Modified

CBCS Scheme

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15EE52

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Microcontroller

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Discuss the need for stack memory in microcontroller. How stack is operated in 805 μc? What is the default location of stack? **(06 Marks)**

b. With an example explain the various addressing modes used in 8051 μc (any four). **(06 Marks)**

c. Compare RISC and CISC micro controllers. **(04 Marks)**

OR

2 a. Explain the bit pattern of program states word. **(06 Marks)**

b. With a neat diagram, explain the steps to interface 8K bytes of program RDM and 6 K bytes of data ROM to 8031 based system. **(06 Marks)**

c. Identify the addressing modes of the following instructions:
i) MOV C, A , @ A+DPTR
ii) MOV DPTR, #1234
iii) MOV A, 4
iv) CLR C **(04 Marks)**

Module-2

3 a. Write a program to find the square root of a given number. **(06 Marks)**

b. With a neat diagram explain the range of JUMP and CALL instructions. **(08 Marks)**

c. Explain the following instructions: i) DA A, ii) ANL C, P2.5 **(02 Marks)**

OR

4 a. What are assembler directives? Explain any four of them with an example. **(06 Marks)**

b. Assume that register 'A' is loaded with number 'N' (any integer value from 0 to 255). Write a program to count the number of ones in even numbered bits of accumulator. **(05 Marks)**

c. Write a program to complement the content of accumulator 62500 times. **(05 Marks)**

Module-3

5 a. Explain the different data types supported by 8051C microcontroller. **(08 Marks)**

b. Write a program to create a square wave of 100 Hz with a duty cycle of 80% on port 1.1. Use timer '0' and operate that timer '0' in mode '1'. Assume XTAL f_{mov} = 12 MHz. **(08 Marks)**

OR

6 a. A switch is connected to pin P1.2. Write on 8051 C program to monitor 'SW' and create the following frequencies on pin P1.7.
SW = 0 : 500 Hz
SW = 1 : 750 Hz
Use timer '0', mode '1' for both of them. Assume crystal frequency = 11.0592 MHz. **(08 Marks)**

b. Write an 8051C program to them bit P1.5 ON and OFF 50000 times. **(03 Marks)**

c. Write a program for counter '1' in mode '2' to count the clock pulse and display the state of the TL, count on P2. **(05 Marks)**

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Module-4

7 a. Write a program to retrieve the data serially and put them in P1. Set the band rate at 4800, 8-bit data and one stop bit. **(06 Marks)**

b. Write an 8051C program to transfer the message "INDIA" serially at 9600 band rate, 8 bit data and one stop bit, continuously. **(06 Marks)**

c. Explain the importance of TI and RI flags. **(04 Marks)**

OR

8 a. What is an interrupt? List the various interrupts of the 8051 with their corresponding vector address. **(06 Marks)**

b. Write a program that continuously gets 8-bit data from 'P0' and sends it to 'P1' where simultaneously creating a square wave of 200 μs period on pin P2.1. Use timer '0' to create square wave. Assume KTAL = 11.0952 MHz. **(07 Marks)**

c. Explain simplex, half duplex and full duplex serial data transfer. **(03 Marks)**

Module-5

9 a. A switch is connected to pin P2.7. Write a 'C' program to monitor the status of 'SW' and perform the following:

i) If SW = 0 : the stepper motor moves clock wise.

ii) If SW = 1 : the stepper motor moves counter clock wise. **(10 Marks)**

b. Explain the control word format of 8255. **(06 Marks)**

OR

10 a. Explain the various modes of 8255 and find the control word for following configurations:

i) All ports of A, B and C are O/P ports (mode '0')

ii) PA = IN, PB = OUT, PCL = OUT and PCH = OUT. **(08 Marks)**

b. Explain the steps to interface ADC 0808 to the 8051 microcontroller. **(08 Marks)**

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10ES42

Fourth Semester B.E. Degree Examination, June 2012
Microcontrollers

Time: 3 hrs. Max. Marks:100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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PART – A

1 a. Explain briefly the Harvard and Von-Neumann CPU architecture. **(06 Marks)**

b. Sketch the internal block schematic of 8051, list its salient features and briefly explain its register set. **(10 Marks)**

c. Briefly explain the dual functions of port-3 pins of 8051. **(04 Marks)**

2 a. Briefly explain any four addressing modes of data of 8051 with an example for each. **(06 Marks)**

b. Explain the operations of the 8051 instructions:
i) RLC A ii) DA A iii) MUL AB and iv) AJMP addr **(08 Marks)**

c. Write an ALP (assembly language program) in 8051 to count the number of positive and negative numbers present in the internal memory block starting with the address 20H, containing N bytes. Store the counts after the last data byte in the memory block. **(06 Marks)**

3 a. Briefly explain the different assembler directives used in an assembly language program. **(04 Marks)**

b. Write an 8051 ALP to find the value of N!/R! using a subroutine that calculates the factorial of a given number. Assume the values of N and R are stored in locations 10H and 11H. Store the value of N!/R! in 12 H. Assume N!, R! and N!/R! are all maximum 8 bit values. **(10 Marks)**

c. Write an 8051 software time delay subroutine to generate a time delay of 100 µsec when called. Assume crystal frequency as 12 MHz. Show delay calculations. Do not use timers. **(06 Marks)**

4 a. Interface an LCD display unit to 8051 and write an ALP to display the message 'DONE'. **(10 Marks)**

b. Interface a stepper motor to 8051 and rotate it by checking the status of a simple toggle switch connected to pin P2.0 as follows:
i) If switch is open rotate motor in clock wise direction.
ii) If switch is closed rotate motor in counter clockwise direction. **(10 Marks)**

PART – B

5 a. With regard to the interrupts of 8051,
i) Give the vector addresses of the interrupts.
ii) Briefly explain the procedure of enabling / disabling the entire interrupt system and enabling / disabling of individual interrupts.
iii) Indicate the default priority on reset and procedure to alter this default priority. **(06 Marks)**

b. With regard to timers of 8051,
i) Explain briefly the difference between the timer and counter operation modes.
ii) Indicate how to start / stop the timer if GATE control is also used.
iii) Explain mode – 2 operation. **(06 Marks)**

c. Write an ALP in 8051 to generate a square wave of frequency 5 kHz on pin P2.7 using Timer-1 in interrupt mode. Assume crystal frequency as 11.0592 MHz. **(08 Marks)**

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10ES42

Fourth Semester B.E. Degree Examination, June/July 2015
Microcontrollers

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. Include suitable comments to your programs.

Important Note : 1. On completing your answers, c... orily draw diagonal cross lines on the remaining blank ... s.
2. Any revealing of identification, a... peal to evaluator and /or equations written eg, 42+8 = 50, wi... e treated as malpractice.

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PART – A

1 a. Compare 8051, 8052 and 8031 microcontrollers. **(05 Marks)**

b. Explain the internal RAM section of 8051 µc with required diagrams. **(10 Marks)**

c. For the following µc ICS, determine the ROM memory address of AT89C51 with 4KB, DS89C420 with 16 KB and DS5000 with 32KB. **(05 Marks)**

2 a. What are the merits and demerits of indirect addressing mode? **(05 Marks)**

b. State the type of addressing mode used for the following instructions :
i) ADD A, 30h,
ii) CJNE A, #29h, AGHAIN
iii) INC @ R0
iv) XCH A, R3
v) CLR C. **(05 Marks)**

c. Explain the working of DAA instruction with an example. Assume that data is 99h and 99h. **(05 Marks)**

d. Write a program to covert hexadecimal number to decimal. Include suitable comments. **(05 Marks)**

3 a. Write a program to load accumulator with the value 55h and complement the content of accumulator 900 times. **(05 Marks)**

b. For AT89C51, with a crystal frequency of 22 MHz, write a program to generate a delay of 5ms. **(05 Marks)**

c. Explain the working of JZ LABEL instruction with an example. Is zero flag present in 8051? **(05 Marks)**

d. Explain the calculation of checksum byte in ROM with an example. **(05 Marks)**

4 a. Explain the features of ADC 0804. Also explain the working of its various pins. **(10 Marks)**

b. Explain the principle of stepper motor. Write a program to rotate motor 64° in clockwise direction. The motor has step angle of 2°. Write the 4 step sequence also. The motor has steps per revolution = 180, number of rotor teeth = 45, movement per 4 step sequence = 8°. **(10 Marks)**

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PART – B

5 a. Explain the bit status of TMOD special function resister. Also, explain its various modes. **(05 Marks)**

b. Using P1.5, timer – 1 in mode – 1, write a program to generate the following waveform as shown in Fig. Q5(b). Assume that system clock is 11.0592 MHz. Show the delay calculations. This waveform should be generated continuously. **(10 Marks)**

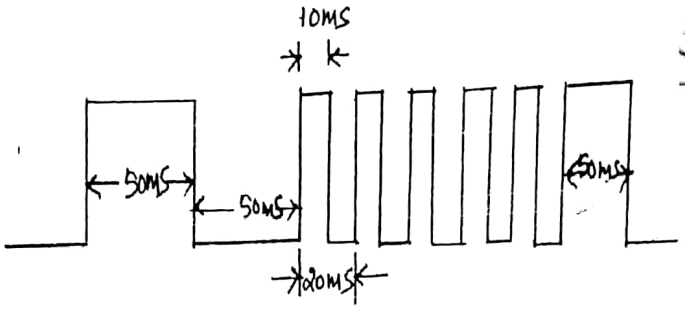

Fig.Q5(b)

c. Write a 'C' program that continuously gets a single bit of data from P1.7 and sends it to P1.0, while simultaneously creating a square wave of 200 μs period on pin P2.5. Use timer – 0 to create the square wave. Assume that crystal is 11.0592 MHz. **(05 Marks)**

6 a. Explain the bit status of SCON special function register. **(05 Marks)**

b. Write a 'C' program for 8051 to transfer the letter 'A' serially at 4800 baud continuously. Use 8 – bit data and 1 stop bit. Use timer 1 in mode 2. **(05 Marks)**

c. Determine the baud rate if THI = –2, SMOD = 1, XTAL = 11.0592 MHz. Is this baud rate supported by IBM PCS? **(05 Marks)**

d. Calculate the control word of 8255 for the following cases :

i) All the ports A B and C are output ports (mode – 0)

ii) PA = in, PB = out, PCL = out = PCH. **(05 Marks)**

7 a. Explain the expansion of MSP μc. Also explain how MSP μc is different from conventional μc, with an example. **(08 Marks)**

b. Explain the differences between MSP430XIXX, MSP430F2XX, MSP430X3XX, MSP430X4XX and MSP 430X μcs. **(08 Marks)**

c. Explain the salient features of MSP430μc. **(04 Marks)**

8 a. Explain the functions of watchdog timer, basic timer – 1, real time clock, timer A and timer B in MSP430μc. **(10 Marks)**

b. Explain the interfacing of LCD to MSP430μc. **(10 Marks)**

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10ES42

Fourth Semester B.E. Degree Examination, Dec.2015/Jan.2016

Microcontrollers

Time: 3 hrs. Max. Marks:100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
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PART – A

1 a. With neat diagram, with the programming model of 8051 with addresses of SFR's and ports. Also give 128 bytes RAM allocation. **(12 Marks)**

b. Interface 8051 to 8K external RAM and 32K external ROM and explain how 8051 access them? **(08 Marks)**

2 a. Explain difference addressing modes of 8051. Give an example for each of them and mention limitations of each. **(07 Marks)**

b. Explain the following instruction of 8051 with example (values).
i) XCHD A_1 @ Ri ii) MOVC A_1 @ A + PC iii) SWAP A
iv) RL A v) MUL AB vi) DA A **(09 Marks)**

c. Examine the following code and analyse the result with flag register. Content
MOV A_1 # –30d
MOV R_2, # –50d
ADD A, R_2 **(04 Marks)**

3 a. Explain the different types of conditional and unconditional jump instruction of and unconditional jump instruction of 8051. Specify the difference range associated with jump instruction. **(08 Marks)**

b. Classify the CALL instruction in 8051. Explain each one. **(06 Marks)**

c. Write a program to generate and store Fibonacci terms, which are less then FFh. **(06 Marks)**

4 a. What are assembler directives? Explain any four of them. **(05 Marks)**

b. Write a program to find LCM (List Common Multiplier) of two number m_1 and m_2. **(09 Marks)**

c. Explain C data types for 8051 with their data size in bits and data range. **(06 Marks)**

PART – B

5 a. Explain TMOD and TCON register of 8051 timers. **(10 Marks)**

b. For every 50 chocolates, vending machine is getting heated up, it requires minimum of 1sec break after every 50 chocolates. Provide solution for this real time problem. **(10 Marks)**

6 a. What is baud rate? Which timer of the 8051 is used to set the baud rate? **(04 Marks)**

b. Explain SCON register with its bit pattern. **(08 Marks)**

c. Write a 8051 program to send the data message " MICROCONTROLLERS " of the length 17 character at a baud rate 2400, 8bit data, 1stop bit serially. **(08 Marks)**

7 a. Compare polling and Interrupt. Explain the six interrupt of 8051, with primary and interrupt vector table. **(08 Marks)**

b. Write a program to move stepper motor by 20steps is anticlockwise direction interface. **(08 Marks)**

c. Explain the advantages of interfacing 8255 with 8051 µc. **(04 Marks)**

8 a. Explain MSP430 architecture with neat block diagram. **(08 Marks)**

b. Explain memory address space of MSP430 with neat diagram. **(04 Marks)**

c. Write ALP to find larger element in a block of data using MSP430. **(08 Marks)**

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