment, C.T. and P.T. Surges in transmission lines, Travelling waves and protection.

Utilisation : Industrial diverse electric motors for various drive and estimates of their rating, Behaviour of motor during stating acceleration, breaking and reversing operation, Schemes of speed control for d.c. and induction motors.

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

OR

SECTION C

(Light Currents)

Communication systems, Generation and detection of amplitude-frequency phase and Pulsemoodulate signals using oscillators, modulators and demodulators Comparison of modulated systems, noise, propblems, channel efficiency sampling theorem, sound and vision broadcast transmitting and receiving systme antennas, feeders and receiving circuits, transmission line at autio radio and ultra high frequencies.

Microwaves : Electromagenetic wave in guided media wave guide components cavity resonator, microwave tubes and solid-state devices, microwave gnerator and amplifiers, filters micorwave measuring teachinques, microwave radiation patterns, communication and antenna systems Radio aids to navigation.

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