17EE52

Fifth Semester B.E. Degree Examination, Aug./Sept.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. With the help of neat diagram, explain the architecture of 8051 microcontroller. **(10 Marks)**
   b. Mention the applications of 8051 microcontroller. **(04 Marks)**
   c. Differentiate microprocessor and microcontroller. **(06 Marks)**

OR

2 a. Draw and explain the memory structure of 8051. **(10 Marks)**
   b. Give the complete block schematic of an 8051 based system having the following specifications 64 kB of program memory and 64 kB of data memory. Make use of 16 k × 8 bit memory chips and 74 LS138 decoders. Indicate clearly the addresses selected for the memory chips. **(10 Marks)**

Module-2

3 a. Explain with examples the PUSH and POP instructions. **(08 Marks)**
   b. Write an assembly program to store ten terms of a Fibonacci series. **(06 Marks)**
   c. Write an assembly program to find the average of 10 numbers stored in the internal memory. **(06 Marks)**

OR

4 a. Explain the following instructions with an example :
   (i) MOV C A @ Atdptr   (ii) SWAP A   (iii) ANL A, #data   (iv) XCHD A, @RP
   (v) MUL AB **(10 Marks)**
   b. Write short notes on Jump and call instructions. Also specify its ranges. **(10 Marks)**

Module-3

5 a. Explain C data types with its ranges? **(06 Marks)**
   b. Explain the various logical operators supported by 8051 C. **(06 Marks)**
   c. Write an 8051 C program to read the content of port P1. If it is greater than 200 wait for 250 msec and send data to port 2. Otherwise wait for 150 msec and send data to port 0. **(08 Marks)**

OR

6 a. Write short notes on TMOD and TCON registers with examples. **(10 Marks)**
   b. Write an 8051 C program to generate a rectangular wave of 2 kHz with 60% duty cycle in pin P1.2. Assume crystal frequency as 11.0592 MHz. Use timer 0 in model. Show delay calculation. **(10 Marks)**

Module-4

7 a. What is serial communication? How serial communication is carried out with SCON and PCON registers. Show their Bit patters. **(05 Marks)**
   b. Write short notes on hand shaking signals and specify the purpose of max 232 while interfacing. **(05 Marks)**

c. Write a C program that continuously gets a single bit data from P1.7 and sends it to P1.0 which creates a square wave of 200 μsec period on pin P2.5, XTAL freq = 11.0592 MHz.

(10 Marks)

OR

8 a. Explain the two hardware interrupt pins $\overline{INT0}$ and $\overline{INT1}$ of 8051 with its concerned registers. Give an application which uses these pins.   (10 Marks)

b. What are external interrupts? Draw the diagrams for activation of external interrupts. How level triggered interrupts are reset? How to set the two external interrupts as edge triggered interrupts?   (10 Marks)

Module-5

9 a. Interface DAC and also write an ALP to generate a triangular waveform.   (10 Marks)

b. How to interface DC motor to 8051 using opto isolator? Write an C program to move DC motor with 25% duty cycle pulse.   (10 Marks)

OR

10 a. Interface 8051 with a stepper motor and write a program to rotate it continuously.

(10 Marks)

b. Explain with a neat diagram, the functional block diagram of 8255.   (05 Marks)

c. Briefly show the control word of 8255 and specify mode selection.   (05 Marks)

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