

**SARDAR PATEL UNIVERSITY**  
**Programme & Subject: B.Sc (Instrumentation – Vocational)**  
**Semester: V**  
**Syllabus with Effect from: June-2013**

<b>Paper Code: US05CINV03</b>	<b>Total Credit: 3</b>
<b>Title Of Paper: Control System Component</b>	

Unit	Description in detail	Weightage (%)
I	<p><b>Relays, Contactors and Solenoid</b>  Solenoids  Relays: Electromechanical Control Relays, Solid State Relays, Timing Relays, Latching Relays, Relay Logic  Contactors: Magnetic Contactor, Arc Suppression, Contactor size and ratings, Magnetic Motor Starter, Solid State Contactor</p>	25%
II	<p><b>Stepper Motor, Servos and Synchros</b>  Stepper motor: Introduction, Construction, phases, poles, Step angle, size and power, rotating magnetic field, torque generation, stepping modes, torque vs angle, torque vs speed characteristics, step angle accuracy, mechanical parameters,  Servos: Introduction, categories of control system, operation of basic servo system, basic servo loops: position, velocity and accelerator, servo components and circuits: sensors, ac and dc rate generators, amplifiers and motors  Synchros: Introduction, classification, operation torque transmitter, torque receiver</p>	25%
III	<p><b>Control Valves</b>  Introduction, Rangeability, Valve capacity, flow rate vs flow coefficient, flow characteristics: inherent and installed, Bonnet Assembly, selection of control valve; Globe Valves: Single Port, balanced plug cage style, double port, three way valves; Butterfly Valves, diaphragm valves, cage guided valve bodies, valve plug guiding</p>	25%
IV	<p><b>Actuator for control valve</b>  Electrical Actuators: Solenoids, Electric motors, Motors as direct actuators  Electromechanical Actuators: rotary and linear output type.  Pneumatic Actuators: Spring and Diaphragm type, fail-safe operation of spring and diaphragm actuators, spring-less diaphragm.  Piston actuators, Rotary Actuators, Rotary air motor actuator and Hydraulic actuators. Comparison between different actuators.</p>	25%

