* S F - 7 1 2 5 / 1 0 0 *

SF-7125

B. E. III (Sem. VI) (IC) Examination

May / June – 2011

Industrial Control Systems

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 3 (Sem. 6) (IC)**

Name of the Subject :

☛ **Industrial Control Systems**

☛Subject Code No. : **7 1 2 5** ☛Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Black figures to the **right** indicate full marks.

(3) Use of non programmable calculator is allowed.

(4) Assume suitable data if required.

1 (a) Answer the following questions in brief : **10**

(i) Using the final value theorem find the value that the following function reaches as $t \to \infty$

$y(t) = 1 - 5e^{-0.5t} \sin(6t + 2)$

(ii) In two element drum level control which two parameters are measured ?

(iii) Why three element drum level control is called so ?

(iv) List different categories of control systems.

(v) List the types of distillation process.

(b) What is feed forward control ? Explain in detail. Also discuss its advantages and disadvantages over feedback control. **10**

2 (a) Explain the general process of power plant. Also discuss the armature reaction in generator. **10**

(b) List different types of distillation process and explain any one. **5**

OR

2 (a) Explain the feed forward control for tubular heat exchanger in detail. Also discuss its advantages over feedback control. **10**

(b) Explain the temperature control for the jacketed reactor. **5**

3 (a) Explain the necessity of turbine speed control and also explain any one method to measure turbine speed. **8**

(b) Explain the steam pressure control for boiler drum. **7**

OR

3 (a) Draw and explain the complete process control systems for the distillation process. **9**

(b) Discuss : **6**

(i) Variable time constants

(ii) Process gain.

4 (a) Answer the following in brief : **10**

(i) State the difference between the discrete i/o and digital i/o.

(ii) Draw the 8 channel analog input module wiring diagram.

(iii) How closed loop PID can be implemented with PLC ?

(iv) Draw typical BCD output wiring diagram.

(v) Brief about instrument current loop.

(b) Write an IL language program to start and stop an electric pump. Assume the following : **4**

A normally open start push button connected to input bit Ix1, a normally closed stop push button is connected to input Ix2, a discrete output drives a pump starter relay at address Qx1, and an auxilliary motor starter contact NO connected to input Ix3.

(c) Explain the on delay timer and off delay timers and their application. **6**

5 (a) Discuss the memory organization of PLC. Also discuss the computer based PLC and communication techniques. **8**

(b) State the different types of memory and explain each. **7**

OR

5 (a) Draw the ladder diagram for the digital equation A = (B+C) D + ED where A is output relay and all other are contacts. **6**

(b) Explain the purpose of electrical isolation between field device and PLC. Also discuss the techniques for providing electrical isolation. **9**

6 (a) Comment on the specifications of PLC. Also comment on processor selection. **8**

(b) Draw the signal conditioning circuits to convert 4-20 mA current into 1 to 5 volts. **7**

OR

6 Draw and explain the ladder diagram of batch mixer in which the mixture of liquid is heated and then discharged from tank. Stirrer is used. **15**
