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EC 131601

Roll No. of candidate

2017

B.Tech 6th Semester End-Term Examination

MICROCONTROLLER AND APPLICATIONS

Full Marks–100   Pass Marks–35   Time–Three hours

The figures in the margin indicate full marks
for the questions.

1. Answer any *ten* of the following questions :

10×3=30

(a) Mention the range of addresses for the banks
of internal data memory of 8051 micro-
controller.

(b) Write the significance of pin named "EA" of
8051 microcontroller. Write the instructions
in assembly language to access (read from /
write to) external RAM whose address is
1000H.

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(c) List down the flags of 8051 microcontroller.

(d) Which register bank is selected by default after reset ? How is the register bank changed ?

(e) How many ports are available in 8051 microcontroller ? Write instructions in assembly C language to read the status of port P1 and then set bit P1.3 without affecting the other bits of the port.

(f) Which registers are used for accessing data memory by indirect addressing method ? Give an example.

(g) Write instructions in assembly language to divide 1234H by 10H. Clearly mention the name of registers that will store the value of remainder and quotient.

(h) What are the interrupt sources of 8051 microcontroller ? Which register is used to enable/disable the interrupt sources ?

(i) Which register is used to configure the mode of timer 0 and timer 1 of 8051 microcontroller ? Write instructions in assembly C language to configure timer 0 in mode 1 and timer 1 in mode 2.

(j) Draw the circuit to cause reset to the 8051 microcontroller.

(k) Write the name of the register that is used to communicate with the serial port of 8051 microcontroller. Which bits are used by the UART of 8051 microcontroller to indicate the completion of transmission and reception of bytes ?

(1) Write instructions in assembly language to add two numbers stored at RAM address 20H and 21H.

2. Answer any *eight* of the following questions :

$8 \times 5 = 40$

(a) Draw and explain the data memory organization of PIC 18FX42 device.

(b) What are the addressing modes of 8051 microcontroller ? Give an example of each of the mode.

(c) Calculate the value of timer registers of timer 0 so that it overflows after a period of 1ms Write a program in assembly C language that can be used to create an accurate delay of 1 ms using timer 0.

(d) Write a program in assembly language to construct a BCD counter that can count from 0 to 99.

(e) Explain the functions of any *five* of the following SFRs: Accumulator, PSW, SBUF, IE, PCON, TCON, SCON.

(f) Identify the addressing mode used in the following instructions :

   (i) MOV A, # 88H

   (ii) MOV A, 22H

   (iii) MOV A, @ r0, where R0= 22H

   (iv) MOVC A, A + DPTR where DPTR = 0021 H

   (v) SWAP A

(g) Write a program in assembly C language to toggle the LEDs connected to port P1 50 times.

(h) Write a program in assembly C language to convert a 2 digit decimal number into 8-bit packed BCD number.

(i) Give two examples each of Arithmetic, Logical and Boolean instructions of 8051 microcontroller.

(j) Assume that a switch is connected to pin P1.7 and an LED is connected to pin P2.7. Write a program in assembly C language to read the status of the switch and send it to the LED.

3. Answer any *three* of the following questions :

$3 \times 10 = 30$

(a) Interface 32KB RAM as data memory and 16KB ROM as program memory and one 8255 device. The starting memory address for RAM, ROM and 8255 devices should be 0000H, 0000H and F800H respectively. Draw the diagram and show the memory map for each chip. Draw neatly the circuit diagram.

(b) Write a program in assembly C language to transmit a string "MESSAGE" through the serial port with a baud rate of 9600bps. Assume the crystal frequency of 11.0592MHz.

(c) Explain the memory organization of 8051 microcontroller.

(d) Develop a scheme to convert an analog voltage to 8-bit digital value using an ADC chip 0801 or any other suitable ADC chip. Draw the schematic diagram and write the program in assembly language or C.

(e) Draw and explain the functional block diagram of 8051 microcontroller.