Subject Code : RNR413A

INDUSTRIAL CONTROL.

UNIT – I : Special Machines:

Stepper motors – Constructional details – variable reluctance type – Permanent magnet type – Hybrid type – Switching sequence – Drive circuits and devices – Brush less DC motor – Block Diagram.
Servo Mechanism:
Potentiometers and encoders – Synchro transmitter – Synchro receiver – differential synchro servo motors – constructing of drag cap. Two phase servo motor – conventional two phase servo motor circuit – Torque speed characteristics.

UNIT – II : Motor Controls:

Braking of DC motors – Friction brake – Shoe brake – electrical braking for various types of DC motors – Plugging circuit.
Speed Control : Field – weakening – Armature resistance control – armature voltage control – Simple solid state motor speed controllers – Motor speed control using SCRs – closed loop speed controllers – Speed control for (series) universal motor – DC chopper control.
Braking of AC motors – capacitor discharge method speed control of AC motors – variable frequency converter – Static frequency converters – DC servo motors – AC technogenerator closed loop position control – word Leonard position control.

UNIT – III : Starters and Control Devices:

Electromagnetic relays – Schematic diagram of a relay – Relay types – solenoids – contactors – motor starters – overload protection. Time delay relay – ladder diagrams – starting of 3 phase motors - reduced voltage starting – Primary resistance starting - Auto transformer starting – Star delta starting – Timers – Programmable timers.

UNIT –IV : Rectifiers and Regulators:

Review of rectifier circuits – half wave and full wave bridge rectifier – 3 phase (half wave) – 3 phase full wave various filter circuits –voltage multipliers – voltage regulators IC voltage multipliers – voltage regulators - IC voltage regulators, current booster circuit – constant current circuits – various types of opto couplers –Glass isolated – Air isolated – opto couple triac.

UNIT – V : Programmable Logic Controllers:

Definition and articulation with related equipment block structure of PLC – structure of CPU structure of memory – input – output modules – Operation of the whole processor Unit – Programming and hard wiring the PLC – Programming Languages – Ladder logic – Symbolic representation – Single line timers and counters – single line data manipulation. Instruction – block counters and timers – development of ladder logic diagram for various industrial applications.

Book for Study:

Digital and Analog Controls. Marvin A. Needler. Reston Publication