Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2016

Subject Code: 2151402 **Date: 06/05/2016**

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 (a) Define the followings **07**

1. Recorder
2. controller
3. sensitivity
4. hysteresis
5. range
6. span
7. error

(b) What is transfer function? Explain ratio control loop with figure. **07**

Q.2 (a) What are transducers? Explain analog and digital transducers. Discuss different factors to be kept in mind for the selection of transducers. **07**

(b) State the importance of pressure measurement in food industry. Write down the basis of categorization of pressure measurement devises. Discuss different pressure measuring methods. **07**

OR

(b) What is International Practical Temperature Scale (IPTS). Give the typical value of primary "Fixed" point of Boiling point of water, Triple point of water. Explain the working of Bimetallic and Helical thermometer. **07**

Q.3 (a) What scales are used for measuring specific gravity of a liquid? Discuss the importance of specific gravity measurement in industrial process and describe an instrument used for continuous monitoring of specific gravity **07**

(b) What do you understand from strain gauge? Define Gauge factor. Describe Bonded and Unbonded strain gauge. **07**

OR

Q.3 (a) Discuss about the electrical resistance thermometer. Why platinum is used in PRT, also discuss its construction with diagram. **07**

(b) How would you define thermocouples? Discuss See beck effect, Peltier effect. List out different types of thermocouples with materials of constructions. **07**

Q.4 (a) Describe various pressure terms with diagram. List out different types of moderate pressure measuring instruments. Discuss LVDT type pressure transducers. **07**

(b) List out different types of high and low pressure measuring instruments. Discuss McLeod Gauge in detail. **07**

OR

Q.4 (a) Draw and explain Bode diagram in detail. **07**

(b) Write a short note on feed forward control loop by taking one example. **07**

Q.5 (a) Define Laplace transform of function f(t). Find Laplace transform of f(t)= cos kt*u(t) , t>0, Where, u(t) is a unit step function **07**

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

OR

Q.5 **(a)** Explain the principle of rotameter with diagram. Also discuss the advantages and limitations of that. **07**

(b) List out the importance of temperature measurement in food industry. Why mercury is used in thermometer? Prove that; **07**

$$\frac{C}{5} = \frac{F-32}{9}$$

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