End Semester Examination (ESE), 2020

Semester: 6th Semester

Subject: Microcontrollers and Embedded Systems

Subject Code: Et-603

New Syllabus/ Old Syllabus: New Syllabus

Total Marks: 56 Marks

Time: 2 Hours 30 minutes

All questions are compulsory

Q1. Choose the correct answer :

i) The 8051 is a microcontroller of -   1

a) 4 bit   b) 8 bit   c) 16 bit   d) None of the above

ii) The 8051 has ROM of size   1

a) 4KB
b) 8KB
c) 16KB
d) 32KB

iii) To select register bank 1 the value of bits of RS1 (PSW.4) and RS0 (PSW.3) will be-   1

a) RS1 (PSW.4) = 0 and RS0 (PSW.3) = 0
b) RS1 (PSW.4) = 0 and RS0 (PSW.3) = 1
c) RS1 (PSW.4) = 1 and RS0 (PSW.3) = 0
d) RS1 (PSW.4) = 1 and RS0 (PSW.3) = 1

Q2. Fill in the blanks :

i) The 8051 microcontroller has _____ number of I/O pins in total.   1

ii) When the 8051 is powered up, the SP (stack pointer) register contains value _____.   1

iii) In the 8051, the Program Counter register is _____ bit(s) wide.   1

Q3. Write True or False.

i) No value can be moved directly into registers R0-R7.   1

ii) In the 8051, with each PUSH instruction, the stack pointer is incremented by 1.   1

iii) A microcontroller normally has RAM, ROM, I/O devices on-chip ?   1

iv) To reset the 8051, a high pulse of minimum duration equal to 2 machine cycles must be
applied to reset pin 9.   1

Q4.

a) i)   MOV   R4, #25H
   ii)   MOV   A, #16H
   iii)   ADD   A, R4

   After execution of
   Code i), what will be the content of R4 ?
   Code ii), what will be the content of A ?
   Code iii) what will be content of A ?   1+1+1=3

   b) How many interrupts are there in the 8051 excluding reset. Write steps to enable an
      interrupt.   3

   c) Find the address space for the on-chip ROM of the 8051.   3

   d) What do you mean by Assembly language ? Write the advantages of C programming.
                                                                                            1+2=3

   e) What is interrupt ? Differentiate between polling and Interrupt.   1+2=3

Q5. a) What is microcontroller ? Differentiate between microcontroller and microprocessor.

Or

   Write an assembly language program to copy the value 55H into RAM locations
   40H to 45H using register indirect addressing mode with a loop.   4

Q6. a) Write an assembly language program to toggle all the bits of port P1 by sending to it the
      values 55H and AAH continuously. Put a time delay in between each issuing of data to port P1.

Or

   Write short notes on unconditional jump instructions.   4

   b) Calculate time delay for the following subroutine for an 8051 system of 11.0592 MHz.

Machine Cycle

   DELAY: MOV   R2, #100   1
   HERE: NOP   1
              NOP   1
              DJNZ   R2, HERE   2
              RET   2   4

Q7. What are the different types of addressing modes in the 8051?   5
     Explain any two addressing modes with example.

Q8. a) Draw the internal block diagram of 8051 microcontroller.   5
    b) Explain the block diagram briefly.   4

Q9. Write an 8051 C program to turn bit P1.3 on and off 50,000 times with a 500 ms delay.   5