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Question Papers	Notes	Syllabus
Exams/Timetable	News	Results

USN | | | | | | | | | | 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.

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)**

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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CBCS Scheme

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Fifth Semester B.E. Degree Examination, June/July 2018
Microcontroller

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Explain the various internal blocks of a CPU with necessary block diagram. **(08 Marks)**
   b. Explain the various addressing modes of 8051 with an example for each. **(08 Marks)**

OR

2 a. Discuss the internal memory organization of 8051 microcontroller. **(06 Marks)**
   b. Identify the addressing modes of source operand in the following instructions:
      i) MOV A, #2CH   ii) MOV A, @R0
      iii) ADD A, 50h   iv) MOVC A, @A+dptr **(04 Marks)**
   c. Design an memory interface to correct 4 KB ROM memory using 74L5138 decoder with address space 4000h-4fffh. **(06 Marks)**

Module-2

3 a. Explain the operation of following instructions of 8051:
      i) MOVX A, @dptr
      ii) DJN2 R3, rpt
      iii) ADDC A, 40h **(06 Marks)**
   b. Write an 8051 ALP to find average of marks scored by student in 6 subjects [Max per subject = 20]. Assume the marks are stored from location 40h and the average is to be stored at location 50h. **(06 Marks)**
   c. Write an 8051 ALP to read content of Port 1 and send it to Port 2 after inversion. The operation should be continuous. **(04 Marks)**

OR

4 a. Discuss call and jump instruction types and ranges of branching in each case. **(06 Marks)**
   b. Write an 8051 ALP to convert a 2 digit BCD number to its equivalent binary (Hexadecimal) value. **(06 Marks)**
   c. How many IO ports are available in 8051? Give the usage of all the IO ports mentioning any alternate use if they have. **(04 Marks)**

Module-3

5 a. What are the various data types supported by 8051 C? Mention the range of representation in each case. **(06 Marks)**
   b. Explain TMOD-SFR with necessary format. **(04 Marks)**
   c. Write an 8051-C program to realize a square wave of frequency 2 kHz on P2.0. Use timer 1, mode 1 for the operation. Take crystal frequency as 11.0592 MHz. **(06 Marks)**

OR

6 a. Write an 8051 C program to toggle bits of port 1 with arbitrary delay. The operation has to be continuous. **(06 Marks)**

1 of 2

b. Write a program segment to configure timer 1 in 16-bit counting mode to count internal clock and timer 0 in 8-bit auto reload mode to count internal clock. Assume software control for the operation. **(04 Marks)**

c. Write on 8051 C program to generate square wave of frequency 2.5 kHz on P1.0 using Timer 1 mode 2. Take crystal frequency of 12 MHz. **(06 Marks)**

Module-4

7 a. Explain the use of various bits of SCON-SFR. **(04 Marks)**

b. Write an 8051 C program to transmit a message "VTU Belagavi" serially at a baud rate of 9600. Use 8 bit data with one stop and one start. **(08 Marks)**

c. What are the various interrupt available in 8051? Mention vector ROM address and priority of each of the interrupts. **(04 Marks)**

OR

8 a. Explain the need for MAX 232 line driver for connecting RS232 to 8051. Show the interface of RS232 to 8051 using MAX 232. **(06 Marks)**

b. The value of IP-SFR is 00001100b. Explain the priority of interrupts. **(04 Marks)**

c. Write an 8051 program to receive a data byte serially and send to P1. Use baud rate of 4800. **(06 Marks)**

Module-5

9 a. Interface an DAC to 8051 and write an program to generate triangular wave using DAC interface. **(08 Marks)**

b. The direction of a DC motor is controlled by using a H-bridge as shown below in Fig.Q9(b).
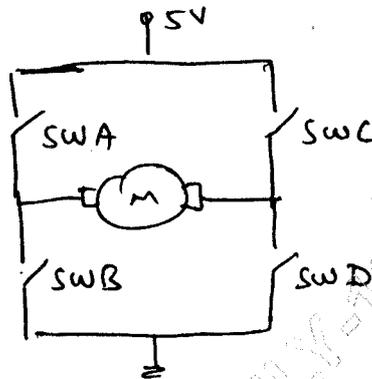

Fig.Q9(b)

SW A is connected to P1.0, SW B to P1.1, SW C to P1.2 and SW D to P1.3. Write a program to monitor a switch at P2.0.
If switch = 0 rotate motor in a direction
        = 1 rotate motor in opposite direction. **(08 Marks)**

OR

10 a. Explain the various fields of 8255 control word format. Draw the control word format. **(06 Marks)**

b. Interface an LCD to 8051 and write a program using 8051-C to display message "Good day". **(10 Marks)**

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Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Microcontroller

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1   a. Draw the programming model of 8051 μc. Explain the function of following :
        (i) Accumulator, Register B and CPU Registers.
        (ii) Program controller, Stack and Stack pointer   **(10 Marks)**
    b. After adding the following data, show the states of CY, AC and P flags:
        (i) 55h and AAh
        (ii) 12h and 62h   **(06 Marks)**

OR

2   a. Explain the internal RAM organization of 8051 with suitable diagrams.   **(08 Marks)**
    b. How many address lines are required for accessing the data in the following memory ICs, while data is organized as bytes:
        (i) 512 bytes RAM   (ii) 8K RAM.   **(04 Marks)**
    c. Explain the program ROM space allocation for the following :
        (i) EA = 0 for 8751 chip (ii) EA = V_{CC} with both on-chip and off-chip ROM for 8751.
                                                                            (04 Marks)

Module-2

3   a. Explain the following assembler directives:
        (i) DB   (ii) ORG   (iii) EQU   **(06 Marks)**
    b. Explain the working of the instruction SUBB when borrow = 0 and borrow = 1.   **(06 Marks)**
    c. A student has to take 6 courses in a semester. The marks of the student out of 25 are stored in RAM locations 50h onwards. Write a program to find the average marks and save it in Register R6.   **(04 Marks)**

OR

4   a. Write a program to complement the value AAh, 800 times.   **(04 Marks)**
    b. With respect to Port 0, explain the following :
        (i) Working of Port 0
        (ii) Dual role of Port 0
        (iii) Example program to use Port 0 as input and output.   **(08 Marks)**
    c. Write a program to generate a square wave of 50% duty cycle on bit 5 of Port-2.   **(04 Marks)**

Module-3

5   a. Write an 8051 'C' program to send values – 4 to +4 to Port P1.   **(05 Marks)**
    b. Write 8051 'C' program to toggle all the bits of P0 and P2 continuously with 250 ms delay.
                                                                            (05 Marks)
    c. Write an 8051 'C' program to convert packed BCD 0×28 to ASCII and display bytes on P1 and P2.   **(06 Marks)**

OR

6 a. Explain Mode-1 programming of 8051 timer. Describe the different steps to program in Mode-1. **(08 Marks)**

b. Write 8051 assembly program to generate square wave with $t_{ON} = 3ms$ and $t_{OFF} = 10ms$ on all pins of Port 0. System clock is 22 MHz. Use timer 0 in Mode-1. **(08 Marks)**

Module-4

7 a. Describe bit status of SCON register. **(08 Marks)**

b. Write 8051 assembly program to receive the data in serial form and send it out to Port-0 in parallel form. Save the data in RAM location 62h. Assume baud rate = 9600. Use timer 1 in Mode 2. **(05 Marks)**

c. Calculate the baud rate if TH1 = – 2, SMOD = 1, XTAL = 11.0592 MHz. Is this baud rate supported by IBM PCS? **(03 Marks)**

OR

8 a. Explain the steps in executing an interrupt. **(04 Marks)**

b. Write 8051 assembly program in which 8051 reads data from P1 and writes it to P2 continuously while giving a copy of it to serial COM port to be transferred serially. Assume baud rate = 9600 and XTAL = 11.0592 MHz. Use timer –1 in mode 2. **(08 Marks)**

c. Explain the bit status of IP Register. **(04 Marks)**

Module-5

9 a. Calculate the address range of 16×2 LCD and 20×1 LCD. **(03 Marks)**

b. Explain the internal architecture of ADC 0804 and its timing diagram to convert analog data to digital form. **(10 Marks)**

c. Consider 8 bit ADC. Assume $V_R = 5V$. Calculate the 8 bit digital output when $V_{in} = 3V$. **(03 Marks)**

OR

10 a. Write 8051 assembly program to rotate a stepper motor 64° in clockwise direction. The motor has step angle of 2°. Use 4 step sequence and draw the schematic diagram. Steps per revolution = 180, number of rotor teeth = 45. Movement per 4 step sequence = 8°. **(08 Marks)**

b. What is PWM technique? Explain bidirectional motor control using L293 chip. If SW = 0, the dc motor moves clockwise and if SW = 1, the dc motor moves counter-clockwise. Draw the schematic diagram. Write 8051 assembly program to do this. **(08 Marks)**

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15EE52

Fifth Semester B.E. Degree Examination, June/July 2019
Microcontroller

Time: 3 hrs.

Max. Marks: 80

Note: *1. Answer any FIVE full questions, choosing
ONE full question from each module.*
2. Missing data, if any, may be suitably assumed.

Module-1

1 a. With neat diagram, explain the internal architecture of 8051. **(10 Marks)**
   b. Compare micro processor with microcontroller. **(06 Marks)**

OR

2 a. What is microcontroller? List out the differences between CISC and RISC. **(06 marks)**
   b. Explain any five addressing modes of 8051 with examples for each. **(10 Marks)**

Module-2

3 a. What do you understand by assembler directives? Explain the following assembler directives : i) ORG   ii) END   iii) EQU. **(08 Marks)**
   b. Briefly explain the steps involved to assemble and run an 8051 program. **(08 Marks)**

OR

4 a. Explain the following instructions with an example :
   i) DIV AB   ii) SWAPA   iii) RRC A   iv) XCHD A,@Rp. **(08 Marks)**
   b. Write an ALP to find the value of P = N!/R! Using a subroutine which finds the value of factorial of a given number. The values of N and R are stored in locations 30H and 31H. Store P in 32H. **(08 Marks)**

Module-3

5 a. Explain the various data types in 8051C. **(08 Marks)**
   b. Assume that XTAL = 11.0592MHz. What value do we need to load into the timer's registers if we want to have a time delay of 5ms? Write an ALP for timer 0 to create a pulse width of 5ms on P2.3. **(08 Marks)**

OR

6 a. Write an 8051C program to find the checksum byte of data stream 30H, 4AH, 65H and 10H. Convert the binary value of checksum into decimal and display the value of the BCD digits on ports P_0, P_1 and P_2. **(10 Marks)**
   b. Assume that a 1–Hz external clock is being fed into pin T_0(P3.4). Write a C program for counter 0 in mode 1 to count the pulses and display the THO and TLO registers on P2 and p1 respectively. **(06 Marks)**

Module-4

7 a. What is serial data communication? Explain the significance of SCON register in detail. **(06 marks)**
   b. Write an ALP to transfer letter "A" serially at 4800 baud continuously? **(06 marks)**
   c. Write the steps to transfer data serially. **(04 Marks)**

OR

8 a. Explain the different interrupts of 8051 indicating their vector addresses. **(06 marks)**

   b. 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 200µs period on pin P2.5. Use timer 0 to create the square wave. Assume that XTAL = 11.0592MHz. **(10 Marks)**

Module-5

9 a. Write an ALP to rotate the stepper motor 5 steps in clockwise direction and 10 steps in anticlockwise direction with a delay between each step. **(10 Marks)**

   b. Explain with a diagram, the interfacing of DAC 0808 to 8051 chip. **(06 Marks)**

OR

10 a. Interface an LCD display to 8051 and write an 8051 C program to send letters 'M', 'D', and 'L' to the LCD using delays. **(10 Marks)**

    b. With a block schematic explain the features of 8255 PI chip. **(06 Marks)**

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15EE52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Microcontroller

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. Explain the important features of 8051µc. **(04 Marks)**
   b. Explain the working of stack and stack pointer. **(06 Marks)**
   c. Explain any 4 addressing modes of 8051µc with an example **(06 Marks)**

OR

2 a. Briefly explain the memory organization of 8051µc. **(07 Marks)**
   b. Explain the pin functions of port 3 in 8051µc **(05 Marks)**
   c. Compare microcontroller and microprocesses. **(04 Marks)**

Module-2

3 a. Classify the CALL instruction in 8051. Explain each one. **(06 Marks)**
   b. Write an ALP to generate 50 odd numbers from one (in BCD) and store them starting from location 30h. **(05 Marks)**
   c. Write an ALP to load accumulator with the value 55h and complement the content of accumulator 900 times. **(05 Marks)**

OR

4 a. Explain the working of DA A instruction with an example. Assume that data is 99h and 99h. **(05 Marks)**
   b. Explain CJNE and JZ instruction with an example. **(06 Marks)**
   c. Explain 5 assembler directives available in ALP. **(05 Marks)**

Module-3

5 a. Explain mode 2 timer programming with neat sketch and specify the programming steps. **(06 Marks)**
   b. Write an ALP to generate the following waveform on P1.2.XTAL = 22MHz. Use timer 1 mode 1.

Fig Q5(b) **(10 Marks)**

OR

6 a. Write a C program to get a bit from P1.0 and send it to P2.7 after inverting it. **(05 Marks)**
   b. Explain different data types in 8051C. **(05 Marks)**
   c. Write a C program to convert ASCII digits of '4' and '7' to packed BCD and display them on P1. **(06 Marks)**

Module-4

7 a. Explain RS232 handshaking signal and specify the purpose of MAX232 while interfacing.
(08 Marks)

b. Write an ALP to transfer serially the message "VTU BELGAUM" continuously at a band rate of 9600. Also write the importance of SCON register. (08 Marks)

OR

8 a. Write a C program using interrupts to do the following :
  i)   Receive data serially and send it to P0
  ii) Read port P1, transmit data serially and give a copy to P2.
  iii) Make timer 0 generate a square wave of 5KHz frequency on P0.1.
  Assume XTAL = 11.0592 MHz. set the band rate 4800. (10 Marks)

b. Explain the significance of IE and IP register. (06 Marks)

Module-5

9 a. Explain interfacing of DC motor to 8051μc with a neat diagram and write a C program to monitor the status of SW and perform the following :
  i) If SW = 0, the DC motor moves with 50% duty cycle pulse.
  ii) If SW = 1, the DC motor moves with 25% duty cycle pulse. (10 Marks)

b. Draw the pin diagram of 8255 and briefly explain the signals. (06 Marks)

OR

10 a. Draw the block schematic of DAC 0808 interfaced to 8051 and write an C program to generate sine wave. (08 Marks)

b. With a neat diagram, show how a stepper motor in interfaced to 8051. Write a program to rotate stepper motor continuously. (08 Marks)

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USN ☐☐☐☐☐☐☐☐☐☐   **15EE52**

Fifth Semester B.E. Degree Examination, Aug./Sept.2020
Microcontroller

Time: 3 hrs.   Max. Marks: 80

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

Module-1

1 a. Sketch PSW register. Also, explain its flag bits.   **(06 Marks)**
   b. Explain any four addressing modes of 8051 with examples.   **(06 Marks)**
   c. With a neat block diagram, explain the RAM memory space allocation in the 8051.
                                                                                          (04 Marks)

OR

2 a. With a neat block diagram, explain the various features of 8051 microcontroller.   **(08 Marks)**
   b. What are stack? Explain the PUSH and POP Instructions with examples.   **(06 Marks)**
   c. What are SFR'S? List any four bit and byte SFR'S and their addresses.   **(02 Marks)**

Module-2

3 a. Define assembler directives. Explain the functions of various assembler directives in 8051
       Microcontroller.   **(06 Marks)**
   b. Explain the following instructions:
       (i) Div AB   (ii) DA A   (iii) SWAP A   (iv) MOVC A, @A+DPTR   **(06 Marks)**
   c. Write an assembly language program to convert packed BCD number to two ASCII
       Numbers.   **(04 Marks)**

OR

4 a. Explain the different types of conditional and unconditional jump instructions of 8051.
                                                                                          (06 Marks)
   b. Write an ALP to check if the character string of length 5, stored in RAM locations 50 H
       onwards is a palindrome, if it is palindrome, display output character 'Y' to port P1.
                                                                                          (06 Marks)
   c. Classify the CALL Instruction in 8051. Explain each one.   **(04 Marks)**

Module-3

5 a. Explain the bit status of TMOD register.   **(06 Marks)**
   b. Write an ALP to generate a square wave of frequency 1 kHz on pin P1.2 using Timer 0,
       Mode 2. Assume that crystal frequency of 8051 is 22 MHz.   **(06 Marks)**
   c. Explain different Data types in 8051C.   **(04 Marks)**

OR

6 a. A switch is connected to pin P1.2. Write an 8051C 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.   **(06 Marks)**
   b. Write a C program for counter 0 in Mode 1 to count the pulses and display the THO and
       TLO registers on P2 and P1 respectively. Assume that a 1 Hz external clock is being fed in
       to pin P3.4.   **(06 Marks)**
   c. Explain the different logical operations supported by 8051 C.   **(04 Marks)**

Module-4

7   a.   Explain the bit status of SCON special function register.   **(06 Marks)**

    b.   Write an 8051 C program to send two messages "Normal Speed" and "High Speed" to the serial port. Assuming that SW (Switch) is connected to pin P2.0, monitor its status and set the baud rate as follows:

      SW = 0 ; 28,800 baud rate

      SW = 1 ; 56K baud rate

      Assume that XTAL = 11.0592 MHz for both cases.   **(06 Marks)**

    c.   Explain the 9 pins of RS232.   **(04 Marks)**

OR

8   a.   Explain the different interrupts of 8051 along with their vector addresses.   **(06 Marks)**

    b.   Explain the activation of external hardware interrupts using level-triggered interrupt and edge triggered interrupt method.   **(10 Marks)**

Module-5

9   a.   Explain the various pins of ADC0808 chip with a pin diagram.   **(08 Marks)**

    b.   With a neat circuit diagram, explain the connection of 8051 to ADC 0848 and temperature sensor.   **(08 Marks)**

OR

10   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 clockwise

      (ii)   If SW =1 ; the stepper motor moves counter clockwise   **(06 Marks)**

    b.   Draw a circuit DC motor connected using a Darlington transistor.   **(04 Marks)**

    c.   Explain the four modes of operation 8255 along with control word format.   **(06 Marks)**

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USN [| | | | | | | |]   17EE52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Microcontroller

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a.   Draw the block diagram of 8051 µC. Explain the working of:
        (i)   Program counter and data pointer
        (ii)   Accumulator and register B
        (iii) Register bank, stack and stack pointer   **(10 Marks)**

    b.   Draw and explain program status word register of 8051 µC. Calculate the status of carry, auxiliary carry and parity flags after the addition of (i) 55h and 52h (ii) 91h and 92h. What is the hexadecimal sum in each case?   **(10 Marks)**

OR

2   a.   Explain register indirect addressing mode. State its advantages.   **(05 Marks)**

    b.   Explain indexed addressing mode with MOVC and MOVX instructions.   **(05 Marks)**

    c.   What is memory address decoding? Explain the steps in interfacing memory chips to µC. Develop the interfacing circuit to connect 4K × 8 memory IC using logic gates as decoder. Assume the memory address from 3000 h to 3FFF h.   **(10 Marks)**

Module-2

3   a.   Define assembler directive. Explain DB and ORG directives.   **(05 Marks)**

    b.   Write a program to multiply 35 by 10 using repeated addition. Save the result in R6. Neglect carry.   **(05 Marks)**

    c.   Explain the working of MUL AB and DIV AB instructions.   **(05 Marks)**

    d.   State the following instructions as valid or invalid. Give reasons:
         (i) MOV A, @ R4   (ii) PUSH R0   (iii) MOV R5, R6
         (iv) POP 00h   (v) MOV P1, #0FFh   **(05 Marks)**

OR

4   a.   Explain the working of port 0 as input port. State its dual role.   **(05 Marks)**

    b.   Calculate the delay for the following program. Assume clock frequency as 11.0592 MHz.

	Machine cycle
MOV R3, #255	1
GO: NOP	1
NOP	1
DJNZ R3, GO	2
RET	1

                                                                         (05 Marks)

    c.   How the following numbers are represented in 8051?
         (i) 4   (ii) –4   (iii) 82   (iv) –82   (v) –128   **(05 Marks)**

    d.   Explain the working of overflow flag. After the addition of +45 with +04, what is the status of overflow flag and what is the sum, according to µC?   **(05 Marks)**

Module-3

5   a.   State and explain the advantages of using 'C' program for 8051 µC.   **(05 Marks)**

    b.   Write 8051 'C' program to toggle bit D7 of port 0, 60,000 times.   **(05 Marks)**

    c.   Explain the differences between sbit, bit and sfr declarations.   **(05 Marks)**

    d.   Write 8051 'C' program to convert ASCII digits '9' and '2' to packed BCD and display it on port P2.   **(05 Marks)**

1 of 2

OR

6 a. Explain the bit status of TMOD register. **(05 Marks)**

   b. Write an assembly program to generate square wave with ON time = 5 ms and OFF time = 20 ms on all pins of port-1. Use Timer0 in Mode1. Assume crystal frequency = 11.0592 MHz. Calculate the duty cycle. Explain TH0, TL0 and TMOD calculations. **(10 Marks)**

   c. Explain the characteristics and operations of mode-2 program in 8051 timer. **(05 Marks)**

Module-4

7 a. Explain the bit status of SCON register. With XTAL = 11.0592 MHz, calculate the THI value needed for the band rates; (i) 9600 (ii) 2400. **(10 Marks)**

   b. A square wave is being generated at pin P1.2. This square wave is to be sent to a receiver connected in serial form to 8051.Write an assembly language program for this. Explain the calculations of TMOD, SCON, TH1 value. Assume Timer0 and Timer1 in Mode2. Assume baud rate = 9600 and XTAL = 11.0592 MHz. **(10 Marks)**

OR

8 a. Compare interrupts versus polling methods, in 8051 interrupts. **(05 Marks)**

   b. Explain the 6 interrupts in 8051. Also state its ROM location. **(05 Marks)**

   c. Write an assembly program to get data continuously from port 0 and send it to port P1 while simultaneously creating a square wave of 200 µs period on P2.1 Use Timer0 to create square wave. Assume XTAL = 11.0592 MHz. Explain IE, TMOD, TH0 calculations. **(10 Marks)**

Module-5

9 a. State advantages of LCD over multi-segment LEDS. Explain the architecture and working of 14 pin LCD. Draw its schematic diagram. **(10 Marks)**

   b. Explain the interfacing circuit of DAC to 8051 µC. If I_{ref} = 2 mA, calculate the DAC output if all the inputs to DAC are high. **(05 Marks)**

   c. Calculate V_0 of sawtooth wave (with respect to DAC interface) with the following program. Assume R_F = 5 KΩ in I/V converter in DAC circuit interfacing.[Refer fig.Q9(c)]
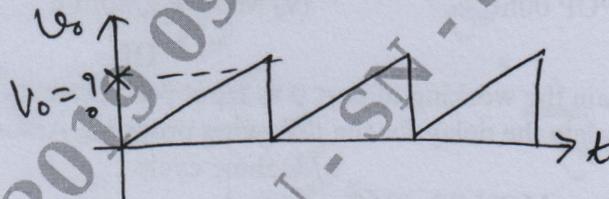

Fig.Q9(c)

```
Program:  MOV A, #00h
          MOV P1, A
       GO: INC A
          SJMP GO
```
(05 Marks)

OR

10 a. Explain the construction and working of stepper motor. Also explain 2-φ, 4 step stepping sequence, step angle and steps per revolution. **(10 Marks)**

   b. Explain the control word format of 8255 IC. What is the control word for all the ports as output ports? **(05 Marks)**

   c. Explain the principle of opto isolator and its purpose in interfacing to 8051 µC. **(05 Marks)**

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