



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; June - 2017

Microcontrollers

Time: 3 hrs

Max. Marks: 100

Note: i) Answer FIVE full questions, selecting ONE full question from each unit.

ii) Missing data may be suitably assumed.

UNIT - I

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|------|---|---|
| 1 a. | State what is a microprocessor and a microcontroller. Mention their applications. | 6 |
| | b. Explain Princeton and Harvard architectures used in microcontrollers. | 6 |
| | c. State the functions of the following pins of 8051 MCU : | |
| | (i) RST ; (ii) \overline{PSEN} ; | 8 |
| | (iii) \overline{RD} ; (iv) ALE. | |
| 2 a. | List the differences between CISC and RISC processors. Give examples for each type. | 8 |
| | b. Describe the special function registers with 8051 MCU. | 6 |
| | c. What is the duration of a 4-machine cycle instruction cycle in a generic 8051 system operating at 11.0592 MHz? | 6 |

UNIT - II

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| 3 a. | Explain merits and demerits of assembly language programming. | 6 |
| | b. What are pseudo- opcodes? Describe some of the commonly used pseudo-opcodes. | 6 |
| | c. Write proper comments for each of the following statements and finally state what will be the content of A at the end of the instruction sequence given below : | |
| | MOV A, # 7FH | |
| | MOV 50H, # 29H | 8 |
| | MOV R0, # 50H | |
| | XCHD A, @ R0 | |
| 4 a. | Explain the operation of stack and stack pointer with an example. | 6 |
| | b. Assume that a byte of data is stored at data memory location X. Write a program which tests bit 5 of (X). Write FFH into X+1 if bit 5 is 0, and write 00H at the same location if bit 5 is 1. | 8 |
| | c. Explain why LJMP or SJMP instruction is stored at program memory location 0000H and 8051 MCU based system having ISRs. | 6 |

UNIT - III

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| 5 a. | Explain the following Instruction with an examples : | |
| | (i) DJNZ; (ii) CJNE; (iii) JZ; (iv) AJMP; (v) LJMP. | 10 |

- b. Write an assembly language program to find the sum of ten 8-bit numbers. 10
6. a. Write an assembly language program to find the largest number in an array. Assume that each element in the array has 8 bits. 10
- b. Write a subroutine in assembly language for 8051 MCU to cause a delay of 1 second. Using this, realize a delay of 1 minute. Assume MCU clock frequency of 11.0592 MHz. 10

UNIT - IV

- 7 a. Explain various modes of operation of timers / counters in 8051 MCU. 10
- b. Assume that a 1 Hz external clock is connected to pin P3.4 of a generic 8051 MCU. Write an ALP to make timer 0 work as a counter in Mode 1 to count the pulses arriving at pin P3.4 and display the count value continuously on port 2 and port 1. 10
- 8 a. Explain the stress involved in mode 2 operation of Timer in 8051 MCU. 10
- b. Write an ALP to generate a square wave 100 kHz on pin 2.3 using Timer 1 in Mode 1, clock frequency is 22 MHz. 10

UNIT - V

- 9 a. What is the meaning of simplex, half duplex and full duplex data transfers? 10
- b. In a generic 8051 MCU how do you enable interrupts TF0, TF1, INT0 and disable interrupts INT1 and RI/TI? Write instruction sequence to realize this. 10
- 10 a. Explain RS232 standard of serial communication. 10
- b. Explain various interrupts in 8051 MCU. 10

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