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

(An Autonomous Institution affiliated to VTU, Belgaum)

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

Semester End Examination; June/July – 2015

Microcontrollers

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer any **FIVE** full questions, selecting at least **TWO** full questions from **each part**.*

PART - A

1. a. With block diagram briefly explain Harvard and Von Neumann CPU architectures. 4

   b. With respect to 8051 microcontroller briefly explain the following : 12

   (i) Flags and program status word (ii) Internal memory (iii) Stack operation.

   c. Write a note on I/O ports of 8051 microcontrollers. 4

2 a. With examples, explain different addressing modes of 8051 microcontroller. 10

   b. Explain the following 8051 instructions with examples: 10

   (i) MOV C (ii) RRC (iii) CPLA (iv) ADD C (v) DIV

3 a. Write the O\P and flag status after the following program is executed 6

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MOV A, # +96 ;
MOV R1, # +70;
ADD A, R⊥
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   b. Find the content of registers A & B after the following code in each case : 8

   (i) MOV A, # 37H
   ANL A, # OCA H

   (ii) MOV A, #37H
   ORL A, # OCA H

   (iii) MOV A, # 85H
   CPL A
   ADD A, #⊥

   (iv) MOV A, # 95H ;
   MOV B, # 05H;
   MUL AB.

   c. Take 10 bytes of data from RAM locations 45 H to 54 H, add 02 to each of them and save the result in data RAM locations 79 H down to 70 H. 6

4 a. With an example explain the following instruction : 8

   (i) INC and DEC (ii) SETB c and SETB b

   (iii) ANL c, b and ANL c, /b (iv) CLR c and CLR b

   b. ADD the BCD numbers found in internal RAM 25 h, 26 h and 27 h. Put the result in RAM locations 31 h (MSB) and 30 h (LSB). 6

Contd…2

c. Write a program to multiply the unsigned number in register R_3 by the unsigned number on Port 2 and Put the result in external RAM locations 10 h (MSB) and 11 h (LSB) — 6

PART – B

5 a. Briefly explain the following jump instructions with examples :
(i) JNB b, radd (ii) JBC b, radd (iii) LJMP radd. — 6

b. The number A6 h is placed somewhere in external RAM between locations 0100 h and 0200 h. Find the address of that location and put the address in R6 (LSB) and R7(MSB) — 6

c. Assume internal RAM memory locations 40 H – 44 H contain the daily temperature for five days, as shown below. Search to see if any of the values equals 65. If value 65 does exist in the table, Give its location to R4; otherwise make R4 = 0.
40 H = (76), 41 H = (79), 42 H = (69), 43 H = (65) 44 H = (62) — 8

6 a. With reference to 8051 microcontroller briefly explain the functions of
(i) Timer 0 and Timer 1 registers (ii) TMOD registers (iii) TCON register — 8

b. Write a program to generate a square wave of 50% duty cycle on P 1.5 bit. Use Timer 0 in mode 1 Load the count as FFF2 H — 6

c. Assume that X_{TAL} = 11.0592 MHz. What value is to be loaded into the timer's registers to have a delay of 5 milli seconds? — 6

7 a. Briefly explain the following with respect to serial communication :
(i) Half and full duplex transmission
(ii) Asynchronous and synchronous serial communication
(iii) RS 232 standards. — 8

b. Briefly explain the role of TI flag bit and RI flag bit in serial communication. — 6

c. Write a program to receive the data which has been sent in serial form and send it out to port 0 in parallel form. Also save the data at RAM location 60 H. — 6

8 a. Mention the steps in executing an interrupt. List and explain the interrupts of 8051 micro controller. — 8

b. How interrupts are enables and disables in 8051 microcontroller. Briefly explain. — 6

c. Write a program to generate a square wave on port 0 which is half the frequency of the signal applied at INTO Pin [Pin no. 3.2] — 6

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