Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (MECHATRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, MAKEUP

SUBJECT: MICROCONTROLLER BASED SYSTEM DESIGN [MTE 3103]

DEC2019/JAN 2020

Time: 3 Hours MAX. MARKS: 50

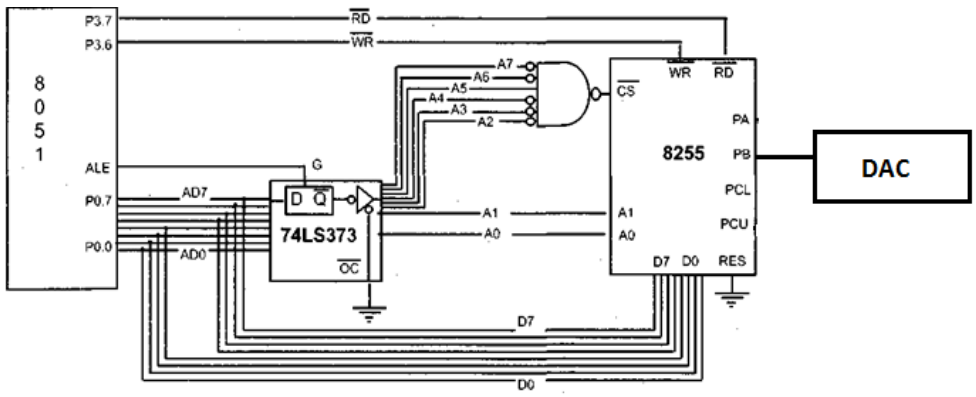
Instructions to Candidates:

- Answer **ALL** the questions.
- Data not provided may be suitably assumed

1A.	Write a C program to send the following ASCII characters to P2 based on the status of the switches with the baud rate 9600**.** Assume that the Higher three bits of port P1 of 8051 are connected to three switches as shown in table 1A	**05**	**C05**
1B.	Construct an embedded C program to enable external interrupts'0 ' and '1', configure it to receive level triggered interrupt request and keep waiting for the interrupt. i) When 8051 is interrupted through INT0, write an ISR to obtain a rectangular wave of 1.5 KHz with 35% duty cycle at P1.6 pin of 8051 continuously. ii) When interrupted through INT1, write an ISR to obtain a rectangular wave of 600Hz with 70% duty cycle at P1.6 pin. Use '8' bit registers of 8051 to obtain the delay.	**05**	**C05**
2A.	State the need for MAX232 line driver for connecting RS232 to 8051 and show the interface of RS232 with 8051 using MAX232.	**03**	**CO3**

SWITCHES			ASCII
P1.7	**P1.6**	**P1.5**	
0	0	0	'M'
0	0	1	'A'
0	1	0	'D'
0	1	1	'A'
1	0	0	'M'
1	0	1	'0'
1	1	0	'1'
1	1	1	'2'

Table 1A

2B.	Develop an assembly language Program to check whether the given 6 byte of data is palindrome or not. Consider the 6 bytes of data is stored in RAM location starting from 50h. If the data is palindrome store FFh in R1 register of Bank 0, else store 00h in R2 register of Bank 2.	**04**	**CO2**
2C.	Compile the different functionality of port 3 in 8051 with suitable examples.	**03**	**CO3**
3A	Develop an assembly language program to generate a sine waveform continuously on the DAC interface. Maximum peak to peak voltage for DAC is 10V.An 8 bit DAC is interfaced to 8051 through Port B of 8255. Find the address allocated to 8255 registers shown in figure 3A  Figure 3A	**05**	**CO4**
3B	Summarize the different assembler directives used in an assembly language programming with suitable example.	**02**	**CO1**
3C	Explain the utilization of Tri-state buffers for reading input pin and latch in port 1 pin diagram with required sketch.	**03**	**CO3**
4A	Develop an embedded C program to design a non-touch towel dispenser using an IR sensor and LED1 connected to pin P2.0 and P2.5 of 8051 microcontroller respectively. When the user crosses his or her hand by the IR sensor, a high signal will indicate that the paper towel is needed. Then, LED1 will turn on for four seconds to indicate that the paper towel is fed. During this time, no other paper towel request is accepted. When the waiting time is over, LED1 will turn off. The system will wait for a new paper towel request. Use timer 0 in mode 2 to generate the delay.	**04**	**CO5**
4B	Explain the following: a. Sampling a low level triggered interrupt b. Significance of the INTR pin in ADC	**03**	**CO3**
4C.	Elucidate in detail on control register format of 8255. Both in I/O mode and BSR mode utilization.	**03**	**CO4**

5A.	Construct an Assembly Language program to rotate the motor by 180° clockwise 2 Times and 45° anticlockwise for 5 times. assume that the Stepper Motor is Interfaced with 8051 through 8255.	**05**	**CO4**
5B.	List any 6 difference between RISC and CISC.	**03**	**CO1**
5C.	Find the size of the delay in following program, if the crystal frequency is 22MHz. **PROGRAM** — **MACHINE CYCLE** DELAY: MOV R2,#200 — 1 AGAIN: MOV R3,#25 — 1 HERE: NOP — 1 NOP — 1 DJNZ R3,HERE — 2 DJNZ R2,AGAIN — 2 RET — 2	**02**	**CO2**