Part I: Multiple Choice (24 points)

Answer all of the following questions. READ EACH QUESTION CAREFULLY. Fill the correct bubble on your mark-sense sheet. Each correct question is worth 2 points. Choose the one BEST answer for each question. Assume that all given C code is syntactically correct unless a possibility to the contrary is suggested in the question.

Remember not to devote too much time to any single question, and good luck!

1. **The % symbol is**

    A. Used to find a remainder
    B. Used to calculate percent
    C. Used in formulating placeholders
    D. A and C
    E. All of the above

2. **What is true about the following conditional:**

    ```
    if ( (x = 5) || !(y == 5) ){
        /* some code here */
    }
    ```

    A. THE CONDITION IS ALWAYS TRUE
    B. THE CONDITION IS NEVER TRUE
    C. CAN'T TELL—IT DEPENDS ON THE VALUES OF X AND Y
    D. THE VALUES OF X AND Y ARE BOTH CHANGED AFTER THE CONDITIONAL

    E. NONE OF THE ABOVE

3. **After this code is executed**

    ```
    double x, y;
    x = ((double) 10) / 3 * 3.0;
    y = ((double) (10 / 3)) * 3.0;
    ```

    which of the following is true:

    A. x is greater than y
    B. x and y are equal
    C. y is greater than x
    D. Because x and y are doubles it is hard to tell for sure
    E. None of the above

4.   **Which of the following will be the certain result of failing to fill in properly your name, student ID, section number, and exam version on your Scantron answer sheet?**

    A.   A score of 0 will be recorded for the multiple choice portion of the final exam, regardless of how many questions you answer correctly

    B.   Your grade in the course will be lower than it might otherwise be since a 0 will be recorded for the multiple choice portion of the final exam

    C.   The grade you get for the multiple choice portion will rhyme well with the name of the Roman emperor Nero (Hint: Starts with a Z.)

    D.   You will need to do exceptionally well on the programming portion of this exam to help offset the 0 that you will earn for the multiple choice portion

    E.   All of the above

5.   **Of the following, which are valid identifiers?**

```
i)     Apt4
ii)    5thAve
iii)   Number_9
iv)    1st&Main
```

    A.   `i` and `ii`
    B.   `ii` and `iv`
    C.   `i` and `iii`
    D.   `i`, `ii`, and `iii`
    E.   `All of them`

6.   **Examine the following program which was designed to read in two integers and print out their sum:**

```
#include <stdio.h>

int main(void)

    int x, y, z;

    printf("Please input an integer: ")
    scanf("%d", &x);

    printf("Please input another integer: ");
    scanf("%d", &y);

    z = x + y;

    printf("Their sum is %d\n", x);

    return 0;
}
```

    This program has

    A.   no errors
    B.   syntactic error(s)
    C.   semantic error(s)
    D.   both syntactic and semantic errors

7.   **What's wrong with the following code fragment:**

```
int foo, bar;
. . .
if (foo == bar) {
    printf("foo and bar are equal);
}
```

   A.   It is an error to use curly braces — '{' and '}' — when you can omit them
   B.   It should use = instead of ==
   C.   It is missing a quotation mark
   D.   A and C
   E.   B and C

8.   **In a switch statement what is true:**

   A.   The switch expression can be of type int, char, or double
   B.   The cases can be variables
   C.   One uses break statements to avoid "falling through"
   D.   A and C
   E.   B and C

9.   **Given the following variable declarations:**

```
int x;
double y;
```

   in which line of code does a promotion occur?

   A.   `x = 173 / 3;`
   B.   `y = 12.6 * 9.0;`
   C.   `y = x * 8;`
   D.   `x = 13.5 * 6.0;`
   E.   `x = x + 1;`

10. **The conditional expression**

```
!((x > y) && (v == y))
```

is equivalent to

A. `((x < y) || (v != y))`
B. `((x <= y) && (v != y))`
C. `(!(x > y) && !(v == y))`
D. `((x <= y) || !(v == y))`
E. None of the above

11. **Examine the following program:**

```c
#include <stdio.h>

int main(void){

    int x = 0;
    int y = 2;

    if (x == 0) {
        x = y;
        y = x;
    }

    if (y <= 2){
        x = y;
        y = x;
    }

    printf("%d %d", x, y);

    return 0;
}
```

What does the program print?

A. 0 0
B. 2 0
C. 0 2
D. 2 2
E. None of the above

12.   Examine the following program:

```c
#include <stdio.h>

void setTo15(int x) {
    x = 15;
    return;
}

int main(void) {
    int x = 20;

    printf("%d\n", x);
    setTo15(x);
    printf("%d\n", x);

    return 0;
}
```

What does the program output?

A.   20
     20

B.   20
     15

C.   nothing — it doesn't compile

D.   20
     undefined value

E.   None of the above

Part II: Programming Questions (26 points)
Write C code for the following two problems.

13. (13 points) **Given your limited budget and gas prices as high as they are, you decide to write a simple program to help you figure out if you can take that road trip you were planning on. Assume that gasoline costs $2.00 per gallon and that your car can go a measly 13 miles on a gallon of gas. Write a program that prompts the user for**

- **The number of miles that the user wishes to travel**
- **How much money the user has**

Given these numbers your program should first calculate whether the user has enough money to make the trip. If the user has enough money, the program should then tell the user how much money they will have left over at the end. If they don't have enough money, the program should tell them how much more money they need to make their trip; format the value so that is has two decimal places. Assume the user's input is valid — don't worry about checking for errors.

```c
#include <stdio.h>
/* define any needed constants here*/




int main(void) {

    /* Declare all necessary variables here */




    /* read in the user's input*/






    /* Compute and print the necessary output */









    return  0;
}
```

14. (13 points) **At the Seattle C Fair every visitor gets a prize based on their age.**
- **If younger than 8, the visitor gets a red balloon**
- **If between 8 and 18 (including 8, but not 18) the visitor gets a stylish t-shirt**
- **If 18 or older, the visitor gets an exciting C book**

In addition, if their age is odd, the visitor gets a free Britney Spears CD.

Write a program that prompts the user for their age and outputs the prize(s) they recieve.

```c
#include <stdio.h>

int main(void) {
   /* Declare all necessary variables here */




   /* Prompt the user and perform the necessary input */




   /* do the necessary computation and remaining I/O */
```

```c
   return  0;
}
```