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10EE752

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Programmable Logic Controllers

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What is PLC? Explain its hardware with the help of a neat block diagram. Mention its advantages and drawbacks. **(10 Marks)**

b. With relevant diagram, explain the operation of Absolute Encoder with incremental encoder. **(10 Marks)**

2 a. What are proximity switches? Explain the different types of proximity switches. **(06 Marks)**

b. What is a Ladder diagram? Explain the conventions to be followed while drawing the ladder diagram. **(06 Marks)**

c. Express half adder using ladder diagram and functional block diagram. **(08 Marks)**

3 a. Discuss the following programming methods: IL, SFC, ST. **(06 Marks)**

b. A signal lamp is to be switched on if, i) a pump is running and the pressure is satisfactory, or ii) if the lamp test switch is closed. Draw the ladder diagram and with the IL program. **(06 Marks)**

c. Draw the SFC for the following part of a washing machine cycle. A drum is to be filled with water, and then when the drum is full, a heater has to be switched on and remain on until the temperature reaches the required level. Then the drum is to be rotated for a specific time. **(08 Marks)**

4 a. List and describe, the structured text operators, in order from highest to lowest precedence. **(06 Marks)**

b. Give on example each of i) conditional statement; ii) iteration statement. As used in structured text programming. **(08 Marks)**

c. Draw the ladder program for the SFC shown in Fig.4(c), and explain. **(06 Marks)**

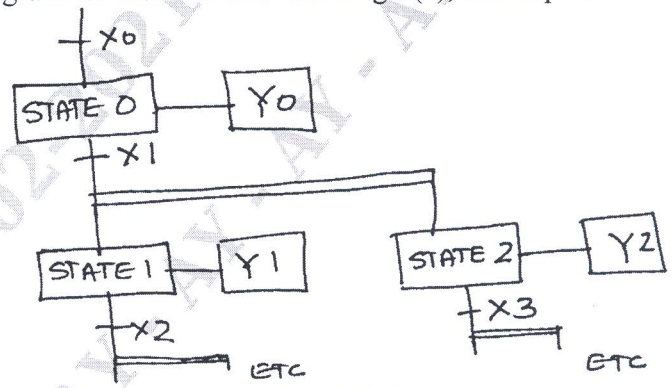

Fig.Q.4(c)

PART – B

5 a. Explain the working of a master control relay with the help of an example. **(06 Marks)**

b. Explain the significance of internal relays in PLC operation. With the help of an example, explain the role of internal relay in resetting a latch circuit. **(08 Marks)**

c. Explain one – shot operation with necessary ladder diagram. **(06 Marks)**

6 a. Explain with ladder diagram and timing diagram, how to start three motors in sequence with some delay using single start button, timer and internal relays. **(08 Marks)**

b. Explain with ladder diagram usage of timer for flashing the lights on and off as long as there is an output occurring. **(06 Marks)**

c. Explain the basic form of counting circuit with neat ladder diagram and instruction list (Mitsubishi program) and input and output waveform. **(06 Marks)**

7 a. With necessary ladder diagram, explain the operation of pulse timer. **(06 Marks)**

b. Explain with neat ladder diagram and instruction list how a machine is to be controlled such that it is required to direct 12 tins along one path for packing in a box and then 24 tins along another path for packing in another box. A deflector plate may be controlled by a photocell sensor that gives an output every time a tin passes it. **(08 Marks)**

c. Explain various timers used in PLC and how cascaded timers are used to produce a delay of 1099s. **(06 Marks)**

8 a. Write a short notes on data handling and arithmetic operations in PLCs. **(10 Marks)**

b. Explain with a ladder diagram and instruction list, the operation of a 4 – bit shift register program in Mitsubishi PLC. **(10 Marks)**

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