Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 710806N **Date: 30-06-2014**

Subject Name: Mechanical Engineering for Mechatronics

Time: 02:30 pm - 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)**	What do you mean by Mechatronics. How design of Mechatronics differs from traditional design? Explain the concurrent integration for Mechatronics with neat sketch.	**07**
	(b)	Explain the automatic washing machine with a block diagram. How does the mechanical system complement electronic one?	**07**
Q.2	**(a)**	What is transducer? Give the classification of transducers & list the selection specification for the transducers.	**07**
	(b)	Define Hall Effect. Explain the linear and threshold Hall Effect sensors.	**07**
		OR	
	(b)	Which are light sensors? Describe a digital optical encoder.	**07**
Q.3	**(a)**	Explain Hydrostatic transmission with neat sketch.	**07**
	(b)	Explain working principle of a hydraulic motor. Describe the working of vane motor with a neat diagram.	**07**
		OR	
Q.3	**(a)**	Classify the sensors. Explain any one flow sensor with neat sketch.	**07**
	(b)	Explain with neat sketch the basic elements of the control system of an Automatic camera.	**07**
Q.4	**(a)**	Write three basic types of faults in Pneumatic systems. When the fail safe circuit employed in Pneumatic systems?	**07**
	(b)	Derive transfer function of Armature controlled DC motor.	**07**
		OR	
Q.4	**(a)**	Explain the stages of preparation of air in brief. Why it is needed?	**07**
Q.4	**(b)**	What is transfer function? Derive equation for field controlled DC motor.	**07**
Q.5	**(a)**	Explain theory of re-circulating ball screw with neat sketch. State the applications of it.	**07**
	(b)	What is difference between antifriction and frictionless bearing? Discuss selection criterion of each.	**07**
		OR	
Q.5	**(a)**	What is stick slip phenomena? How it affects performance of slide ways? Explain methods to avoid this phenomena.	**07**
	(b)	Explain force current and force voltage analogy with its mathematical equations.	**07**

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