

8E4094

Roll No. \_\_\_\_\_

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**8E4094**

**B. Tech. VIII Sem. (Main/Back) Exam., April, 2015**

**Electronics & Communication**

**8EC4.3 Microcontroller & Embedded Systems**

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks: 24**

*Instructions to Candidates:*

*Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

*Units of quantities used/calculated must be stated clearly.*

*Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*

1. NIL \* 2. NIL

**UNIT - I**

- Q.1 (a) Write the basic characteristics for a CPU to be classified as a microcontroller. [4]  
(b) What is PSW register? Explain the function of individual bits of the PSW register. [6]  
(c) What are the alternate functions of the pins of port 3 of 8051 microcontroller? [6]

**OR**

- Q.1 (a) Explain why microcontroller is suitable for design and development of embedded systems. [4]  
(b) Explain the RAM structure of 8051 microcontroller. [6]  
(c) What are different register banks available in 8051 microcontroller? What is the default register bank and how do you switch between different register banks. [6]

## UNIT – II

- Q.2 (a) What is the use of following directives in 8051:- [6]
- (i) ORG,
  - (ii) EQU,
  - (iii) END,
  - (iv) DB
- (b) Why 8051 is called a Boolean Processor? What is the difference between RET and RETI instruction? [4]
- (c) Write a program in 8051 assembly language to add the first ten natural numbers. [6]

**OR**

- Q.2 (a) What is the difference between LJM<sup>P</sup> and SJMP instructions, LCALL and ACALL instructions? [4]
- (b) Write a program to - [6]
- (i) Load the accumulator with the value 55H, and  
Complement the accumulator 500 times.
- (c) Write a program to determine if the content of R0 is FFH. If so, move FFH to R5. [6]

### UNIT - III

- Q.3 (a) How many interrupts are there in 8051? What is the default priority of the interrupts? [4]
- (b) Write the function of the individual bits of the TMOD register. [6]
- (c) With a frequency of 22 MHz, generate a frequency of 100 KHz on pin 2.3. Use timer 1 in mode 1. [6]

### OR

- Q.3 (a) What is the use of GATE bit of TMOD register? What is the software method for starting and stopping the timer system of 8051? [6]
- (b) Write the function of the individual bits of the IE register. [6]
- (c) What is the counter system of 8051? Write one application where the counter system may be used. [4]

### UNIT - IV

- Q.4 (a) Draw the schematic and explain the method of interfacing a matrix keyboard with 8051 microcontroller. [8]
- (b) What is the difference between interrupt driven input/output and polling method of input/output? Which method is preferable? [4]
- (c) Write the function of TI and RI flag of SCON register. [4]

**OR**

- Q.4 (a) Draw the schematic and explain the method of interfacing a LCD display 8051 microcontroller.
- (b) Draw the schematic and explain the method of interfacing an A/D converter 8051.

**UNIT – V**

- Q.5 (a) What are the various scheduling techniques used in operating systems? Explain any two.
- (b) What do you understand by multitasking in operating systems? How is it achieved?

**OR**

- Q.5 (a) List three ways in which an RTOS handles the ISRs in an multitasking environment.
- (b) What is a unique feature of Linux device drivers? How does Linux schedule tasks? Why is this feature highly useful in an embedded system?

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