True or False – (12 Points)

1. (12 pts) Circle T for true and F for false:

   T  F  a) Local identifiers have name precedence over global identifiers of the same name.

   T  F  b) Local variables retain their value from function call to function call.

   T  F  c) Local variables can be accessed only within the block in which they are declared.

   T  F  d) Arguments corresponding to value parameters must be variables.

   T  F  e) A break statement causes an immediate exit from the loop in which it occurs.

   T  F  f) A continue statement causes an immediate exit from the loop in which it occurs.

   T  F  g) void functions can use the statement return;

   T  F  h) Member names within a structure must be unique.

   T  F  i) A structure variable contains information for one of its members only at any given time.

   T  F  j) The lifetime of a local variable is for the duration of the program.

   T  F  k) Static variables in a function maintain their value from function call to function call.

   T  F  l) A default statement is optional in a switch statement.

Multiple Choice (12 points) – Questions 2 – 13

For these problems circle all correct answers.
For example if answers A, C and E are all valid then circle A, C and E.

2. How many function values does a value-returning function have?

   A) 0       B) 2       C) 1       D) As many as necessary       F) None of these
3. Which operations below ARE ALLOWABLE aggregate operations on structures?

   A) Input/Output       B) Assignment       C) Comparison
   D) Return as a functions return value   E) Arithmetic

4. A function SomeFunc has two parameters, alpha and beta, of type int.
   The data flow for alpha is one-way, into the function.
   The data flow for beta is one-way, out of the function.
   What is the most appropriate function heading for SomeFunc? (One answer only)

   A) void SomeFunc(int alpha, int beta)
   B) void SomeFunc(int& alpha, int beta)
   C) void SomeFunc(int& alpha, int& beta)
   D) void SomeFunc(int alpha, int& beta)
   E) None of the above

5. Value parameters (passing by value) are used if a parameters data flow is:

   A) One-way, into the function
   B) One-way, out of the function
   C) Two-way, into and out of the function
   D) None of the above

6. Reference parameters (passing by reference) are used if a parameters data flow is:

   A) One-way, into the function
   B) One-way, out of the function
   C) Two-way, into and out of the function
   D) None of the above

7. Which parameters in the following function heading are value parameters?

   void DoSomething(string date, int num, float average, float& sum, string& name)

   A) date       B) num       C) average    D) sum       E) name

8. Which parameters in the following function heading are reference parameters?

   void DoSomething(string month, int day, float& cost, float pay, string year)

   A) month       B) day       C) cost       D) pay       E) year
9. A function that returns a function value is known as what kind of function?

A) Expression less  B) Void  C) Empty
D) Reference Parameter  E) Value returning  F) None of these

10. The void function named GetNums has two parameters:
    A pass-by-value parameter named num of type float.
    A pass-by-reference parameter named x of type int

Which of the following choices is the most appropriate function prototype for the function GetNums? (There is only one answer on this problem)

A) void GetNums( float , int& );
B) void GetNums( float& , int );
C) void GetNums( float , int );
D) void GetNums( float& , int& );

11. The void function named GetNums has two parameters:
    a pass-by-reference parameter named num of type float.
    a pass-by-reference parameter named x of type int

Which of the following choices is a valid function prototype for the function GetNums? (more than one answer is possible)

A) void GetNums( float&, int& );
B) void GetNums (float&, int);
C) void GetNums (float num , int& x );
D) void GetNums (float& num , int x );

12. An individual pass through, or repetition of, the body of a loop is called a(n) _____.

A) Loop test  B) Event  C) Termination condition  D) Iteration  E) None of the above

13. in loops, a variable that is incremented each time a particular event occurs is called _____.

A) A loop control counter  B) An event counter  C) An iteration counter  D) A sentinel value  E) None of the above
Short Answer (76 points) – Questions 14 – 23

14. (8 pts) There are four functions shown in the code segment below. Assume all variables and function prototypes have been correctly declared before this segment of code.

```c
Compute(inFile, MyCalc());
Average(SumUp(num), num);
```

A) Which function(s) is(are) most likely value-returning function(s)?

B) Which function(s) is(are) most likely void function(s)?

C) What are the arguments that are used in the function calls?

15. (6 pts) If a user enters the numbers 1 1 2 2 -5 6 7 8 9, what is the output for the following segment of code? Place one character per box, and skip a box to indicate a space.

```c
int sum = 0;
int number;
do
{
    cin >> number; // read in a number from standard input
    if (number < 0)
        break;
    sum = sum + number;
    cout << sum << "-";
}while (sum < 11);
```
16. (8 pts) When the program shown below is executed, what is the output to the screen? This problem deals with the scope of a variable in a program, and the order of execution of statements.

```
#include <iostream>
using namespace std;

void function_A(int&);
void function_B(int&);
int number = 4;       // global variable declaration of number
int main()
{
    int number = 5;
    cout << "number in main is: " << number << endl;
    function_B(number);
    return 0;
}
void function_A(int& number)
{
    number = number - 2;
    cout << "number in function A is: " << number << endl;
}
void function_B(int& sum)
{
    cout << "number in function B is: " << number << endl;
    function_A(sum);
    sum = sum - 1;
    cout << "sum in function B is: " << sum << endl;
}
```

The identifying phrases written by the cout statements in this program are shown below. In the blank to the left of the lines, place 1, 2, 3 or 4 to indicate the order the statements are printed (1 for first, 4 for last). The value output is placed in the blank at the end of the line.

___ number in main is: ____
___ number in function A is: ____
___ number in function B is: ____
___ sum in function B is: ____
17. (5 pts) Consider the following structure declarations when answering the questions below.

```c
struct Date {
    int day;
    int month;
    int year;
};
struct Purchase {
    string name;
    Date purchaseDate;
};
```

a) Write a statement that declares the identifier `payday` as a variable of DataType `Date`.

b) Write a `cout` statement that will output the value of `month` of the variable `payday`.

c) Write a statement that declares the identifier `item` as a variable of DataType `Purchase`.

d) Write a statement that assigns a value of “Car” to the `name` member of `item`.

e) Write a `cout` statement that will output the value of `year` of the `purchaseDate` member of `item`.

18. (5 pts) Write the type declaration for a struct DataType named `Appointment` containing the following members:

- A `string` variable representing the name of the appointment
- A `Date` variable indicating the date of the appointment where `Date` is a structure already defined
- A `Time` variable indicating the time of the appointment where `Time` is a structure already defined
19. (10 pts) Finish the program below by adding the void function specified below. Add only a function prototype, function call statement and function definition to the following program. No other information is to be added (i.e. variables)

The name of the void function is InitDate.
The function has three parameters (2 integers and a string) for the day month and year of a date. The function is to initialize the parameters so that they contain information for January 1, 1999. The information stored in the parameters must be available in main() after the function call.

#include <iostream>
using namespace std;

// Place the function prototype below this line

int main()
{
    int day;
    string month;
    int year;

    // Place the function call statement below this line

    cout << month << " " << day << ", " << year << endl;
    return 0;
}

// Place the function definition below this line
20. (8 pts) Rewrite the **void function definition** below as a **value returning function definition** such that the caller of the function still has access to the result (contained in the function parameter sum) that is being returned by the void function.

   - Use **two value parameters only with the value-returning function**.

   ```cpp
   void FindSum(float& sum, float value, int num)
   {
       sum = 0.0;
       for (int x = 0; x < num; x++)
           sum = sum + value;
   }
   ```

21. (8 pts) What is the output for the following segment of code? Place one character per box and skip a box to indicate a space.

   ```cpp
   for (int i = 0 ; i < 5; i++)
   {
       if (i > 2)
           continue;

       cout << "-" << i;
       for (int j = 0; j < 5; j++)
       {
           if (j > 2)
               break;
           cout << "-" << j;
       }
       cout << endl;
   }
   ```
22. (8 pts) For the following code segment, write out what is printed to the screen. Show the displayed output precisely by using the following rules:
   - Write one character per box.
   - Skip a box to indicate the presence of a blank space in the output.
   - Skip a row to indicate the presence of a blank line in the output.

```cpp
#include <iostream>
using namespace std;
void Sub(int);
int main()
{
    Sub(1);
    Sub(2);

    Sub(3);
    Sub(4);
    return 0;
}
void Sub(int sub)
{
    static int i = 10;
    static int j = 0;

    cout << i << "—" << j << endl;

    j++;
    i = i - sub;
}
```
23. (10 pts) Write a **void function definition** that is described below:

- The name of the void function is **OpenOutput**.
- The function has one parameter – an output file stream.
- The function is to:
  a) Prompt the user for the name of an output file and read it.
  b) Open the file.
  c) If the file did not open successfully, print out a message stating as such, reset the output stream variable (code to do this is outputFileStreamVariableUsed.clear();)
  d) Repeat steps a,b,c until a file is successfully opened or the user enters ctrl-c.
Extra Credit #1 (2 pts) Given the for loop below, write an equivalent do-while loop.

```cpp
for(int loop = 10; loop >= 0; loop--)
    cout<< "loop is: " << loop << endl;
```

Extra Credit #2 (4 pts) Write a value returning function definition that counts the number of times the word “Hello” appears in an input file, and returns this count to the caller of the function. This function requires a single parameter – the input file stream (function assumes the file stream is open).