Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– V (New) EXAMINATION – WINTER 2019

Subject Code: 2151402 **Date: 04/12/2019**

Subject Name: Food Process Instrumentation & Control

Time: 10:30 AM TO 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)**	(i) Write short notes on followings; 1. Significance of specific gravity measurement. 2. Different types of flow. 3. Partially immersed thermometer	**03**
	(b)	Discuss the working of Efflux viscometer with diagram.	**04**
	(c)	Discuss the working of following instrument; 1. Vapour pressure thermometer 2. Constant volume thermometer	**07**
Q.2	**(a)**	Draw only neat diagram of the followings 1. Magnetic Flow meter 2. Target flow meter	**03**
	(b)	Explain different types of flow. Describe the working of Rotameter.	**04**
	(c)	What do you understand by direct and indirect method of liquid level measurement? Discuss float gauge and purge method in detail with diagram.	**07**
		OR	
	(c)	A McLeod gauge has volume of bulb, capillary and tube down to its opening equal to $95cm^3$ and a capillary diameter of 1.5mm. Calculate the pressure indicated by a reading of 5cm.	**07**
Q.3	**(a)**	Justify with facts that why platinum is used in RTD.	**03**
	(b)	Describe the working of LVDT type hydrometer with diagram.	**04**
	(c)	Discuss resistance strain gauge. Show with diagram about balance and unbalance bridge.	**07**
		OR	
Q.3	**(a)**	(i) Explain the working principle of bimetallic strip with detailed diagram.	**03**
	(b)	(ii) Draw the diagram of different elements used in pressure measurement. Discuss inclined manometer with diagram.	**04**
	(c)	Discuss the See Beck and Peltier effect. Explain the laws of thermocouple with diagram.	**07**
Q.4	**(a)**	Define the following terms: 1. Sensitivity drift 2. Range 3. Span	**03**
	(b)	Explain Feedback control loop in detail.	**04**
	(c)	Solve the following IVP. $2y''+3y'-2y=te^{-2t}$,where $y(0)=0$, $y'(0)=-2$	**07**
		OR	
Q.4	**(a)**	Define the terms: 1. Error 2. Resolution 3. Sensitivity	**03**

(b) Draw ratio control loop for a reactor having two reactant and the proportion of both is to be maintained 1:3. **04**

(c) Explain step by step approach of drawing Bode diagram by taking any one example. **07**

Q.5 **(a)** What is a transfer function? Explain the term in detail by taking any one system as an example. **03**

(b) Write a short note on cascade control loop by taking one example. **04**

(c) Explain the system of two interacting tanks in detail with transfer function. **07**

OR

Q.5 **(a)** Define Laplace transform of function f(t). What would be the Laplace of d^2x/dt^2? **03**

(b) Find Laplace transform of f(t)= cos kt*u(t) , t>0, Where, u(t) is a unit step function **04**

(c) What are the importance of temperature measurement in food industry. Find transfer function for mercury in glass thermometer system. **07**

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