

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012**

**Subject code: 162402**

**Date: 03/01/2013**

**Subject Name: Microcontrollers for Power Electronics**

**Time: 02.30 pm - 05.00 pm**

**Total Marks: 70**

**Instructions:**

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Draw and explain architecture of 8051 microcontroller with internal RAM, ROM & SFR organization. **07**  
 (b) Explain 8051 timer with related SFRs and any one of its operating modes. **07**

- Q.2** (a) Explain various addressing modes of 8051 microcontroller. **07**  
 (b) What is the difference between interrupt and polling ? Explain external interrupt in detail. **07**

**OR**

- (b) Write an 8051 C program to toggle all the bits of P0 continuously at 250 ms delay. **07**

- Q.3** (a) (i) Give comparison of microprocessor and microcontrollers. **04**  
 (ii) Give some important criterion for the selection of microcontroller. **03**  
 (b) Write an assembly language program to convert a binary data stored at memory location 40H in ASCII and store at suitable memory locations. **07**

**OR**

- Q.3** (a) Explain any four logical instructions with example. **07**  
 (b) Explain serial data transfer for 8051 microcontroller with SCON & SBUF registers. **07**

- Q.4** (a) Give schematic diagram and flow chart (program logic) for keyboard interface with 8051 microcontroller. **07**  
 (b) Explain the execution of PUSH & POP instructions with respect to stack operations. **07**

**OR**

- Q.4** (a) Write a short note on assembler directives and data types of 8051 microcontroller. **07**

- Q.4** (b) Write a 8051 C program to produce waveform of 1 KHz frequency on P1.0. **07**

- Q.5** (a) Give bit identification of IE, IP and PSW registers. **07**  
 (b) Write an assembly language program to calculate the sum of 10 numbers stored at memory location 40H onwards and store the answer in the memory location 50H. **07**

**OR**

- Q.5** (a) Explain MUL & DIV instructions with example. **07**  
 (b) Assuming all the instructions of 1 machine cycle for simplification, find out the maximum delay which can be created by a single loop delay. Take crystal frequency 12 Mhz. **07**

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