Reg. No.											

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

V SEM B.Tech (BME) DEGREE MAKE-UP EXAMINATIONS, DEC/JAN 2018-19

SUBJECT: MICROCONTROLLER BASED SYSTEMS (BME 3102)
(REVISED CREDIT SYSTEM)
Tuesday, 1st January 2019, 2 PM to 5 PM

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to Candidates:

1. Answer ALL questions.
2. Draw labeled diagram wherever necessary.
3. Assume suitable data, if missing.

1. (A) How do you make use of the resources IE, IP, and the PSW of the 8051 microcontroller to configure the microcontroller to accept INT1, Timer0, and serial interrupts with highest to least priorities in the descending order, and register bank 3 in the active state. 5

(B) How do you build a single-digit hexadecimal down-counter using the 8051 microcontroller and a common-cathode type seven segment display? Explain. 5

2. (A) Is it possible to carry out decimal subtraction in the 8051 microcontroller? Justify your answer with an appropriate illustration. 4

(B) What is the purpose served by the following 8051 instruction sequence? Explain in detail. Assume F_{OSC} = 12.0MHz. 3

```
START: MOV A, #00h
       MOV A0h, A
       NOP
       NOP
       MOV A, #80h
       MOV A0h, A
       NOP
       SJMP START
```

(C) What are the addressing modes of the following 8051 instructions? Write significance of the identified addressing modes. 3

(i) AJMP, BELOW

(ii) MOV A, F0h

(iii) CPL C

3. (A) Why is it required to pull-up the Port 0 pins externally? Justify. 4

(B) How do you handle multiple hardware interrupts in the 8051 system using daisy-chain mechanism? Explain. 3

(C) Is it possible to employ the PIC microcontroller to easily monitor the changes in the external environment? Justify your answer. 3

4. (A) What happens, if the following instructions are executed by the 8051 microcontroller? Explain. 3

(i) JZ STOP

(ii) RET

(B) How do you make use of the 8051 microcontroller to build a product counter? Explain. 3

(C) Design an 8051 based data acquisition system to acquire an analog signal varying in the range 0-5V and 0 to 500Hz. 4

5. (A) Write an 8051 assembly language program to add hundred 4-digit decimal numbers available in the external memory locations starting at 8000H. Store the sum in the location 8100H. 4

(B) Design an 8051 system to have 12KB of program memory bypassing the internal ROM, 8 KB of RAM, and six additional I/O ports. Make use of appropriate memory chips and interfacing devices. 6