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SB-3784

M. Sc. (Tech.) (Part - II) (Instru.) Examination

March / April – 2011

Paper - 4 : Process Instrumentation & Signal Processing

Time : **3** Hours] [Total Marks : **53**

Instructions :

(1)

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

Name of the Examination :

☛ **M. Sc. (Tech.) (Part-2) (Instru.)**

Name of the Subject :

☛ **Paper - 4 : Process Instrumentation & Signal Processing**

☛ Subject Code No. : **3 7 8 4** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Answers to each section must be written in separate answer books.
(3) Figures to the right indicate maximum marks.
(4) Draw neat figure wherever required.

1 Attempt any three : **12**

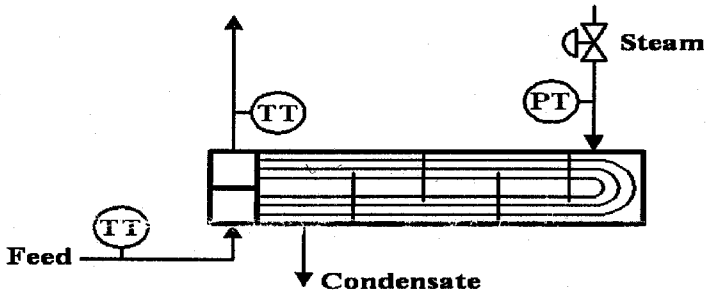
(a) Draw basic block diagram of DCS with explanation.
(b) What is error ? State and explain each of its types.
(c) State the advantages of DCS system.
(d) Discuss standard test input signals used to evaluate system or instrument characteristics.

2 (a) Give an example of cascade control system and discussed it's advantages and disadvantages. **6**

(b) Explain the basic operation of on-off control system with suitable example. **6**

OR

2 (a) Draw a schematic for a combined feed-forward and feedback controller in which the inlet feed temperature is the feed-forward variable and the outlet temperature is the feedback variable. The combined controller output is the set-point for a steam pressure controller. **6**



(b) Give comparison between P,PI and PID control action. **6**

(c) Discuss any three term which are used to evaluate system performance. **3**

3 Attempt any two : **10**

(a) Calculate the backplane current requirements for the PLC system with the following modules 6 DC I/P modules,3 DC O/P modules, 2 analog input modules, and two analog output modules mounted in a PLC rack. Assume the rack power supply and backplane power suitably.

(b) Implement PLC logic for :

(i) AND gate

(ii) OR gate

(iii) NOT gate.

(c) A thermometer is suddenly subjected to a step input of 200° C form 0° C. Calculate the temperature indicated by the thermometer after a time of 1.5 seconds. The thermometer may be idealized as a first order system with a time constant of 2.5 seconds. Would there be any change in the indicated temperature if the thermometer was initially held at 25 °C.

4 Attempt any two : **6**

(a) Determine memory size needed for a programmble controller system with 500 input points and 400 outputs (assume 35% spare memory capacity).

(b) State the purpose of electrical isolation between field device and PLC. How it is provided ?

(c) Discuss sinking and sourcing in context of PLC-I/O system.

5 Attempt any two : **10**

(a) Give classification of control valve based on body design.

(b) Give comparison between Single port body design and Double port Body design. Also state the application of angle valve and 3-way valve.

(c) Discuss following flow characteristic of control valve

(i) Quick on-off,

(ii) Linear

(iii) Equal percentage.
