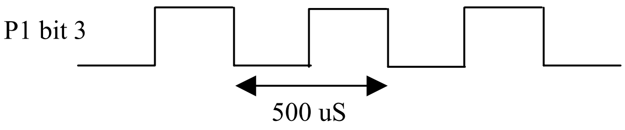
CpE213 – TEST II

Name____________________

Show all your work in the space provided. Answers with a simple "yes", "no", or a single number are typically incomplete and will not be given full credit. Answers in non-reduced form, like (a+sqrt(b))/c, are fine where appropriate. Good English on essay/short answer questions is required. ON MULTIPLE CHOICE QUESTIONS, IF YOU'RE NOT SURE DON'T GUESS – you will get points off for wrong answers. If you know part of an answer, write what you know for partial credit.

1. (25 Points) You need to create a square wave operating at 2 KHz (period = 500uS) to generate a tone on a speaker connected to port 1 bit 3. Write an ASM program, complete with segments, variables, etc, to create this tone. Assume a 12MHz clock. (Don't use interrupts)



2. (25 Points) Write a short bit of ASM code to perform the same function as the following statements in C.

a. unsigned int xdata y[5]; // note: position not specified

b. char data x _at_ 0x21;

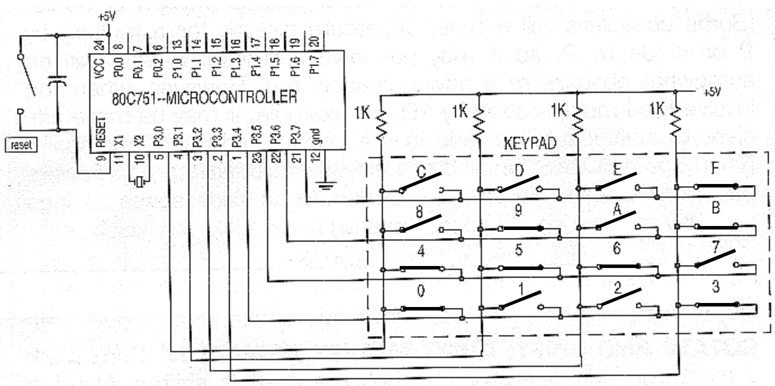
c.
```
x = *y;      // assume x and y are both chars and that y points
             // to a location in internal memory
```

d.
```
// For the following code, you do not have to worry about declaring segments
// and variables in ASM.  You do need to worry about passing variables and
// other “stuff” related to using functions.
main(){
    P1 = blah(P1);
}
void blah(char x){
    x++;
    return x;
}
```

3. (10 Points) Say the following code is performed. In one or two sentences, what happens?

```
MOV 42H, #52
MOV 43H, #80H
PUSH 42H
PUSH 43H
RET
```

4. (10 Points) Given the state of the keypad, what value would be the value of `result` after executing the given segment of C-code. (Show work for partial credit).



Keypad schematic

C-code:

```
unsigned char pat;
unsigned char result;

result = 0x00;
pat = 0x40;
P3 = ~pat;
result =(P3&0x0F);
```

a) result = 0xD263 b) result = 0x6857 c) result = 0x4B93 d) result = 0x2D9C

e) result = 0xC9D2 f) result = 0x7586 g) result = 0xB46C h) result = 0x5280
i) result = 0x42 j) result = 0x05 k) result = 0x07 l) result = 0x06
m) result = 0x45 n) result = 0x09 o) result = 0x0A p) result = 0xB5
q) no way to tell r) none of the above

5. (30 Points) Re-write the following ASM code in C. The code doesn't necessarily do anything "real". For full credit, make the ASM and C code as similar as possible (put variables in the same memory spaces, etc).

```
numentries     EQU     42

mydata segment data
        rseg mydata
        i: DS 1
        x: DS 2
        y: DS numentries

XSEG AT 5280H
        z: DS 1

mycode segment code
        rseg mycode

start:  MOV x,P1
        MOV x+1,#0
        MOV i,#0
loop:   MOV DPTR, #z
        MOV A,P1
        ADD A, #42H
        MOVX @DPTR, A
        MOV A, #y
        ADD A, i
        MOV R0,A
        MOV @R0,P1
        INC i
        MOV A,i
        CJNE A,#numentries,loop
        JMP start

        END
```