Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VI Regular Examination May 2011

Subject code: 162303

Subject Name: Plastic Process Instrumentation & Process Control

Date: 19-05-2011 **Time: 10.30 am – 01.00 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)**	Define, draw and derive equations for (i) Impulse Function, (ii)Sinusoidal Input (iii) Step Response (iv) Impulse Response	**07**
	(b)	For mixing process, derive an equation for Laplas Transform relating to outlet and inlet i.e. Y(s) & X(s)	**07**
Q.2	**(a)**	A thermometer having time constant of 10 seconds, is placed in a bath. After it reaches 30 ^{0}C as study state, temperature is increased linearly by 6 ^{0}C /min. Sketch the response (use graph paper)	**07**
	(b)	Derive the equation for the response of Interacting Liquid Level System	**07**
		OR	
	(b)	Give expression for- stored quantity, driving force, flow resistance and capacity for the system of (i) Thermometer, (ii) Liquid level process, & (iii) Mixing Process	**07**
Q.3	**(a)**	Derive equation for second order system for step response for "eeta" less than 1, equal to 1 and more than 1.	**07**
	(b)	With the help of a figure, define- (i) Period of oscillation and (ii) Natural period of Oscillation.	**07**
		OR	
Q.3	**(a)**	Define the terms- 1. Calibration. 2. Accuracy. 3. Precision. 4. Repeatability. 5. Drift. 6. Sensitivity. 7. True value.	**07**
	(b)	Define and describe-(i) static error (ii) systematic error (iii) Random error and (iv) sources of errors	**07**
Q.4	**(a)**	What are the different types of Electrical Tachometers? Along with a sketch, explain Resonance Tachometer. Give its construction and working.	**07**
	(b)	Name 3 types of Thermo-couples with their respective compositions and polarity. Explain its principle of polarity.	**07**
		OR	
Q.4	**(a)**	Along with a sketch, describe the advantages and disadvantages of Filled system thermometers.	**07**
	(b)	What are Automatic Controllers? What are its basic functions? Give classification of Industrial Controllers along with its block diagram.	**07**
Q.5	**(a)**	Write short note on (i) Magnetic Drag Type Tachometer and (ii) Magnetic Pickup Sensor.	**07**

	(b)	List the various common process variables and related instruments. Explain the effect of Instrumentation of film performance during wind up of a film making plant.	**07**
Q.5	**(a)**	Write short note on (i) Comparison between P, PI, PID type of control action and (ii) On –Off Controllers.	**07**
	(b)	With the help of line diagram show the extrusion lines with multiplicity of different process sensors and automatic control points interfaced with central computers.	**07**

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