Total No. of Questions: 20

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

RA3CO38 Microcontroller & Programmable Logic Controllers

Programme	:	B.Tech.	**Branch/Specialisation**	:	RA
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. 8051 microcontrollers is a _____ bit processor. **1 1 1**

- ○ 16
- ◉ 8
- ○ 2
- ○ 4

Q2. Which unit of 8051 is used as a counter? **1 1 1**

- ◉ Timer
- ○ Serial port
- ○ Data bus
- ○ Power supply unit

Q3. Which register is used as a pointer for external RAM in a 8051 microcontroller? **1 1 1**

- ○ B
- ○ PSW
- ◉ DPTR
- ○ None of these

Q4. JC, JNC, instructions check contents of _____ register. **1 1 1**

- ○ PC
- ○ TMOD
- ◉ PSW
- ○ IE

Q5. Simplex communication includes: **1 1 1**

- ◉ Unidirectional flow of data via single cable
- ○ Unidirectional flow of data via double cable
- ○ Bidirectional flow of data via single cable
- ○ Bidirectional flow of data via double cable

Q6. What does UART stand for? **1 1 1**

- ◉ Universal asynchronous receiver transmitter
- ○ Unique asynchronous receiver transmitter
- ○ Universal address receiver transmitter
- ○ Unique address receiver transmitter

Q7. When AVR wakes up, then the value of PC becomes? **1 1 1**

- ○ 00H
- ○ 000H
- ◉ 00000H
- ○ 0000H

Q8. Which instruction set architecture does the PIC microcontroller use? **1 1 1**

- ◉ RISC
- ○ CISC
- ○ ARM
- ○ VLIW

Q9. PLC refers to- **1 1 1**

- ○ Industrial Computers
- ○ Programmable logic controllers
- ○ Ladder logic controllers
- ◉ Any of the above

Q10. Basic elements required for drafting a simple ladder logic program are: **1 1 1**

- ○ NO, Timer, NC
- ○ NO, NC
- ◉ NO, NC, Coil
- ○ NO, Counter, Coil

Section 2 (Answer all question(s))

Marks CO BL

Q11. Explain register banks area, bit addressable area, and scratch pad area in Internal DATA memory structure of 8051. **3 2 2**

Rubric	Marks
register banks area 1 bit addressable area 1 and scratch pad area 1M	3

Q12. (a) Draw the pin configuration of 8051 and give description of any five special pin functions. **7 2 2**

Rubric	Marks
Draft the pin configuration of 8051 2M and give description of any 5 special pin functions. 1 for each	7

(OR)

(b) Describe special function registers in 8051. Give the functions of A and B registers, DPTR, and Program Status Word in 8051.

Rubric	Marks
Describe special function registers in 8051. 2 Give the functions of A and B registers, DPTR, and Program Status Word in 8051. 1 M for each register	7

Section 3 (Answer all question(s))

Marks CO BL

Q13. Write a program or algorithm to perform addition of two hexadecimals numbers, using registers in assembly language. **3 3 3**

Rubric	Marks
program or algorithm 3M	3

Q14. (a) What are the different addressing modes in 8051 microcontroller? Represent each of them by their syntax and analyze its output. **7 3 3**

Rubric	Marks
What are the different addressing modes in 8051 microcontroller. 2M Represent each of them by their syntax and analyze its output. 5M	7

(OR)

(b) Develop an algorithm to apply the following instructions on R0=5H & R1=6H and generate the predicted response of the controller:

- JNC
- JC
- DJNZ

Rubric	Marks
Develop an algorithm to apply the following instructions on R0=5H & R1=6H and generate the predicted response of the controller: 1. JNC, 2M 2. JC, 2M 3. DJNZ. 3M	7

Section 4 (Answer all question(s))

Marks CO BL

Q15. What is serial communication? Define its types. 3 2 2

Rubric	Marks
What is serial communication? 1 M Define its types? 2M	3

Q16. (a) Draw the block diagram of 8255 PPI in detail. Also explain the functions of each unit in detail. 7 2 1

Rubric	Marks
Draw the block diagram of 8255 PPI in detail. 3M Also explain the functions of each unit in detail. 4M	7

(OR)

(b) Describe the working of SBUF and SCON registers in detail.

Rubric	Marks
Describe the working of SBUF 3.5M and SCON 3.5 M registers in detail.	7

Section 5 (Answer all question(s))

Marks CO BL

Q17. Write features of PIC18 microcontrollers. 3 1 1

Rubric	Marks
1 M FOR EACH	3

Q18. (a) Draw the block diagram of AT mega 32 and explain its each unit in detail. 7 1 1

Rubric	Marks
Draw the block diagram of AT mega 32 3M and explain its each unit in detail. 4M	7

(OR)

(b) Draw and explain the AVR architecture in detail.

Rubric	Marks
Draw 3M and explain the AVR architecture in detail.4M	7

Section 6 (Answer all question(s))

Marks CO BL

Q19. What is PLC? Explain rails and rungs using a suitable figure. 3 2 2

Rubric	Marks
What is PLC? 1M Explain rails and rungs using a suitable figure. 1 FOR EACH	3

Q20. (a) Explain the working of Timer in PLC, also explain the timer operations using a suitable example. **7 2 2**

Rubric	Marks
Explain the working of Timer in PLC, 3M also explain the timer operations using a suitable example. 4M	7

(OR)

(b) Compare the operation of PLC with relay panel. Also write any two applications of PLC.

Rubric	Marks
Comparison 5M application 2M	7

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