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Question Paper Code : 50539

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Fifth Semester

Electrical and Electronic Engineering

EE 8551 – MICROPROCESSORS AND MICROCONTROLLERS

(Common to: Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define tristate logic.
2. Write the largest hexadecimal number that can appear on 8085 data bus. Also, specify the number of memory locations that can be addressed using 8085 address lines.
3. Give an example for a two-byte instruction and a three-byte instruction.
4. Find the result stored in accumulator after the execution of the following assembly program:

MVI A, FFH

MVI B, 8DH

SUB B

ANI 0F

STA 2550H

HLT

5. What are the criteria for choosing a microcontroller?
6. Show the status of auxiliary carry and parity flags after the addition of 38H and 2FH in the following instructions:
MOV A, #38H
ADD A, #2FH
7. Compare two key lock out mode of 8279 with N-key roll over mode.
8. Draw the control word format for I/O mode of 8255 programmable peripheral interface.
9. List any two characteristics of the architecture followed by 8051 microcontroller.
10. What happens when the 8051 microcontroller instruction "MOVC A, @A+DPTR" is executed?

PART B — (5 × 13 = 65 marks)

11. (a) With a functional block diagram, briefly discuss the architecture of the 8085 microprocessor.

Or

- (b) (i) Illustrate the steps involved in the development of an assembly language program for an application. (7)
- (ii) Discuss how the 8085 microprocessor write into a register of a memory chip. (6)
12. (a) (i) List the different types of addressing modes supported by the 8085 microprocessor with examples. (4)
- (ii) Write an assembly language program using 8085 to find sum of even numbers in a given series containing 8-bit numbers stored in a continuous memory location and store the result in another memory location. (9)

Or

- (b) List the categories under which the instructions in the instruction set of the 8085 microprocessor are grouped. Explain the operation of any two instructions in each group.

13. (a) With a functional block diagram, briefly discuss the architecture of the 8051 microcontroller.

Or

- (b) (i) Differentiate RET and RETI instructions. Explain why RET cannot be used as the last instruction of an ISR instead of RETI. (6)
(ii) Illustrate the options available with Timer Mode (TMOD) register of 8051. (7)

14. (a) Describe the operating modes and control words of 8255. Also, specify the handshaking signals and their functions if port A of 8255 is setup as input port in mode 1.

Or

- (b) Show how the 8085 micro processing unit is interfaced with the analog to digital converter using the interrupt. Also, explain the principle and control signals involved in the analog to digital conversion process.
15. (a) Explain how to interface a 8×4 matrix keyboard to 8051 microcontroller. Also, Write an assembly language program to show how 8051 detect a key press and identify the key pressed.

Or

- (b) Explain how to interface a servo motor with 8051 microcontroller. Also, write an assembly language program to control the angular position of servo motor using 8051 microcontroller.

PART C — ($1 \times 15 = 15$ marks)

16. (a) Describe the need for timing diagram in 8085 microprocessor. Also, show the timing diagram for execution of IN 3AH instruction. (Assume the machine codes DBH and 3AH generated for the instruction IN 3AH are available in locations 4065H and 4066H respectively).

Or

- (b) Show how to interface a stepper motor to 8051 microcontroller. Also, write an assembly language program to demonstrate control of direction and speed of stepper motor rotation.