Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-IV Examination-Nov/Dec-2011

Subject code: 142002 **Date: 02/12/2011**

Subject Name: Basic Mechatronics

Time: 02.30 pm -5.00 pm **Total marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	(a)	(i) Explain different types of control systems with suitable examples.	03
		(ii) Give the elements of the closed loop system and advantages of closed loop system.	04
	(b)	Explain Hydraulic actuator modeling.	07
Q.2	(a)	(i) Compare conventional, NC and CNC systems.	03
		(ii) Describe general configuration of CNC Machines. Give applications of CNC Machines in metal cutting and other industries.	04
	(b)	Describe following sensors : i) Bimetallic strip ii) Venturimeter iii) LVDT	07
		OR	
	(b)	Describe following sensors : i) Diaphragm pressure gauge ii) Orifice meter iii) Resistance Temperature detector	07
Q.3	(a)	Explain PWM DC converter circuits with its wave forms.	07
	(b)	Explain types of buses of Microprocessors.	07
		OR	
Q.3	(a)	What is Unipolar stepper motor and Bipolar stepper motor? Explain control of any one with full stepping switching sequence.	07
	(b)	Give broad classification of electrical motors.	07
Q.4	(a)	Describe operations of Gear Pump, Pressure Relief Valves and Bladder Accumulator with neat sketch.	07
	(b)	(i) State advantages of Belt drive. Also give factors to be considered for selection of Belt drive.	04
		(ii) The ratio of the belt tensions in two sides of a belt drive is 2:1. Find the tensions when 5 kW is being transmitted at 600 RPM. The diameter of the Driving pulley is 800 mm.	03
		OR	
Q.4	(a)	(i) Calculate the pressure (bar) required to move load of 30 kN, if piston diameter is 100 mm.	02
		(ii) Calculate the velocity of piston if flow is 100 LPM and piston diameter is 125 mm.	02
		(iii) Draw and explain hydraulic circuits to control single acting Hydraulic cylinders.	03
	(b)	(i) Explain Simple and Compound gear train with neat sketch.	04
		(ii) Classify different types of Journal Bearings and explain them briefly.	03
Q.5	(a)	Explain different types of memories for 8085 Microprocessors.	07
	(b)	Draw and explain the circuit diagram and connection diagram of Long Shunt Compound Motor.	07
		OR	
Q.5	(a)	Explain any two types of stepper motors.	07
	(b)	Explain Transistor in detail.	07