C.U.SHAH UNIVERSITY
Summer Examination-2019

Subject Name: Programmable Logic Controller and Applications

Subject Code: 4TE08PLA1   **Branch: B.Tech (EC)**

Semester: 8   **Date: 22/04/2019**   **Time: 10:30 To 01:30**   **Marks: 70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1	**Attempt all questions**	**(14)**
a)	State the key points that differentiate PLC from PC.	1
b)	What do you mean by PLC open and close architecture?	1
c)	State the key functions of CPU in PLC.	1
d)	State the key functions of programming device used for PLC.	1
e)	State the steps of PLC scan process.	1
f)	Which baud rate is used by PLC CPU computer work with its keyboard?	1
g)	Which baud rate is used by PLC system for remote operation?	1
h)	State and function of the first block of power supply of PLC.	1
i)	Which type of error codes are used for small and large PLC?	1
j)	State one difference between discrete I/O and analog I/O.	1
k)	Define the term 'nominal input voltage'.	1
l)	Define the term 'Leakage current'.	1
m)	Define the term 'resolution'.	1
n)	Define the term 'output current/voltage range'.	1

Attempt any four questions from Q-2 to Q-8

Q-2	**Attempt all questions**	**(14)**
(a)	Enlist advantages of PLC. Explain any six in detail.	**7**
(b)	Write short notes on 'PLC process scanning considerations'.	**7**
Q-3	**Attempt all questions**	**(14)**
(a)	Explain in detail with examples PLC ladder programming format's limitations.	**8**
(b)	Explain in detail with block diagram of power supply used for PLC.	**6**
Q-4	**Attempt all questions**	**(14)**
(a)	Explain in detail with diagram discrete I/O modules used in PLC.	**9**
(b)	Explain in detail with examples rack/slot based addressing formats for PLC's I/O module.	**5**
Q-5	**Attempt all questions**	**(14)**
(a)	Explain briefly different specifications used for analog I/O modules.	**7**

(b) Draw the ladder logic programs for following logic gates   **7**
1. NOT 2. NOR 3. EX-OR 4. NAND
Express each of the following equations as a ladder logic program:
1. $Y = AB + \bar{B}D + \bar{C}\bar{B}E$ 2. $Y = (AC+\bar{B})DE$ 3. $Y = A\bar{C} + DE + B\bar{E}$

Q-6   **Attempt all questions**   **(14)**

(a) Explain in detail memory organization in PLC (Hint. Program and Data files).   **7**

(b) List the five standard PLC languages as defined by the International Standard   **7**
for PLCs, and give a detail description of each with examples.

Q-7   **Attempt all questions**   **(14)**

(a) Explain in detail with examples different types of branching used in PLC   **7**
ladder program.

(b) Explain in detail with example cascading of counters.   **7**

Q-8   **Attempt all questions**   **(14)**

(a) Classify data manipulation instructions into two broad categories. Explain   **7**
data transfer operations in detail with examples.

(b) List and describe specific PLC troubleshooting procedures.   **7**