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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2153406 **Date:11/05/2016**

Subject Name:Mechatronics

Time:02:30 PM to 05:00 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)**	Discuss the merits and demerits of Mechatronics Systems. What are the conditions under which Mechatronics systems are better than Mechanical systems?	**07**
	(b)	i. Differentiate open loop and closed loop systems giving examples.	**03**
		ii. Explain the following : CNC and NC machines, CAM and FMS systems	**04**
Q.2	**(a)**	Describe the following: (1) LVDT (2) Absolute and Incremental Encoders (3) Tactile and Proximity Sensors	**07**
	(b)	Explain the operation and construction of, (i) Vane pump (ii) Double acting Pneumatic Cylinder (iii) Pressure relief valve	**07**
		OR	
	(b)	Differentiate Hydraulic and Pneumatic systems giving suitable examples and applications of each.	**07**
Q.3	**(a)**	Explain speed control of DC motor using full wave converter with circuit and waveform.	**07**
	(b)	What is a Gear train? State different types of Gear trains. Describe Reverted Gear train and derive the relation of Gear ratio.	**07**
		OR	
Q.3	**(a)**	Explain the application of PLC in context of Engine management systems and robotics. "PLC is a good substitute for a relay" Evaluate.	**07**
	(b)	State different types of temperature transducers and explain any two in details.	**07**
Q.4	**(a)**	Explain the feedback control of DC motor for velocity, velocity plus position and PID controllers.	**07**
	(b)	"Bearings are very important element in power transmission". Explain.	**03**
		Classify different types of Journal bearings and explain them briefly	**04**
		OR	
Q.4	**(a)**	Explain the construction and working principle of single phase induction motor.	**07**
	(b)	(i)Describe operation of Fast and Loose pulley	**03**
		(ii) Compare Gear, Chain and Belt drive.	**04**
Q.5	**(a)**	"Robots are more versatile than human beings". Evaluate. Differentiate between forward and inverse kinematics.	**07**
	(b)	Explain the different types of configurations of a robot using a neat sketch.	**07**
		OR	
Q.5	**(a)**	Explain the D-H notation and derive the algorithm for any robotic configuration.	**07**
	(b)	Discuss the different types of drive systems in robots listing their merits and demerits.	**07**

****