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MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

V SEM B.Tech (BME) DEGREE END-SEMESTER EXAMINATIONS, NOV/DEC 2018.

SUBJECT: MICROCONTROLLER BASED SYSTEMS (BME 3102) (REVISED CREDIT SYSTEM) Friday, 30th November, 2018, 2 PM to 5 PM

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to Candidates:

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

- 1. (A) How do you make use of the bit "GATE", to control Timer of the 8051 5 microcontroller operating in Mode1? Explain in detail.
 - (B) How do you build a single-digit decimal up-counter using the 8051 5 microcontroller and a common-anode type seven segment display?
- 2. (A) Why is the addressing mode of the instruction "SJMP" relative? Why is it making 4 use of a signed byte? How is it computed? Illustrate with an example.
 - (B) What is the purpose served by the following sequence of instructions in an 8051 3 system? Explain in detail. Assume $F_{OSC} = 11.0592$ MHz.

START: MOV TMOD, #10h CLR 95h UP: CPL 95h MOV TH1, #FFh MOV TL1, #E0h SETB TR1 WAIT: JNB TF1, WAIT CLR TR1 CLR TF1 LJMP UP

- (C) What are the addressing modes of the following 8051 instructions? Write 3 significance of each instruction.
 - (i) MOVX @DPTR, A(ii) MOV R0, F0h
 - (iii) LCALL 2500h
- 3. (A) Why is it required to set the 8051 microcontrollers Port1 latch bits to configure it 4 as an input port? Explain.
 - (B) Is it possible to increase number of hardware interrupts from two to many 3 interrupts in the 8051 microcontroller system? Justify your answer with an appropriate illustration.
 - (C) What causes the 8051 microcontroller to bypass the internal program memory? 3 How do you configure the microcontroller to make use of the internal program memory? Explain.
- 4. (A) What happens, if the following instructions are executed in the 8051 3 microcontroller? Explain.
 - (i) RETI(ii) RLC A
 - (B) How do you make use of the 8051 microcontroller to measure R-R interval of an 3 ECG signal? Explain.
 - (C) Design an 8051 based system to generate a periodic step waveform of amplitude 4 0 to 10V and of frequency 1 KHz. Let there be five steps in the ascending limb of the waveform, each of equal duration and amplitude.
- 5. (A) Making use of appropriate instructions of the 8051 microcontroller, write a 4 memory efficient assembly language program to multiply two 2-digit decimal numbers available in the RAM locations 8100h and 8101h. Store the product in the location 8105h.
 - (B) Assume that, you are provided with the 8051 microcontroller, 4KB EPROM 6 chips, 4KB S-RAM chips, 8255 PPIs, and appropriate interfacing devices. Making use of the provided components design a system having 8KB of ROM, 4Kbytes of RAM and 3 I/O ports in addition to integrated resources. Write design details.