



Printed Pages : 3

TIC – 603

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3099

Roll No.

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B. Tech.

(SEM. VI) EXAMINATION, 2006-07

PROCESS CONTROL ENGG.*Time : 3 Hours]**[Total Marks : 100**Note : Attempt all questions.***1** Attempt any **four** parts of the following : **5×4=20**

- a) How op-amps used in-inverting and non-inverting mode? Explain with neat diagram.
- b) Differentiate between low-pass RC filter and high pass RC – filter along with their need.
- c) What is DIAC? Explain its trigger action for TRIAC with neat working circuit.
- d) Realize NOR circuit with NAND gates also give its Boolean expressions.
- e) Explain any method of ADC with complete diagram.
- f) Determine how many bits a D/A converter must have to provide output increments of 0.04 volts or less. The reference is 10V.

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[Contd...

- 2** Attempt any **two** of the following : **10×2=20**
- a) Explain Hydraulic actuators with its working and relevant expression.
 - b) How the ladder diagram is useful for sequence operation? Explain.
 - c) What are the different pneumatic elements corrected to form pneumatic system? Explain each one.
- 3** Attempt any **two** of the following : **10×2=20**
- a) Define process load, process lag and self regulation.
 - b) Explain the merits and demerits of various discontinuous controller model.
 - c) Draw and explain the controller output for integral and derivative action and also give the comparative statement.
- 4** Attempt any **two** of the following : **10×2=20**
- a) Describe the implementation of two position control modes using opamps.
 - b) While comparing three mode controller with two mode controller (PI, PD) which one gives better performance and why?
 - c) Design a PD controller with a 140% PB and a 0.2 min. derivative time. The faster speed is 1 minute. Measurement range is 0.4 to 2 volts, and the output is 0 to 10V.

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5 Attempt any **four** parts of the following : **5×4=20**

- a) Explain in brief the characteristics of single variable compound and cascade control.
- b) Define gain and phase margin. How the tuning operation in frequency response method is appropriate? Explain.
- c) In the Ziegler methods, the critical period was found to be 2.21 minutes and the critical gain was 4.2. Find the standard setting for (i) proportional mode. Control (ii) PI control and (iii) PID control.
- d) Why control system is designed for under ramped case? Also explain notions of optimum control.
- e) How the control system quality takes the important role to satisfy design criteria? Explain.
- f) Explain :
 - (i) Supervisory control
 - (ii) Analog control
 - (iii) Digital control