

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-V EXAMINATION – WINTER 2015**

**Subject Code: 150504****Date:05/12/2015****Subject Name: Instrumentation and Process Control****Time: 10:30am to 1:00pm****Total Marks: 70****Instructions:**

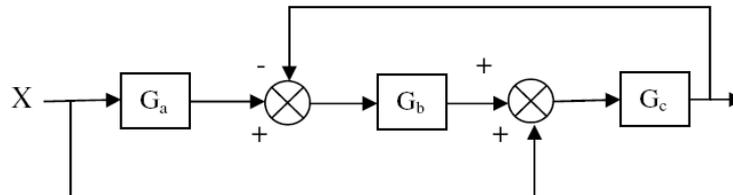
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define second order system. Derive the transfer function of U-Tube Manometer in which pressure P is acting in one limb and other limb is open to the atmosphere. **07**
- (b) Derive the transfer function of mercury thermometer. Determine the response equation of mercury thermometer for impulse forcing function. **07**

- Q.2** (a) Discuss the transfer function for P, PI and PID controller. **07**
- (b) Write a short note on Transportation lag **07**

**OR**

- (b) Derive overall transfer function for two tanks connected in series Non-interacting system. **07**
- Q.3** (a) Explain any one PI diagram for an important chemical equipment used in industries. **07**
- (b) What do you mean by open loop transfer function and closed loop transfer function? Determine the transfer function  $Y(s) / X(s)$  for the following block diagram. **07**

**OR**

- Q.3** (a) Explain the Bode diagrams. Explain the graphical rules for Bode diagrams. **07**
- (b) By means of Routh test, determine the stability of the system having Characteristics equation  $2s^4 + 5s^3 + 3s^2 + 2s + 5 = 0$  **07**

- Q.4** (a) Explain methods used for level measurement with neat sketch. **07**
- (b) Mention various temperature measurement devices and explain the temperature measurement by thermocouple. **07**

**OR**

- Q.4** (a) Short note on viscosity measuring instrument. **07**
- Q.4** (b) Short note on pressure spring thermometer. **07**
- Q.5** (a) Enlist various instruments used for pressure measurement **07**

- and explain one in detail.
- (b) Give the list of various flow measuring devices. Explain area flow meter in detail. **07**

**OR**

- Q.5** (a) Enlist various types of vacuum measuring instruments. Explain any one in detail. **07**
- (b) Write Short note on Static or dynamic characteristics of an instrument. **07**

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