Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – SUMMER 2013

Subject Code: 142002 **Date: 17-06-2013**

Subject Name: Basic Mechatronics

Time: 10:30am – 01:00pm **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 example. (ii) Give full form of following acronyms: AVCS,CIM,CAM,FMS	**03** **04**
	(b)	Explain and derive equation for Direct current shunt motor modeling.	**07**
Q.2	**(a)**	Describe the following: (i) Potentiometer Displacement Sensor (ii) Bimetallic strip	**07**
	(b)	Describe the operation and construction of, (i) Variable displacement Vane pump (ii) Double acting Cylinder	**07**
		OR	
	(b)	(i) Draw the typical Hydraulic circuit and identify different hydraulic components (ii) Calculate (i) Pressure(bar) (ii) Piston velocity if in a Hydraulic system load is 15 kN, Flow is 50 litres/min and piston diameter is 80 mm.	**03** **04**
Q.3	**(a)**	Give the explanation of hall effect transducers with diagram.	**07**
	(b)	Explain four quadrant operation of DC motor speed control and explain why freewheeling diode is used.	**07**
		OR	
Q.3	**(a)**	Explain the single phase induction motor and methods of self starting.	**07**
	(b)	Explain types of memory of Microprocessor 8085	**07**
Q.4	**(a)**	What is Cam? State different types of Cams and Cam followers. Describe working principle of Cam and Cam follower.	**07**
	(b)	(i) Differentiate between simple and compound gear train. (ii) Briefly describe different types of gears	**03** **04**
		OR	
Q.4	**(a)**	(i) What is idler pulley? What is its function? (ii) The open belt drive, running in the clockwise direction, the tension in tight side is 2000N and slack side is 1000N. If the diameter of driving pulley is 750 mm and rotates at 600 rpm. Determine the power transmitted.	**03** **04**

	(b)	(i)Describe operation of Fast and Loose pulley (ii) Compare Gear, Chain and Belt drive.	**03** **04**
Q.5	**(a)**	Explain construction and working of AC servo motor using a circuit diagram.	**07**
	(b)	Explain Bipolar transistors and give detail of its operating region.	**07**

OR

Q.5	**(a)**	Explain any two types of stepper motor with suitable diagram.	**07**
	(b)	Explain the feedback control of DC motor for velocity, velocity plus position and PID controllers.	**07**

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