Evening

Date:- 01/12/2015.

Student Exam No: _____

GANPAT UNIVERSITY

B.TECH SEM. VII - MECHATRONICS ENGINEERING

CBCS REGULAR EXAMINATION NOV/DEC - 2015

2MC701 - ADVANCE CONTROLLER

Time: 3 Hours | Total Marks: 70

Instructions:

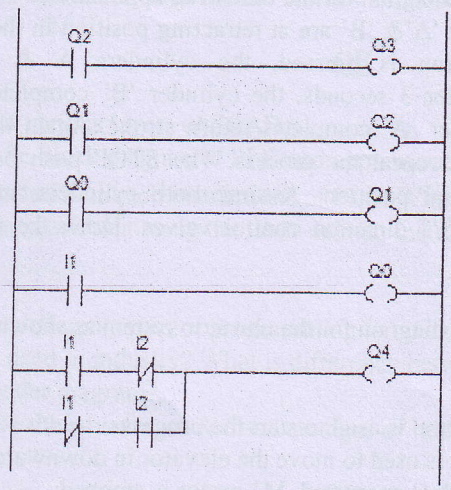
1). All questions are **compulsory**.
2). Figures to the **right** indicate full marks.
3). Answers to the two sections must be written in **separate** answer books.
4). Assume **all** necessary data.

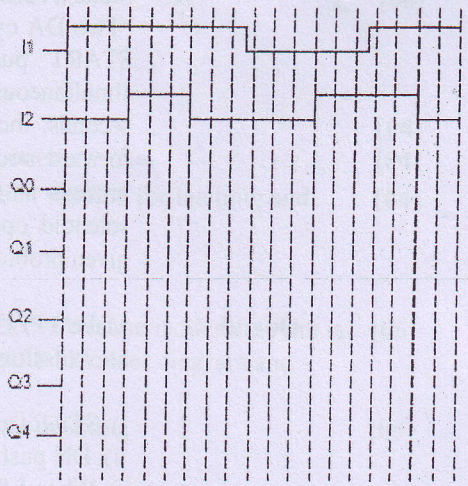
Section – I

Que:-1

(A) Discuss retentive timer instruction with an example. How does it different from the on-delay timer instruction? [06]

(B) Draw the timing diagram of the outputs which are shown in the below figure for the given input condition. [05]



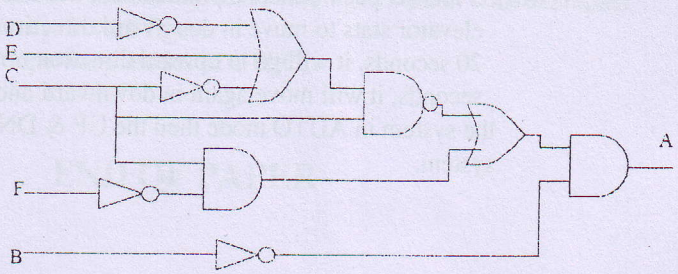


OR

Que:-1

(A) Explain the bidirectional counter with an example. [05]

(B) Draw the equivalent PLC ladder diagram for the following circuit diagram. [06]



Que:-2

(A) Why do we need binary-to-integer instruction in PLC? Explain with an example. **[06]**

(B) Make a PLC ladder diagram for the given objectives: **[06]**

a). When a sensor S1 sense an object, A Motor 1 start after 5 seconds.
b). After 5 seconds, the motor 1 is turned off & the motor 2 will be on.
c). After 5 seconds, the motor 2 is turned off & the motor 1 will be on again.
d). Repeat this process for 10 times. (Use UP Counter Only).
e). When a sensor S2 sense the object, the entire process will be stopped at any time.

OR

Que:-2

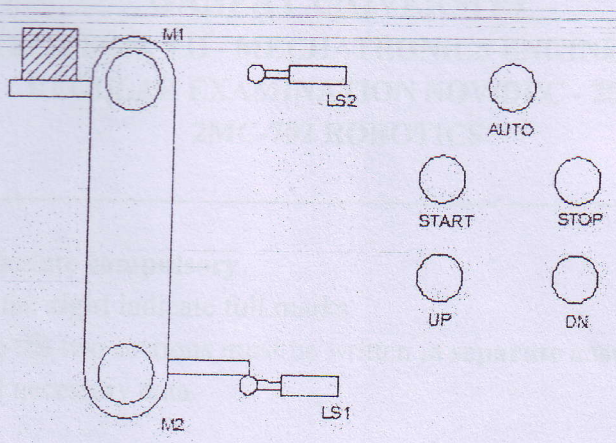
(A) Explain One Shot Rising Instruction. **[04]**

(B) If starting source 16-bit word is: 1011 1110 1100 0011 **[02]**
The bits are allowed to pass: bits 4, 5 & 7 of the lower byte and bits 2, 3 & 5 of the upper byte.
Beginning destination 16-bit word is: 1100 1000 0110 0101
Then what will the mask and the new destination 16-bit word?

(C) Make a PLC ladder diagram for the following application. **[06]**
"Two DA cylinders 'A'& 'B' are at retracting position in the initial position. When a START push button is pressed, the cylinders A & B start forward stoke simultaneously. After 3 seconds, the cylinder 'B' completes return stroke. After 3 seconds, the cylinder 'A' completes return stroke. Again the cylinders A & B start forward stroke and repeat the process. The STOP push button is used to stop the process at the initial position. Assume both cylinders are operated by both side solenoid operated 5/2 direction control valves. Draw the pneumatic circuit for the given problem.

Que:-3 Make a PLC ladder diagram for the elevator system as shown in fig. The objectives are as follows: **[12]**

i). START push button is used to start the process.
ii). DN push button is used to move the elevator in downward direction (M1 Motor).
iii). When LS2 switch is energized, M1 motor is stopped
iv). UP push button is used to move the elevator to up direction (M2 Motor).
v). When LS1 switch is energized, M2 motor is stopped.
vi). When UP & DN pushbuttons are pressed at the same time then the elevator will be stopped at the current position.
vii). STOP push button is also used to stop the elevator at current position.
viii). If AUTO push button is pressed then the elevator works automatically. The elevator stats to move in downward direction until LS2 switch is energized. After 20 seconds, it will go in upward direction until LS1 switch is energized. After 10 seconds, it will move again in downward and repeat the process 20 times. When the system in AUTO mode then the UP & DN pushbuttons does not affect the system.



Section II

Que:-4

(A) Explain the discrete AC input module with the block diagram. **[06]**

(B) What is SCADA? What are the various applications of SCADA? **[06]**

OR

Que:-4

(A) Explain various layers of SCADA. **[04]**

(B) Draw the block diagram of PLC and explain each component. **[04]**

(C) Discuss latch-unlatch instructions of PLC. What is another method for latching and unlatching without using the latch-unlatch instructions. **[04]**

Que:-5

(A) List the different types of programming languages for PLC. Why the ladder diagram is widely used in industry? What is difference between electrical ladder diagram and PLC ladder diagram? **[06]**

(B) Describe the advantages & disadvantages of relay-output switching. **[05]**

OR

Que:-5

(A) Explain different types of PLC memory. **[06]**

(B) List the different types of output modules of a PLC. Brief any one in details. **[05]**

Que:-6 **Attempt All.** **[12]**

(A) What is the difference between sinking and sourcing? Explain with examples.

(B) Explain the PLC scan cycle with figure.

(C) Discuss the different operating modes of a PLC.

END OF PAPER