Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (MECHATRONICS ENGINEERING)
END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT: MICROCONTROLLER BASED SYSTEM DESIGN [MTE 3103]

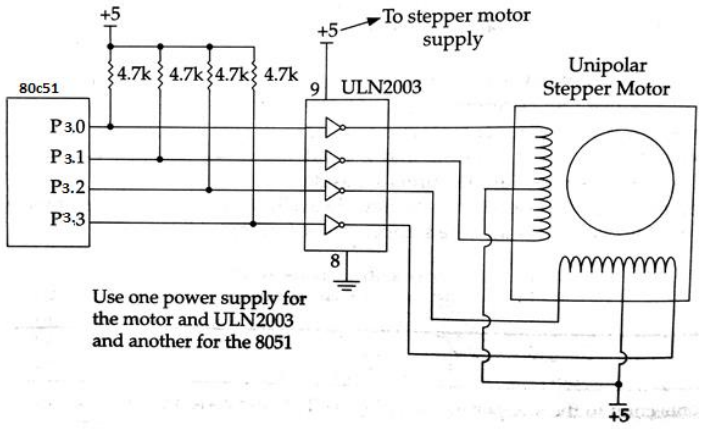
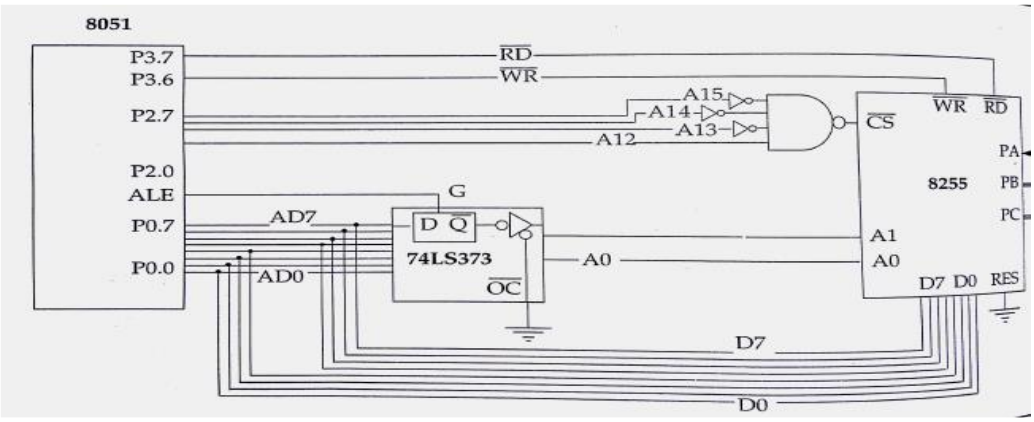
(28/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Data not provided may be suitably assumed
- **ALP** refers to *Assembly Language Program*

1A	Compare and contrast between microcontroller and microprocessor.	**04**
1B.	Illustrate the role of TCON and PCON registers in handling serial communication giving its bits details.	**03**
1C.	Can 8051 effectively handle complex instructions or not? Justify your answer.	**03**
2A.	In the connected world, a student is taking prints of his project report, which is sent through wifi to the printer. During this operation the compiler converts his data into respective ASCII code. A part of his ASCII converted data is 75 H, 25H, C9 H, FE H.	**04**
	i. Apply the checksum operation to ensure data integrity.	
	ii. Identify the error in data if C9H is accidently replaced by 9CH.	
2B.	For a campus placement, develop an ALP to store the least score and highest score in Reg A and Reg B respectively. Where the recruitment test involving negative markings was conducted for 60 candidates. The results database is loaded into a 8051 based system as 8 bit Hexadecimal numbers from memory address 40 H onwards. For the screening of next stage, the least scorer and highest scorer has to be identified.	**06**
3A.	In a condition monitoring of a milling machine, an ALP is to be developed to process the data and store the speed in rotations per minute in the accumulator, using interrupts. The speed of the drive system is measured and analysed. An 8051 microcontroller based system is used to process the digital rotary encoder data which is sensing the change in shaft position. The incremental encoder interface sends 5,000 pulses per revolution. Consider XTAL = 11.059 MHz,	**06**
3B.	Synthesis an 8051 C program to convert any unpacked BCD to ASCII and display the bytes on P1 and P2.	**04**
4A.	The windshield wiper is actuated by a low torque stepper motor with 1.8^0 step angle. The motion is restricted to 270^0 angle. Assuming the configuration in Fig. 4A, solve the task using embedded C programing.	**05**

	 **Fig .4A.**	
4B.	A door sensor is connected to the port P1.1 pin, and a buzzer is connected to P1.7. Design an embedded C program to monitor a door sensor and when it open, sound the buzzer, by sending square wave pattern of 500 Hz, 75% duty cycle. Consider XTAL = 11.0592 MHz	**05**
5A	In the figure shown below, the DAC hardware is interfaced with 8051 through PA of 8255 with external interfacing as shown in Fig.5A. Determine the hardware address and apply ALP programming to generate a sinusoidal wave of amplitude 3V peak to peak at 1 KHz frequency through DAC. Consider XTAL = 11.0592 MHz  **Fig.5A.**	**07**
5B.	Explain with proper examples any three addressing modes of 8051.	**03**