

# Microcontroller and its applications

Elect

IE 301

End Semester Exam – 50 marks

There are 2 sections. Section 1 contains seven theory questions of five marks each. Answer **any five**. Section 2 contains Programming related questions , 10 questions , five marks each. Answer **any five**.

**1. Theory Section: Answer Any five : 5x5 marks**

1. Describe in detail ( with timing diagrams ) how a serial port works in an 8051. What are the important parameters ?
2. Describe the usage of Register Banks in 8051. How many registers at one time are available to the programmer?
3. What are the different segments in an assembly code ? What is their use ?
4. Describe with an example what is an Finite State Machine.
5. Describe in an 8 bit AVR , how calculation over 16 bit and 32 bit values takes place.
6. Describe the different PWM generation modes ( with waveforms ) in an AVR.
7. How will you generate the following logic only using 2: 1 MUX's:  
$$abc + \bar{a}\bar{b}c + d$$

**2. Programming Section : Answer any five : 5x5 marks**

1. Write the ISR in pseudo - C language for Timer 0 interrupt for 8051 , which will reinitialise the timer to 0x0F. Assume the timer count reg to be TCOUNT0 and the setting reg to be TMOD.
2. What are the different types of storage classes in C? Describe with examples.
3. What is a void pointer ? What is its size for AVR and why is it useful ?
4. What is an re-entrant function ? What should you be careful about when writing or calling a re-entrant function for an embedded system?
5. Lets say you want to put some data in the ROM . How will you acheive this for AVR using AVR STUDIO?
6. Design a system using Pseudo-C and a processor of your choice which will gradually increase the brightness of an LED to max and then decrease it to zero continually.
7. Design a single frequency audio playing system which will play F Hz for time T ms using flowchart. What peripherals do you need for this ?
8. Write the pseudo – C code for shifting out data from a particular register onto a Pin. Also output a clock signal on another Pin.
9. Lets say I am writing a dynamic memory manager code which will relocate my entire data to a suitable address with this prototype:  

```
mem_move(void *ptr, int size);
```

Write the Pseudo-C code for the above.
10. Write an algorithm in pseudo-C for finding the maximum , minimum and average of N numbers by reading the numbers only ONCE.