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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-V Examination-Nov/Dec.-2011

Subject code: 150504 **Date: 29/11/2011**

Subject Name: Instrumentation and Process Control

Time: 2.30 pm -5.00 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)** Derive transfer function for a system mercury-in-glass thermometer. What is the significance of time constant ? **07**

(b) Explain in detail the terms used to describe an under damped second order system. **07**

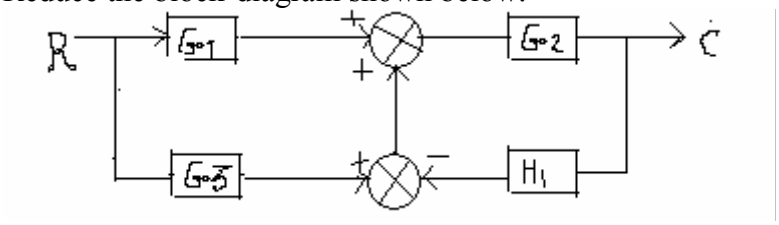
Q.2 **(a)** Derive overall transfer function for two tanks connected in series interacting system. **07**

(b) Prove that the system- two tanks connected in series is equivalent to a second order system. **07**

OR

(b) Compare different types of controllers. Explain any one in detail. **07**

Q.3 **(a)** Reduce the block-diagram shown below.



(b) Explain rules of Root-Locus diagram with example. **07**

OR

Q.3 **(a)** Sketch the Bode diagram for a system having transfer function **07**

$$G(s) = \frac{Kc}{(10S+1)\,(0.5S+1)}$$

(b) List temperature measuring instrument. Explain any one in detail. **07**

Q.4 **(a)** Explain transfer lag and transportation lag. **07**

(b) List vacuum measuring instruments. Explain any one in detail. **07**

OR

Q.4 **(a)** Explain dynamic characteristics of an instrument. **07**

(b) Explain air-purge system for level measurement. **07**

Q.5 **(a)** Write a short note on viscosity measurement. **07**

(b) Write a short note on measurement of density. **07**

OR

Q.5 **(a)** Enlist various types of quantity meters. Discuss any one. **07**

(b) Explain principle and working of venturimeter. **07**

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