

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: DEI 3003
COURSE TITLE	: PROCESS INSTRUMENTATION
SEMESTER/SESSION	: 1-2021/2022
DURATION	: 3 HOURS

Instructions:

- a) This booklet contains 4 questions. Answer **ALL** questions.
- b) All answers should be written in answer booklet.
- c) Write legibly and draw sketches wherever required.
- d) If in doubt, raise up your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

- a) Define each term.
- i. Control system (1 mark)
 - ii. Process (1 mark)
 - iii. Instrumentation (1 mark)
- b) Figure 1 shows the block diagram for close loop control system. State the function for each block.
- i. Set point (1 mark)
 - ii. Controlled variable (1 mark)
 - iii. Controller (2 marks)
 - iv. Final control element (2 marks)
 - v. Plant (2 marks)
 - vi. Measurement element (2 marks)

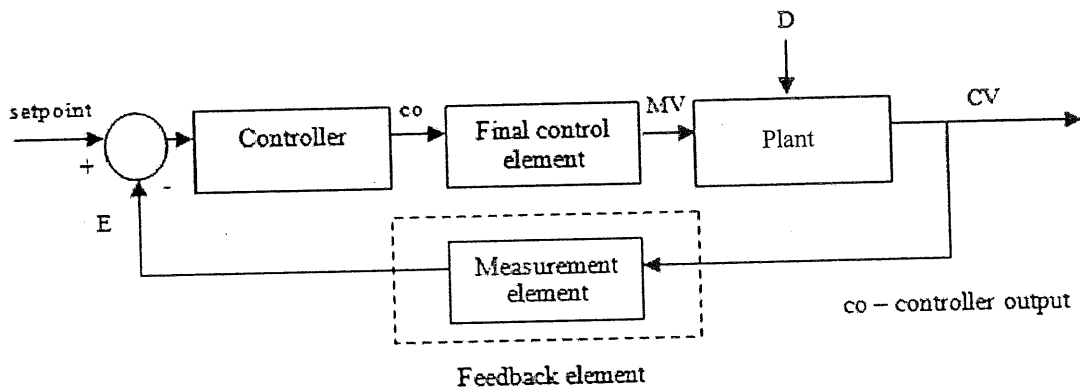


Figure 1

- c) Figure 2 shows the level system, where LT 1 and LIC 1 to control PCV-100 and LT 2 and LIC 2 to control PCV-101. Using given symbols, draw control loop where the process needed.
- (6 marks)

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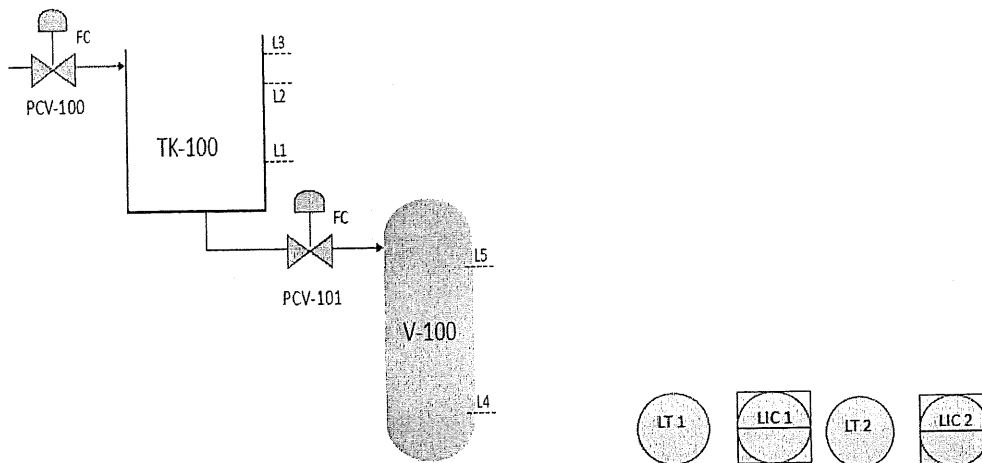


Figure 2

- d) An automated temperature control system is illustrated in Figure 3. It shows a process to produce a hot water. Describe the operation of the temperature system for the process.

(6 marks)

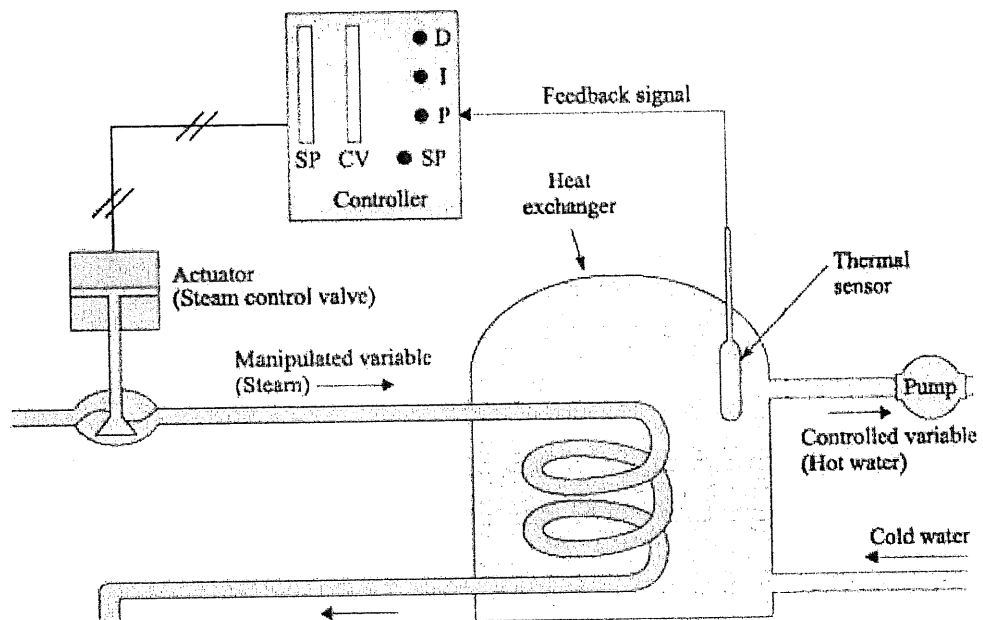


Figure 3

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QUESTION 3

- a) State two (2) types of RS232 device. (2 marks)
- b) List four (4) advantages of fieldbus protocol. (4 marks)
- c) Table 1 shows a 0-100% output signal relates to common dimensional output values. Identify the value for the output. (5 marks)

Table 1

Output Unit, %	Output Value 4-20 mA	Output Value 3-15 psi
0%	4 mA	iii.
25%	i.	6 psi
50%	12 mA	iv.
75%	ii.	v.
100%	20 mA	15 psi

- d) A pressure transmitter PT101 with range 10 – 80 bar is used to measure pressure in the tank. Calculate the output current (mA) produced if the transmitter reading at 50 bar.
(Output range 4 - 20mA) (5 marks)

QUESTION 4

- a) List three (3) advantages of digital system. (3 marks)
- b) State three (3) advantages of Distribute Control System (DCS). (3 marks)
- c) Describe the function of each PLC modules. (8 marks)
- d) Figure 5 shows a DCS in a process control. Describe nine elements in the DCS system. (9 marks)

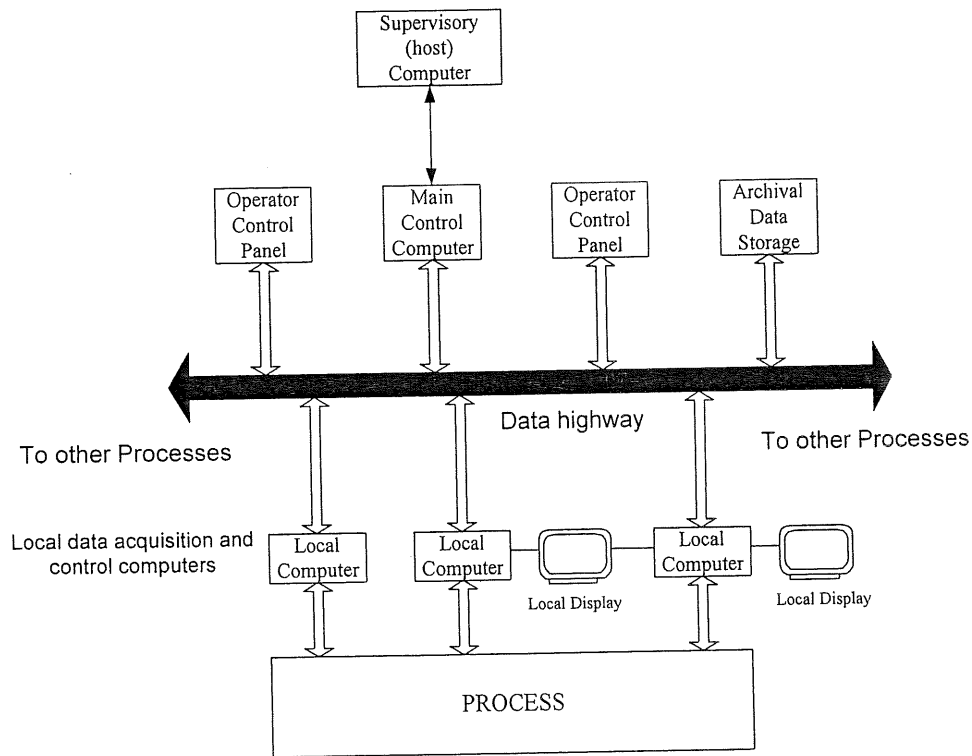


Figure 5

-----End of question-----

