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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2151402 **Date: 01/05/2017**

Subject Name: Food process instrumentation and control

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		**Short Questions**	**14**
	1	Draw graph showing resolution.	
	2	What is thermocouple?	
	3	A thermometer works in temperature range of -80 to 150ºC what is the value of	
	4	What is the value of coefficient of expansion for mercury in degree Celsius?	
	5	What is death space?	
	6	Write an equation to find out moisture content on wet basis.	
	7	Define vena contracta.	
	8	Value of Reynolds number for laminar flow is……	
	9	Define sensitivity.	
	10	What is an application diaphragm?	
	11	What is threshold?	
	12	J type thermocouple is made up of……..	
	13	Define hysteresis.	
	14	What is absolute pressure?	
Q.2	**(a)**	Calculate the gain of a system: heating of fluid in a tank, desired temperature of the tank fluid is 80º C but measured value is 77 º C . Temperature of fluid in a tank is maintained by adjusting the flow rate of fluid, initially which was 15 lit/sec and then it was changed to 16 lit/sec to over come the error in temperature.	**03**
	(b)	Explain ratio control loop in detail.	**04**
	(c)	What is an error? Draw and explain positive feed back control loop with example.	**07**
		OR	
	(c)	Draw and explain bode diagram of stability.	**07**
Q.3	**(a)**	What are the assumptions made while deriving transfer function of mercury in glass thermometer first order system?	**03**
	(b)	What is Laplace transform? Find Laplace transform of f(t)= cost*u(t) , t>0, Where, u(t) is a unit step function	**04**
	(c)	Explain the system of level in a tank in detail with transfer function.	**07**
		OR	
Q.3	**(a)**	What is a transducer? And explain how is it selected?	**03**
	(b)	Discuss See beck and Peltier effect.	**04**

	(c)	Differentiate between thermistor and a thermocouple as a temperature sensor. State the advantages and limitations of thermocouple. What are the different arrangements of thermocouple in which emf will not change?	**07**
Q.4	**(a)**	Differentiate between T-type and K-type thermocouple.	**03**
	(b)	Explain working principle of McLeod gauge with diagram.	**04**
	(c)	What are different types of scale to measure specific gravity measurement? Discuss the working principle of magnetic flow meter with diagram.	**07**

OR

Q.4	**(a)**	What is the difference between color and turbidity instrumentation point of view?	**03**
	(b)	Explain in brief about LVDT type hydrometer with diagram.	**04**
	(c)	What is the importance of pressure measurement? Show Absolute, Atmosphere, Gauge and Vacuum pressure with diagram. Explain the working of high pressure Measuring instrument.	**07**
Q.5	**(a)**	Draw diagram of diaphragm and bellows.	**03**
	(b)	What are the types of orifices? Explain working of orifice meter with figure.	**04**
	(c)	Classify flow meters and derive equation of flow for Rotameter.	**07**

OR

Q.5	**(a)**	Explain resistance strain gauges.	**03**
	(b)	What is RTD? Give reasons why for most laboratory and industrial measurements platinum is considered as the most suitable material in RTD.	**04**
	(c)	What are different types of scale to measure specific gravity measurement? Discuss the working of capillary viscometer and rotating cylinder viscometer.	**07**

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