Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent Institution of MAHE, Manipal)

V SEMESTER B. TECH (ELECTRICAL & ELECTRONICS ENGINEERING)
MAKE UP EXAMINATIONS, JANUARY 2019
SUBJECT: MICROCONTROLLER BASED SYSTEM DESIGN [ELE 3106]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 01, January 2019** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- 8051 and ARM instruction set will be provided.

1A. Describe the different addressing modes supported by 8051 and explain with suitable example for each. ***(04)***

1B. What is the significance of stack pointer register in 8051 and explain the instructions used to access stack memory of 8051 with suitable example? ***(03)***

1C. A student of V semester B.Tech, EEE has registered for 7 subjects. Credits(C) allotted for these subjects are available in successive locations starting from 30H. Grade point (GP) earned by the student is available in successive locations starting at 40H. Maximum credits for a subject is 4 and grade point for the highest grade is 10. Total number of credits (CT) of all the 7 subjects is 23 (17H). Write an 8051 ALP to determine the GPA of the students and store the result (quotient and remainder) at 50H and 51H respectively. $GPA = \frac{\sum_{i=1}^{7}(C_i * GP_i)}{CT}$ ***(03)***

2A. Explain in detail the alternate functions of PORT 3 pins of 8051. Draw and explain the reset circuit of 8051 ***(04)***

2B. Write an 8051 ALP to decrement the 16-bit content of DPTR register by '5'. Initial value of DPTR is A000H, continue the decrement operation (by '5') till the value of DPTR register is '0'. ***(03)***

2C. Calculate the exact time taken by the following 8051 program, if XTAL frequency is 20MHz.

```
ORG 0000H
        MOV R3, #55H
LOOP1: DJNZ R3, LOOP1
        MOV R4, #0FH
LOOP3: MOV R5, #0FFH
LOOP2: NOP
        DJNZ R5, LOOP2
        DJNZ R4, LOOP3
END
```

(03)

3A. 8051 microcontroller-based fire alarm system clocked at 12MHz is connected to a loud speaker through transistor based amplified and is controller using a switch as shown in **Figure 3A**. Write an 8051 ALP to sound the loud speaker at a frequency of 500Hz when the switch is turned ON. Use Timer 1 in mode 2 to obtain the required delay. ***(05)***

3B. Explain the bit-wise details of Interrupt Enable register of 8051. Write Interrupt vector table address for different interrupts of 8051. Write the default priority order of 8051 interrupts. What is the changed priority sequence when MOV IP, #55H is executed? ***(05)***

4A. Show the interfacing circuit to interface 16X2 LCD to 8051. Write an 8051 ALP to display 'MCBSD EXAM' in the center of first line, also display 'GOOD LUCK' in the second line starting at 3rd position. ***(05)***

4B. Show the interfacing circuit to interface 8-bit ADC-0808 to 8051 and write 8051 ALP to read digital output of ADC and display it in external memory location 1000H. Use port P1 for digital data and port P0 for other connections. ***(05)***

5A. Explain with suitable block diagram the architecture of ARM7-TDMI processor. ***(05)***

5B. Explain in detail the CPSR register of ARM 7. ***(03)***

5C. If, A=25, B=19 and C=99, Write and ARM ALP to evaluate (A+8B+7C-27)/8 ***(02)***

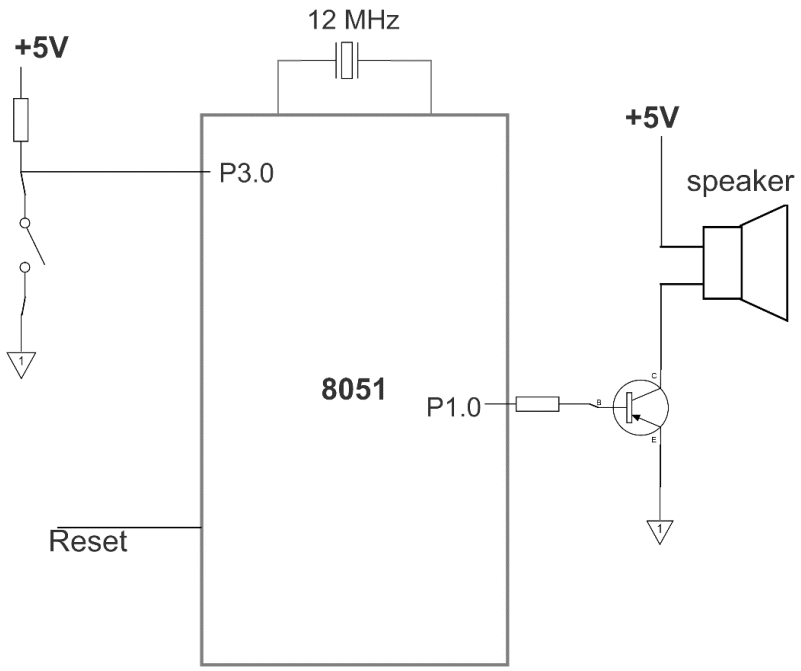

Figure 3A