

Induction and Synchronous Induction Machines.—Types and characteristics. Speed control and pole-changing. Starting. Synchronizing. Testing. Determination of efficiency. Heating. Vector diagram. Windings.

Synchronous Machines.—Types and characteristics. Voltage control. Regulation, parallel operation starting. Synchronizing. Testing. Determination of efficiency. Heating. Vector diagram. Windings. Synchronous converter. Induction alternator.

D.C. Machines and A.C. Commutator Machines.—Types and characteristics. Voltage control. Regulation. Parallel operation. Speed-control (including Ward-Leonard). Starting. Testing. Determination of efficiency. Heating. Commutation. Windings.

Mercury-arc-Rectifiers.—Theory of operation, starting and voltage control. Number of phases. Transformer connections. Testing. Harmonics and smoothing equipment.

A candidate in this subject will be required to present a certificate from the Principal of the institution attended that he has carried out a course of practical work of at least 120 hours' duration based on the prescriptions (a), (b), (c), and (d) above and that his attendance and work have been satisfactory.

Radio Communication. (Four papers—three hours each)

Papers (a) and (b) : Theory and Measurements

More advanced treatment of A.C. network theory.

Class A, B, and C amplifiers. Push-pull operation. Forms of feed-back. Valve and metal rectifiers; smoothing; voltage doubling. Sine-wave and relaxation oscillators; frequency stabilization; generation of micro-waves.

Methods of modulation, amplitude, phase, frequency and pulse, and of demodulation; frequency changing. Transmission-line system for use at high radio frequencies; general theory, reflection effects; matching methods. Waveguides.

Principles of electromagnetic wave propagation and of effects arising in propagation.

Voltage and current distributions, radiation resistance and polar diagrams of simple antennae. Principles of direction-finding; antenna systems for D.F. purposes; causes of error and their elimination.

Cathode-ray oscillography; methods of controlling focusing, brilliance and deflection; simple time-base circuits.

Methods of measurements of the characteristic impedance, attenuation and phase constants of high frequency transmission lines.

Papers (c) and (d) : Equipment and Circuits

Dielectric and magnetic materials suitable for use at radio frequencies. Radio telegraph, radio telephone, and television transmitters; characteristic features. High- and low-power modulation; carrier suppression; power-supplies.

Receivers; superheterodyne and super-regenerative types; selectivity and gain control; terminal equipment for connection of radio telephone circuits of the landline network. Causes of and methods of suppressing radio interference.

Broadcasting and directional transmitting arrays; receiving aerials; principles of mechanical design.

Simple examples of cost comparison.

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