Seat No:_____

GANPAT UNIVERSITY

B.Tech Semester VI, Electronics & Communication Engineering
Examination May-June 2013
2EC606 Industrial Instrumentation

Max. Time: 3 Hrs.] **[Max. Marks: 70**

Instructions:

1. Attempt all questions.
2. Answers to the two sections must be written in separate answer books.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

SECTION-I

Que-1 **(A)** List any three standard PLC languages as defined by the International Standard for Programmable Controllers, and give a brief description of each. **6**

(B) Explain following files. **6**

a. Control file. b. Processor status file.

OR

(A) What is the working principle of solenoid valve? Which parameters determine the pulling/pushing force on core? **6**

(B) Explain in detail how functionality of relay is achieved through PLC instructions. **6**

Que-2 **(A)** A pump is to be used to fill two storage tanks. The pump is manually started by the operator from a START/STOP station. When the first tank is full, program stops the flow to the first tank automatically and directs flow to the second tank. When the second tank is full, the pump must shut down automatically. Indicator lamps are to be included to signal when each tank is full. Assume proper sensors and electric solenoid valves. **11**

a. Draw a sketch of the process.
b. Prepare a typical PLC program for this control process.

OR

(A) With the help of neat diagram, explain all the components of Data acquisition System. **6**

(B) Compare the operation of the reflective-type and through-beam type photoelectric sensors. **5**

Que-3 **(A)** Explain how an ultrasonic sensor operates. **4**

(B) What types of instructions are not normally included inside the jumped section of a program? Why? Explain with example. **4**

(C) Explain in detail the selectable timed interrupt function.. **4**

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SECTION-II

Que-4 **(A)** Design a program that will implement the following arithmetic operation: **7**

- Use a MOV instruction and place the value 45 in N7:0 and 286 in N7:1.
- Add the values together and store the result in N7:2.
- Subtract the value in N7:2 from 785 and store the result in N7:3.
- Multiply the value in N7:3 by 25 and store the result in N7:4.
- Divide the value in N7:4 by 35 and store the result in F8:0.

(B) Draw block diagram of PLC processor module. Describe three typical modes of operation that can be selected by the key switch of a processor. **5**

OR

(A) Write a program for the following: The temperature reading from a thermocouple is to be read and stored in a memory location every 5 minutes for 4 hours. The temperature reading is brought in continuously and stored in address N7:150. File #7:200 is to contain the data from the last full 4-hour period. **7**

(B) List two common applications for counters. What determines the maximum speed of transitions that a PLC counter can count? Why? Describe the basic programming process involved in the cascading of two counters with example. **5**

Que-5 **(A)** Study the ladder logic program in Figure 1 and answer the questions that follow: **7**

a. What is the value of the accumulated time when power is first applied?
b. When does the timer start timing and stop timing and reset itself?
c. When input LS1 is first closed, which rungs are true and which are false?
d. When input LS1 is first closed, state the status (on or off) of each output.
e. When the timer's accumulated value equals the preset value, which rungs are true and which are false?
f. When the timer's accumulated value equals the preset value, state the status (on or off) of each output.

(B) What is the purpose of the label instruction in the jump-to-label instruction pair? When the jump-to-label instruction is executed, in what way are the jumped rungs affected? Explain with example. **4**

OR

(A) Answer the following questions with reference to the up/down-counter program shown in Figure 2. Assume that the following sequence of events occurs: **7**
Input C is momentarily closed → 20 on/off transitions of input A occur→ 5 on/off transitions of input B occur.
As a result:

a. What is the accumulated count of counter CTU?
b. What is the accumulated count of counter CTD?
c. What is the state of output A?
d. What is the state of output B?
e. What is the state of output C?

(B) Explain in detail different addressing format of Allen-Bradley PLC-5, SLC-500 and Logix5000 controllers. **4**

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Que-6 **(A)** Compare the PLC and PC with regard to: **4**

a. Physical hardware differences
b. Operating environment
c. Method of programming
d. Execution of program

(B) Explain the function of a sequencer input and compare instruction. What is the difference between SQI and SQC instructions? **4**

(C) Explain BTD (bit distribute) instruction with suitable example. **4**

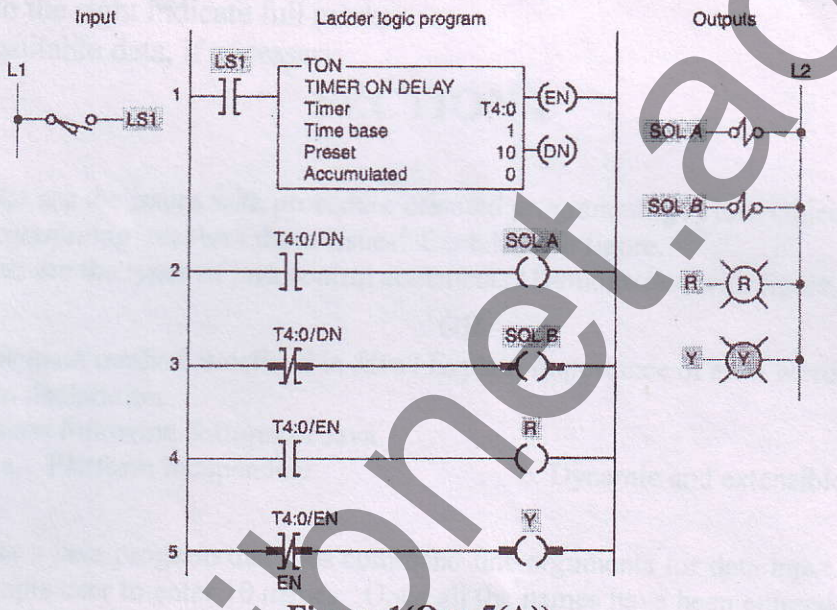

Figure 1(Que 5(A))

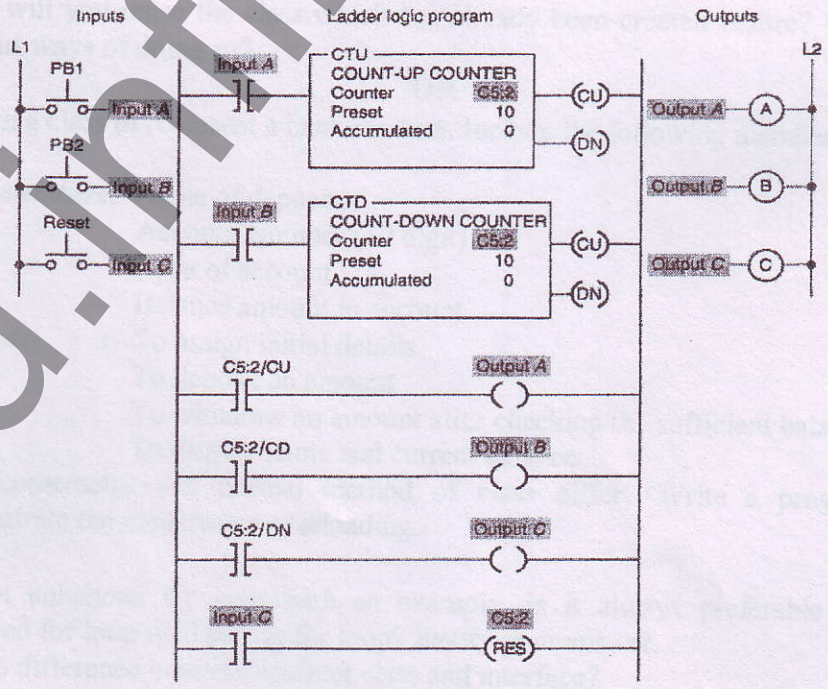

Figure 2(Que 5(A))

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