

B.E./B.TECH. Degree Examination, December 2020

Seventh Semester

ME16702 - Mechatronics

(Regulation 2016)

Time: Three hours

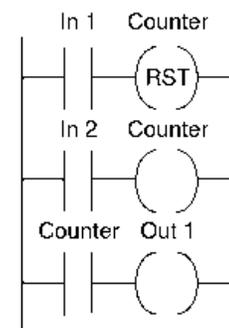
Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

- The temperature control system which maintains the temperature of a room at 30° C when it is set is an example of _____
 - Open loop system
 - Closed loop system
 - Both a. and b.
 - None of the above
- Which of the following statements describe properties inherent in an open loop control system?
 - Output has no effect on input.
 - Inherently stable.
 - Controller has no way of knowing if its command was executed.
 - Controller does not care whether its command was executed.
 - All of the statements above describe an open loop control system.
- Which of these, the microprocessor comprises of?
 - Register section
 - An ALU
 - Control unit
 - All of these
- Describe whether each of these statements is true (T) or false (F). In Figure, when there is an input to In 1:

- The counter contacts in the third rung close.
- The counter is ready to start counting the pulses from In 2.

- (i) T (ii) T
- (i) T (ii) F
- (i) F (ii) T
- (i) F (ii) F



5. A hospital is interested in developing an instrument to measure the force exerted by the human finger. Identify the type of sensor and name its transducing principle.
6. Describe the function of stack pointer in 8085 microprocessor.
7. Draw a ladder to demonstrate the function of battery backed internal relay.
8. State the difference between a servo motor and a stepper motor.

PART B - (4 X16 = 64 marks)

9. (a) Make a table listing in one vertical column each of the following sensors: Pneumatic, LVDT, Eddy Current, Hall Effect. Then make four adjacent vertical columns, labeling them: Variable Measured, Principle of Operation, Advantages/ Disadvantages. Attempt to fill every blank space in the table. **(16)**

(OR)

- (b) (i) Enumerate the applications of thermocouple. Discuss the principle of operation and their types in short note. **(10)**
- (ii) Elaborate the working principle of potentiometer with neat sketch. **(6)**
10. (a) (i) Discuss the signals in detail: Data bus, Address bus, Control & status signals, power supply & frequency signals, externally initiated signals and serial I/O ports. With aid of above mentioned six categories of signals draw the logic pinouts of 8085 microprocessor. **(12)**
- (ii) Determine the type of addressing modes the way of operands is specified in the following instructions: **(4)**

MVI C, 48H
MOV A, C
ANI OFH
OUT PORT01
HLT

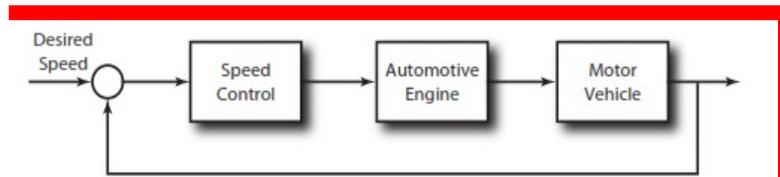
(OR)

- (b) Classify the functional blocks in 8085 Microprocessor and 8051 Microcontroller and show with a neat block diagrams **(16)**
11. (a) (i) Develop a temperature control system using PLC **(8)**
- (ii) Describe the sourcing and sinking in PLC with relevant examples **(8)**

(OR)

- (b) Design a pneumatic circuit to perform A+B+B-A- and draw the ladder logic diagram to execute the given sequence. **(16)**

12. (a) (i) Figure shows a block diagram of an automotive cruise control system. (12)



This helps the driver in monitoring and controlling the speed.

Draw similar diagrams for the following applications by showing the modules of instrumentation system

- Automatic coffee maker for home use
- Motion of axes in a machine tool.

- (ii) What is mechatronics? How is it different from the traditional approach of designing? State the advantage of using the mechatronic design methodology. (4)

(OR)

- (b) Demonstrate the automatic car parking system with a working diagram. And develop a PLC solution to operate the barrier. (16)