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PRESIDENCY UNIVERSITY BENGALURU

 **SET-B**

SCHOOL OF ENGINEERING

**END TERM EXAMINATION - MAY /JUNE-2024**

**Semester :** Semester IV - 2022

**Course Code :** EEE2005

**Course Name :** Microprocessor and Microcontrollers

**Program :** B. Tech.

**Date :** June 19, 2024

**Time :** 9:30 AM - 12:30 PM

**Max Marks :** 100

**Weightage :** 50%

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**Part - A**

**Answer any 5 questions 5 x 4M= 20M**

* 1. The Instruction is the main part of the 8051 Microcontroller Assembly Language Programming as it is responsible for the task performed by the Microcontroller. Write an ALP to convert a packed BCD number into two ASCII numbers. Store the result in R5 and R6 respectively.

(CO1) [Knowledge]

* 1. 8051 Instruction Set. An instruction is a command given to the microcontroller for performing a specified operation on presented data. Explain the operation performed by the following instructions?

a). PUSH 2 b). RR A c). DA A d).SETB C

(CO2) [Knowledge]

* 1. The 8051 family members all come with on- chip ROM to store programs and also have an external code and data memory. Explain the bit pattern of Program status word (PSW) register.

(CO3) [Knowledge]

* 1. Registers are usually known as data storage devices. Explain the function of Program Counter and Data Pointer registers.

(CO4) [Knowledge]

* 1. 8051 microcontroller is designed by Intel in 1981. With simple block diagram explain the features of 8051 microcontroller.

(CO5) [Knowledge]

* 1. An Assembly level program has statements which may be assembler directives or instructions. Define assembler directives. With example explain any 3 assembler directives supported by 8051 microcontroller.

(CO3, CO2, CO1) [Knowledge]

* 1. Flags are indicators of the status of the microcontroller after arithmetic and logical operations. Find the status of the flag bits after adding 32h and 3Dh

(CO5, CO4) [Knowledge]

**Part - B**

**Answer any 4 questions 4 x 10M = 40M**

* 1. Memory is an integral part of any embedded system. Show how a a µController system using 8051 can be interfaced to 16k bytes of ROM & 32k bytes of RAM. Interface the memory such that starting address for ROM is 0000H & RAM is 8000H.

(CO3,CO2,CO1) [Comprehension]

* 1. Microcontrollers can be programmed using a range of different methods. These include: text-based programming languages and close text-based programming language. With a neat figure explain the programming model of 8051 microcontroller.

(CO3,CO2,CO1) [Comprehension]

* 1. Delay can be generated using hardware registers or by using software instructions With a neat figure explain the two special function registers related to timers.

(CO2) [Comprehension]

* 1. The main purpose of the timers is to measure time and count external events. Find the timer’s clock frequency and its period for various 8051-based systems, with the following crystal frequencies.

(a) 12 MHz (b) 16 MHz.

Also if a UART is connected to this timer what will be its frequency?

(CO2,CO1,CO3) [Comprehension]

* 1. DAC0808.is an IC that converts digital data into equivalent analog Current. Hence we require an I to V converter to convert this current into equivalent .Write an embedded C program to generate a triangular waveform using DAC0808.

(CO3,CO1,CO2) [Comprehension]

* 1. Serial communication (also called RS232 communication) enables a microcontroller to be connected to another microcontroller or to a PC using a serial cable**.** Differentiate between asynchronous and synchronous communication. Explain the pins details of RS232 handshaking signals used for serial communication

(CO2,CO1,CO3) [Comprehension]

**Part - C**

**Answer any 2 questions 2 x 20M = 40M**

* 1. When a microprocessor communicates with the outside world, it provides the data in byte-sized chunks. • In some cases, such as printers, the information is simply grabbed from the 8-bit data bus and presented to the 8-bit data bus of the printer. • This can work only if the cable is not too long, since long cables diminish and even distort signals. Program the 8051 to receive bytes of data serially, and put them in P1. Set the baud rate at 4800, 8-bit data, and 1 stop bit. Show the baud rate calculations.

(CO4,CO5) [Application]

* 1. In digital computers, an interrupt is a request for the processor to interrupt currently executing code, so that the event can be processed in a timely manner. Identify all the bits present in the IE and the IP register of 8051 microcontroller and explain each register in detail.

(CO4,CO5) [Application]

* 1. The timer’s registers present in microcontroller to measure time and count external events. Generate a rectangular wave with ON time of 3ms and OFF time of 10ms on all pins of Port 0. Assume XTAL = 22MHz, Timer 0 & Mode 1

(CO5,CO4) [Application]