Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.Tech. (BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2016-17

SUBJECT: MICROCONTROLLER BASED SYSTEMS (BME 3102)

(REVISED CREDIT SYSTEM)

Saturday, 7th January 2017, 2 to 5 PM

TIME: 3 HOURS **MAX. MARKS: 100**

Instructions to Candidates:

1. **Answer all FIVE full questions.**
2. **Draw labeled diagram wherever necessary**

1. (a) List and explain the signals of the 8051 microcontroller, useful in accessing external program and data memory. **06**

(b) Draw the structures and explain the registers of the 8051 microcontroller useful in configuring and controlling the interrupts. **06**

(c) Draw and explain the internal memory organization of the 8051 microcontroller. **08**

2. (a) What are the operations carried out by the following 8051 microcontroller instructions? **06**

(i) LCALL

(ii) SWAP A

(iii) RRC A

(b) Write an 8051 microcontroller assembly language program to compute the sum of hundred 2-digit decimal numbers available in the external memory array beginning at address 1010H. Store the result in the registers of the Register-Bank 1. **08**

(c) Write a memory efficient 8051 microcontroller assembly language program to find the difference of two 2-digit decimal numbers available in the memory locations 30H and 31H respectively. **06**

3. **(a)** Draw the logic diagram and truth table of the bidirectional buffer. **04**

(b) Interface one 4KB EPROM chip and one 4KB RAM chip to the 8051 microcontroller bypassing the internal program memory. Draw the interface diagram and write the memory map. **10**

(c) How do you increase the I/O ports in the 8051 microcontroller system? Illustrate with an appropriate example. **06**

4. **(a)** How do you make use of the 8051 microcontroller to acquire ECG signal? Illustrate with an appropriate interface and an assembly language program. **10**

(b) Design an 8051 microcontroller based waveform generator to produce a rectangular waveform of frequency 200 Hz, amplitude +5 V, and duty cycle 60%. Draw the interface schematic diagram and write an appropriate assembly language program. **10**

5. **(a)** Interface a single common-cathode seven-segment display to the 8051 microcontroller and program it to flash the character "A" continuously. **06**

(b) List and explain the interrupts of the PIC microcontroller. **06**

(c) Draw the status registers of the 8051 and the PIC microcontrollers **03**

(d) List and explain the instructions that are useful in accessing the external data memory of the 8051 microcontroller system. **05**