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Faculty of Engineering
End Sem Examination May-2024

RA3CO38

Microcontroller & Programmable Logic Controllers

Programme: B.Tech.

Branch/Specialisation: RA

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. 8051 microcontrollers are manufactured by which of the following companies? **1**
(a) Atmel (b) Philips (c) Intel (d) All of these
- ii. How many timers exist in 8051 which is 16-bit? **1**
(a) 0 (b) 1 (c) 2 (d) 3
- iii. When the microcontroller executes some arithmetic operations, then the flag bits of which register are affected? **1**
(a) PSW (b) SP (c) DPTR (d) PC
- iv. JZ, JNZ, instructions checked content of _____ register. **1**
(a) DPTR (b) B (c) A (d) PSW
- v. Which of the following can provide hardware handshaking? **1**
(a) RS232 (b) Parallel port
(c) Counter (d) Timer
- vi. What does UART stand for? **1**
(a) Universal asynchronous receiver transmitter
(b) Unique asynchronous receiver transmitter
(c) Universal address receiver transmitter
(d) Unique address receiver transmitter
- vii. PIC stands for: **1**
(a) Peripheral Interface Controller
(b) Programmable Intelligent Computer
(c) Both (a) and (b)
(d) None of these

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- viii. AVR microcontroller refers to: **1**
(a) Advanced Virtual RISC (b) Advanced Visual RISC
(c) Advanced Virtual Rate (d) Advanced Visual Rate
- ix. In fixed programmable logic controller- **1**
(a) Input is fixed (b) Output is fixed
(c) Both (a) and (b) (d) None of these
- x. The control logic in a programmable logic controller can be programmed by _____. **1**
(a) FBD, ladder logic (b) Sequential logic
(c) Structured text (d) All of these
- Q.2 i. Define code and data memory. Also mention the size of these memory in 8051 microcontroller. **3**
ii. Explain the pin configuration of 8051 and give description of each pin. **7**
OR iii. Give a detailed note on interrupts in 8051. Also explain the significance of IP and IE registers. **7**
- Q.3 i. Write any three instructions from logical instruction set of 8051 with its syntax and example. **3**
ii. What is subroutine? Compare ACALL and LCALL instructions. **7**
OR iii. Write an algorithm or program in assembly language to arrange the elements of an array in descending order. **7**
- Q.4 i. What is serial communication? Define its types? **3**
ii. Explain the block diagram of 8255 Programmable Peripheral Interface (PPI) in detail. Write any two applications of it. **7**
OR iii. Describe the working of SBUF and SCON registers. **7**
- Q.5 i. What are the features of AT tiny 25. **3**
ii. Draw and explain the block diagram of PIC 16 Microcontroller. **7**
OR iii. Write a detailed note on AVR microcontroller family. **7**
- Q.6 i. Draw the block diagram of Programmable Logic Controllers (PLC). **3**
ii. Explain the working of an on-delay and off-delay timer using a suitable ladder logic diagram. **7**
OR iii. Compare the operation of PLC with relay panel. Also write any two applications of PLC. **7**

Marking Scheme

Microcontroller and Programmable Logic Controllers (T) - RA3CO38 (T)

Q.1	i)	8051 microcontrollers are manufactured by which of the following companies?	1
		d) All of the mentioned	
	ii)	How many timers exist in 8051 which is 16-bit?	1
		c) 2	
	iii)	When the microcontroller executes some arithmetic operations, then the flag bits of which register are affected?	1
		a) PSW	
	iv)	JZ, JNZ, instructions checked content of _____ register.	1
		c) A	
	v)	Which of the following can provide hardware handshaking?	1
		a) RS232	
	vi)	What does UART stand for?	1
		a) universal asynchronous receiver transmitter	
	vii)	PIC Stands for	1
		a) Advanced Virtual RISC	
	viii)	AVR micro controller refers to:	1
		c) both a & b	
	ix)	In fixed programmable logic controller-__	1
		c) Both a and b	
	x)	The control logic in a programmable logic controller can be programmed by -----.	1
		a) FBD, ladder logic	
Q.2	i.	Define code and data memory.	2 Marks
		Also mention the size of these memory in 8051 microcontroller.	3
		1 Marks	
	ii.	Explain the pin configuration of 8051 and give description of each pin.	7
OR		Diagram	2 Marks
		Explanation	5 Marks
	iii.	Give a detailed note on interrupts in 8051.	4 Marks
		Also explain the significance of IP and IE registers.	3 Marks
Q.3	i.	Write any three instructions from logical instruction set of 8051 with its syntax and example.	3
		1x3=3 Marks	
	ii.	What is subroutine?	2 Marks
		Compare ACALL and LCALL instructions.	5 Marks
OR	iii.	Write an algorithm or program in assembly language to arrange the elements of an array in descending order.	7
		1 Marks for each step	

Q.4	i.	What is serial communication?	1 Marks	3
		Define its types?	2 Marks	
	ii.	Explain the block diagram of 8255 PPI in detail.	5 Marks	7
		Write any two applications of it.	2 Marks	
OR	iii.	Describe the working of SBUF and SCON registers.		7
		3.5 Marks for each register.		
Q.5	i.	What are the features of AT tiny 25.	1x3= 3 Marks	3
	ii.	block diagram of PIC 16 Microcontroller	3 Marks	7
OR		Explanation	4 Marks	
	iii.	Write a detailed note on AVR microcontroller family.	7 Marks	7
Q.6	i.	Draw the block diagram of PLC.	3 Marks	3
	ii.	Explain the working of an on-delay and off-delay timer using a suitable ladder logic diagram.	3.5 Marks for each.	7
OR	iii.	Compare the operation of PLC with relay panel.	5 Marks	7
		Also write any two applications of PLC.	2 Marks	
