Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.Tech. (BME) DEGREE END SEM EXAMINATIONS NOV/DEC 2016

SUBJECT: MICROCONTROLLER BASED SYSTEMS (BME 3102)

(REVISED CREDIT SYSTEM)

Monday, 5th December 2016, 2 PM 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) What are the significances of the following 8051 signals? **06**

(i) ALE

(ii) $\overline{EA}$

(iii) $\overline{PSEN}$

(b) What are the alternate functions assigned to the PORT 3 pins of the 8051? **08**

(c) List and draw labelled diagrams of the 8051 registers useful in configuring and controlling the timers. **06**

2. (a) Write a memory efficient and readable assembly language program to transfer 100 bytes beginning at the address 1000 H in the external memory to the address 1030 H onwards. **08**

(b) What are the operations carried out by the 8051 on executing the following instructions? **06**

(i) DA A

(ii) JBC

(iii) RETI

(c) How do you implement a software delay of 5mS using the **Timer0** of the 8051 microcontroller? Assume the crystal frequency to be 11.0592 MHz. **06**

3. **(a)** Name and explain an interfacing device suitable for demultiplexing the address/Data bus of the 8051 microcontroller. **04**

(b) In addition to the internally available memory and ports, interface externally one 2 KB ROM chip, one 2 KB RAM chip, and one 8255 PPI to the 8051 microcontroller in the single addressable space of 64KB. Draw the interface diagram and the memory map. **10**

(c) What are the methods available to expand the hardware interrupts of the 8051 microcontroller? Explain each of the methods. **06**

4. **(a)** Design an 8051 microcontroller based octal keyboard reader and display system, which, on pressing a key on the keyboard, displays the single-digit key code in a common-anode type seven-segment display interfaced to the 8051 microcontroller using the serial port. **10**

(b) Design an 8051 based system and write an appropriate assembly language program to generate the periodic waveform of frequency 1 KHz, one period of which is shown in figure 4(b). Let the steps be of equal amplitude and duration. **10**

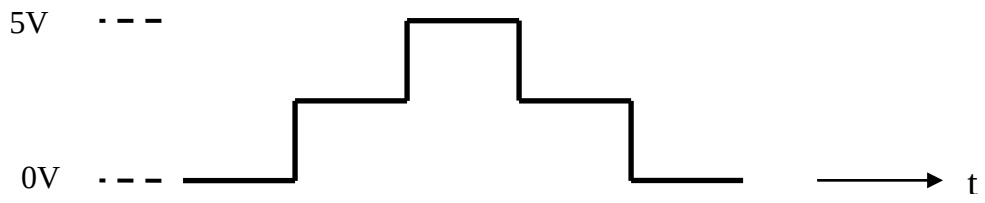

Fig. 4(b)

5. **(a)** How do you implement a Real-Time clock to provide the time components of Hour, Minute, and second? Illustrate. **06**

(b) Draw and explain the structure of the Status register and STACK of the PIC 16CXX microcontroller. **06**

(c) Write the vector addresses of the 8051 microcontroller's interrupts. **03**

(d) How do you access look-up tables available in the program memory of the 8051 microcontroller system? Illustrate with examples. **05**