C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name: Programmable Logic Controller and Applications

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

Semester: 8   **Date: 18/04/2017**   **Time: 02:30 To 05:30**   **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)	Define the term PLC.	1
	b)	Why PLC extensively used in industry for process control?	1
	c)	State key points which differentiates PLC from PC.	1
	d)	State difference between fixed I/O and modular I/O.	1
	e)	State advantage and disadvantage of modular I/O.	1
	f)	State difference between open and close architecture PLC design.	1
	g)	State the different parts of a PLC.	1
	h)	Define the term PLC scan process. State the sequence of PLC scan process.	1
	i)	How many types of PMs for PLC available? State their names.	1
	j)	State the functions of input module of PLC	1
	k)	State the functions of output module of PLC	1
	l)	What do you mean by nominal input voltage specification for discrete I/O module?	1
	m)	What do you mean by input threshold voltages specification for discrete I/O module?	1
	n)	What do you mean by resolution specification for analog I/O module?	1

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

Q-2		**Attempt all questions**	**(14)**
	(a)	Explain in detail with diagrams PLC I/O module interfaces.	**7**
	(b)	Enlist different advantages that PLCs offer over conventional relay-based control systems and explain in detail each of them.	**7**
Q-3		**Attempt all questions**	**(14)**
	(a)	Explain in detail PLC programming equipments.	**5**
	(b)	Draw the block diagram of power supply used in PLC and explain each of blocks in detail.	**5**
	(c)	List four criteria by which PLCs are categorized. Compare the single-ended, multitask, and control management types of PLC applications.	**4**

Q-4		**Attempt all questions**	**(14)**
	(a)	Explain in brief different special I/O modules	5
	(b)	Explain in brief with diagram PLC scanning process considerations.	5
	(c)	Explain in detail different PLC disadvantages.	4
Q-5		**Attempt all questions**	**(14)**
	(a)	Draw the ladder logic programs for basic logic gates. Express each of the following equations as a ladder logic program: 1. $Y = A\overline{B} + CD\overline{E} + A\overline{B}$ 2. $Y = (A+BC)CD$ 3. $Y = A\overline{B}C + \overline{D} + E$	7
	(b)	Explain in detail memory organization in PLC (Hint. Program and Data files).	7
Q-6		**Attempt all questions**	**(14)**
	(a)	Explain in detail with examples different types of branching used in PLC ladder program.	7
	(b)	List the five standard PLC languages as defined by the International Standard for PLCs, and give a detail description of each with examples.	7
Q-7		**Attempt all questions**	**(14)**
	(a)	Enlist different timer instructions available in PLC. Explain any three of them in detail.	7
	(b)	Enlist different counter instructions available in PLC. Explain each of them in detail.	7
Q-8		**Attempt all questions**	**(14)**
	(a)	Enlist the different data compare instructions available in PLC. Explain any three of them in detail with examples.	7
	(b)	Enlist the different math instructions available in PLC. Explain any three of them in detail with examples.	7