

**IV B.Tech I Semester Supplementary Examinations, December 2013**  
**MICRO CONTROLLERS AND APPLICATIONS**  
( Common to Electronics & Communication Engineering, Bio-Medical  
Engineering and Electronics & Telematics)

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Bring out the functional difference between microprocessors and microcontroller by drawing their basic block diagrams. [16]
2. Discuss RAM memory space allocation in the 8051. [16]
3. How do you provide the mechanism so that a polled interrupt controller can receive two simultaneous interrupts in a system? [16]
4. (a) Find the timer's clock frequency and its period for various 8051-based systems with the following frequencies.
  - i. 8MHz
  - ii. 4MHz
  - iii. 16MHz.(b) Write about GATE in TMOD register. [8+8]
5. (a) Explain programming and interface for an LCD display controller which has two lines and sixteen characters in each line.  
(b) Describe IEEE 488 bus signals and timings. [8+8]
6. What is task scheduling and Resource sharing? Explain at least two scheduling algorithm to synchronize task or resource [16]
7. (a) Draw the 80196 Horizontal windows. What are the uses of these windows?  
(b) List non-maskable and maskable interrupts in 80196. [8+8]
8. (a) What register set is used in Thumbstate. How do we use all register set when we are in Thumbstate?  
(b) Explain ARM architecture. [6+10]

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1. Give detailed timing diagrams of 8051 for calculating factorial of a number by writing the program. [16]
2. Write short notes on the following:
  - (a) Data transfer instructions.
  - (b) Bit manipulation instructions.
  - (c) Internal RAM. [5+5+6]
3. How do you provide the mechanism so that a vectored interrupt controller can receive simultaneous interrupts? [16]
4. Discuss elaborately a high speed output works. [16]
5. (a) Explain programming and interface for an LCD display controller which has two lines and sixteen characters in each line.  
(b) Describe IEEE 488 bus signals and timings. [8+8]
6. (a) When do we use cooperative scheduling and do we use preemptive scheduling?  
(b) Explain the importance of each of the following metrics of a real time system
  - (i) through put
  - (ii) interrupt latencies,
  - (iii) average response times and
  - (iv) deadline misses [8+8]
7. (a) Explain how the 80196 can be used to find the period of a square wave of frequency 1 KHz  
(b) How do we obtain a PWM output in Intel 80196? What are its applications. [8+8]
8. (a) Explain the complete ARM register set in different modes of ARM processor.  
(b) Explain how the change of modes take place in ARM? [8+8]

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1. Bring out the functional difference between microprocessors and microcontroller by drawing their basic block diagrams. [16]
2. How do you resolve the conflicts among stack and register banks. [16]
3. (a) How do you access RAM locations 30-7FH as search pad?  
(b) Write short notes on indexed addressing mode. [8+8]
4. Describe the procedure that how to program 8051 timers. [16]
5. (a) With the help of a neat diagram explain the half-step 8 - step sequence of a stepper motor. Also show the interfacing circuit to 8051.  
(b) Write an assembly code to generate 4 step pulse sequence for a 4-phase stepper motor. [8+8]
6. (a) List the layers between "application" and "hardware"  
(b) What are the advantages and disadvantage of fixed and dynamic block allocations by the operating system  
(c) What are the OS units at an RTOS kernel? [8+8]
7. (a) Explain the serial communication control bits during the half duplex synchronous serial functions in 80196.  
(b) What are the difference between synchronous and asynchronous functions of the SI in 80196? [16]
8. (a) What are the Thumb data processing instructions? List and explain them with an example.  
(b) Explain the branch and branch with link instructions with examples. When do we use them. [8+8]

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1. Discuss different addressing modes of 8051 microcontroller by giving an example for each kind. [16]
2. Write a program to convert hex numbers to decimal numbers using 8051 $\mu$ C. [16]
3. Write a program to find the number of ones in register R2. [16]
4. Discuss elaborately a high speed output works. [16]
5. Draw a neat interface circuit that controls the speed and direction of a DC motor. Explain the operation of this circuit that controls the angle/movement of the servomotor. [16]
6. A Robot has three motors having three angle encoders. Each motor receives an input from three tasks. The fourth task measures the position of each motor and sends three directions to the motors to rotate by  $a^0$ ,  $b^0$ , and  $C^0$  Which RTOS will schedule these tasks and which RTOS functions are used in this system design [16]
7. (a) What are the interrupt sources using high speed output (HSO) unit in 80196? What are the uses of CAM in 80196 HSO unit?  
(b) Explain how a maskable interrupt source can be made a highest priority source in 80196? [8+8]
8. (a) Give the programmer model of ARM.  
(b) Explain SWI instruction in ARM and give its applications. [8+8]

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