Ref No: EX/EE/5/T/321/2017(old)

B. E. IN ELECTRICAL ENGINEERING (EVENING) EXAMINATION, 2017

3rd Year, 2nd Semester (old)

SUBJECT: - MICROPROCESSOR AND MICROCONTROLLER

Time: Three hours | Full Marks: 100

Answer any five Questions. 5×20

1. a. Explain the different addressing modes of 8085 with example. 6+4+10
   b. Briefly describe the function of stack and stack pointer of Intel 8085 microprocessor.
   c. Explain with suitable diagram, the de-multiplexing method of the Intel 8085 microprocessor bus pins AD7 – AD0.

2. a. Write an assembly language program to sort 8 single byte data stored in consecutive memory locations in descending order and save data in the same block of memory location. 10+10

   b. Draw a detailed timing diagram with relevant CPU signals and show that the execution of the instruction "STA 8050" of Intel 8085 requires 4 machine cycles and 13 T – states. Also explain in details what is happening in each T – state.

3. a. A 16-bit number is stored in memory locations 8500H and 8501H and 8-bit number in 8502H. Divide the former by the later: store the quotient in 8600H and 8601H and the reminder in 8602H and 8603H. 10+10
   b. State the functions of the following pins of Intel 8085 microprocessor
      (i) ALE;
      (ii) READY;
      (iii) $IO/\overline{M}$;
      (iv) SID & SOD;
      (v) HOLD & HLDA

4. a. What are the different addressing modes of 8051? Explain with necessary examples. 10+10
   b. Draw an appropriate hardware diagram showing the interface of a 7-segment display module with microcontroller and write a program to display the character 'A'.

(25)

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5. a. Write a program to receive a block of 20 data through the serial port and store them in internal memory starting from the address 40h onwards. Assume 9-bit data and a baud rate of 4800. Write appropriate comment in favour of your solution. 10+10
   b. Write a program to blink LED every 100ms using timer-1 in mode-1 using interrupt driven method. Assume that the LED is connected to P1.5 of the microcontroller.

6. a. Describe in brief the interrupt sequence of an 8051 microcontroller. 7+6+7
   b. What is interrupt priority? How does it work in interrupt process?
   c. Illustrate the role of program counter and stack pointer in branching instructions.

7. a. Write the name of flags and the way they are affected after the following instructions are executed. 10+10
      i) DIV ii) CJNE iii) SUBB iv) MOV v) MUL
   b. Write the commands of various branching instructions available in 8051 microcontroller. Mention their complete formats, range of jumps and associated constraints.

8. Write short notes on any Two: 10×2
   a. DMA Controller (8257);
   b. Interrupts of Intel 8085 microprocessor
   c. SFRs for timer-counter
   d. Program counter in branching instructions (8051).