

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2018****Subject Code:2151402****Date:16/11/2018****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.
4. Use pencil to draw the diagram.

- Q.1** (a) Draw the neat sketch of the elements used in pressure measuring devices. **03**
- (b) Discuss different parts of mercury in glass thermometer with diagram. **04**
- (c) What are transducers? Explain active and passive transducers. Discuss different factors to be kept in mind for the selection of transducers. **07**
- Q.2** (a) Define Process variables, Linearity, Precision and Hysteresis **03**
- (b) Draw the neat sketch with pencil of the followings **04**
1. Bimetallic and Helical strip
 2. Capacitance type level gauge
- (c) Find Laplace transform of $f(t) = \sin(at)$ for $t \geq 0$ **07**
- OR**
- (c) Explain the working principle of McLeod gauge with diagram. **07**
- Q.3** (a) Discuss the advantages and disadvantages of mercury and alcohol as a thermometric liquid. **03**
- (b) State dynamic properties of measuring instruments and explain any two of them in detail. **04**
- (c) Explain resistance strain gauges. Discuss application of strain gauges. Explain working of Wheatstone Bridge circuit for resistance strain gauge-based measurement. **07**
- OR**
- Q.3** (a) Define the followings: **03**
1. Static Error
 2. Dynamic Error
 3. Random Error
- (b) Describe the working of the followings **04**
1. Constant volume thermometer
 2. Target flow meter
- (c) Describe Bode Plot and explain about stability condition of Bode plot. **07**

- Q.4** (a) What do you mean by transducer? Explain selection criteria of transducer. **03**
- (b) Why viscosity is important in food industry? Explain the working principle of Rotameter type viscometer. **04**
- (c) Explain standard equation for first order system and derive system response for unit step input on first order system. **07**

OR

- Q.4** (a) Give classification of various types of Control Valves used in process control. **03**
- (b) Differentiate between the followings: **04**
1. Sensor and transducer
 2. Active and passive transducer
- (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**

- Q.5** (a) Justify how can be a capacitive transducer used for level measurement application. **03**
- (b) Differentiate between balanced and unbalanced bridge with diagram. **04**
- (c) Write in detail about feed forward control system. **07**

OR

- Q.5** (a) Draw and explain block diagram of close loop control system with an example. **03**
- (b) List out the advantages and disadvantages of thermocouple. Define See Beck and Peltier effect. **04**
- (c) Discuss different industrial methods of specific gravity measurement. Explain working of hydrometer and LVDT type hydrometer with diagram. **07**

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