**Definition Matching – (8 Points)**

1. (8 pts) Match the words with their definitions. Choose the **best definition** for each word.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifier</td>
<td>A Name associated with a function or data object and used to refer to that function or data object.</td>
</tr>
<tr>
<td>Expression</td>
<td>A step-by-step procedure for solving a problem in a finite amount of time.</td>
</tr>
<tr>
<td>Semantics</td>
<td>The set of rules that determines the meaning of instructions written in a programming language.</td>
</tr>
<tr>
<td>Literal Value</td>
<td>A statement that associates an identifier with a data object, a function or a data type.</td>
</tr>
<tr>
<td>Assignment Statement</td>
<td>The implicit conversion of a value from one data type to another.</td>
</tr>
<tr>
<td>Syntax</td>
<td>The explicit conversion of a value from one data type to another.</td>
</tr>
<tr>
<td>Data Type</td>
<td>Any constant value written in a program</td>
</tr>
</tbody>
</table>

A) Definition is not listed below (This answer can be used more than once if necessary)

B) The set of rules that determines the meaning of instructions written in a programming language.

C) A statement that associates an identifier with a data object, a function or a data type.


E) A Name associated with a function or data object and used to refer to that function or data object.

F) A specific set of values along with a set of operations on those values

G) The explicit conversion of a value from one data type to another.

H) The formal rules governing how valid instructions are written in a programming language.

I) A location in memory, referenced by an identifier, that contains a data value that can be changed

J) Any constant value written in a program

K) The implicit conversion of a value from one data type to another

L) A statement that stores the value of an expression into a variable

M) A location in memory, referenced by an identifier, that contains a data value that cannot be changed.
True or False – (6 Points)

2. (6 pts) Circle T for true and F for false:

T  F  a) The C++ compiler finds semantic errors in a program?
T  F  b) The function main() is required for every C++ program.
T  F  c) A char variable can hold more than one character.
T  F  d) Type coercion is the implicit conversion of one data type to another.
T  F  e) sum = (float)(average + 25.0) + average; is a valid assignment statement.
T  F  f) The statement cin.get(charVar); reads the first non-white space character from the input stream

Multiple choice (22 points) – Questions 3 – 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.

3. Which of the following are valid identifiers in C++?
   A) Name  B) 2bits  C) _Ask  D) _123  E) All are invalid

4. Which of the following are not valid identifiers in C++?
   A) Miles  B) Average_  C) f_num  D) d_value  E) All are valid

5. Converting algorithms to C++ code takes place during the ________________ phase of a computer program’s life cycle
   A) Implementation  B) Problem-Solving  C) Maintenance  D) Full Moon  E) None of the above

6. What is the name of the header file required for using setw and setprecision?
   A) iostream  B) iomanip  C) manip  D) string  E) cmath

7. Which output manipulator is used to control the number of digits printed?
   A) setw  B) setprecision  C) showpoint  D) endl  E) None of the above
8. Which output manipulator is used to control the number of positions the next data item should occupy when printed?

A) setw  B) setprecision  C) showpoint  D) endl

E) None of the above

For questions 9-11, consider the following C++ declarations. In the code, a □ indicates a space

```cpp
string str1 = "This□Class□is□programming";
string str2 = "Next□Line□2";
string str3;
string::size_type num, Position;
```

For the above declarations, answer the questions based on the program fragment shown.

9. What is the output of the following program fragment listed below? (a □ indicates a space)

```cpp
num = str2.length();  cout << num;
```

A) 9  B) 10  C) 11  D) 12  E) string::npos

10. What is the output of the following program fragment listed below? (a □ indicates a space)

```cpp
Position = str1.find("Is"); cout << Position;
```

A) 2  B) 3  C) 5  D) 6  E) string::npos

11. What is the output of the following program fragment listed below? (a □ indicates a space)

```cpp
str3 = str1.substr(10,4);  cout << str3;
```

A) is  B) is□p  C) □Class□is□  D) Class□is□p

E) None of the above

12. After the following code segment executes, what value is stored in the variable result?:

```cpp
float result;
int num = 4;
result = num/5 + 3;
```

A) 0.0  B) 3.0  C) 3.8  D) 0.8  E) a runtime error
13. The following C++ statements are to be included in a program. What is the correct data type needed for the variable len? (only one possible answer for this question)

```cpp
string firstName="Reginald";
????? len;
len = firstName.substr(2,3);
```

A) float  B) string::size_type  C) string  D) bool

E) None of these

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**Unix Commands (8 points) – Questions 14 – 21**

14. What is the Unix command that is used to view the contents of a directory?

15. Give the Unix command to delete the file `gone.txt`

16. What command is typed at a terminal prompt to edit the file `editMe.txt` with the editor `nedit`?

17. Give the Unix command to create the directory `MyDir`.

18. Give the Unix command to compile the C++ program `MyProgram.cpp` and create an executable named `MyProgram`?

19. Give the Unix command that is used to rename the file `in.txt` to `out.txt`

20. What Unix command is used to obtain the current working directory path (shows you which directory you are in)?

21. Give the Unix command to delete the empty directory `mydir`
Short Answer (56 points) – Questions 22 – 33

22. (3pts) Identifiers can consist of what types of characters (three distinct answers)?

23. (3pts) An expression is an arrangement of ________________, ________________ and ________________ that can be evaluated to compute a value of a given type.

24. (2 pts) What are two methods used to indicate comments in a C++ program?

25. (6 pts) Assignment and declaration statements
   a) Provide a constant declaration for a char identifier of INITIAL with a value of ‘M’.

   b) Provide a constant declaration for a double identifier of PI with a value of 3.14159.

   c) Provide a bool variable declaration for the identifier empty.

   d) Provide a float variable declaration for the identifier grade.

   e) Write a statement that assigns “hello” to the string variable str1.

   f) Write a statement that assigns the value 32.5 to the float variable avg.
26. (4 pts) Show the output of each statement below. (output starts at the left side)
Place a single character in each box. Skip a box to indicate a space.

a) cout << setw(8) << “Hello” << setw(8) << left << “World” << “A”;

b) cout << right << setw(3) <<”Name” << setw(8) << left << “please”;

27. (6 pts) Write a valid C++ mathematical expression for the following algebraic expressions.

a) \( a^2 + b^2 + c^2 \)

b) \( a + \frac{b + c}{(c + e)^2} \)

c) \( \frac{(a + b)*c + d}{d - e/f} + a \)

28. (4 pts) Write a segment of code that prompts the user to enter in a phrase consisting of at least 3 words. The first word of the phrase is read into the string variable str. The rest of the phrase is then read into the string variable line. Assume that all variables have been declared previously.
29. (4 pts) Show precisely the displayed output of the following `cout` statement.
- Write one character per box. A □ indicates a space.
- 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.

Example:
```
See Spot Run.
```

```
cout << "***\n" << "***\n" << "***\n" << endl;
cout << "What is 2*2?\n" << endl;
cout << "Answer: \n" << endl;
cout << endl << "Were you correct?";
```

30. (4 pts) The input stream buffer contains the following characters (\n represents the new line character): 22 34.5\nHello A\nWorld 34 45. What is the output to the terminal when the code segment below is executed? Place one character in each box

```
int m; int x; string text; char ch;
cin >> m >> x;
getline(cin,text);
cin.get(ch);
cout << m << "-" << x << "-" << text << "-" << ch;
```

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31. (4 pts) What is the output for the following segment of code? Be careful of postfix/prefix operations and the type of division being performed

```cpp
int num = 19;
cout << num++/2 << endl;
num--;
cout << ++num/2 << endl;
--num;
cout << num << endl;
```

Place a single character in each box, skip a box to indicate a space, skip a row to indicate a blank line.

32. (6 pts) Write a segment of code that prompts the user for the width and height of a rectangle. Read in these values and calculate the area of the rectangle. Output the area using 4 decimal places. Assume that all header files have been declared, and use the following variable declarations.

```cpp
float width;  // width of the rectangle
float height; // height of the rectangle
float area;   // area of the rectangle
```
33. (10 pts) Write a complete program (turn an empty file into a program that compiles, runs and performs the task mentioned.) that performs the following:

- Uses input stream functions/operations only – no string operations allowed
- Read in 3 characters from the standard input stream (cin)
  - Exactly 5 undesired characters proceed each character that is to be read
  - Each character is read into a separate variable
- Output the three characters read from the input stream
- Do not forget the necessary header files
- Do not use the string functions getline, find, substr or size

Sample input stream: 12345A12345B12345C
Program output for the above stream: ABC
Extra Credit (5 pts) What is the output for the following segment of code when it is executed?

```cpp
int n = 4, k = 2;

cout << ++n << endl;
cout << n << endl;
cout << -n << endl;
cout << --n << endl;
cout << n-- << endl;

cout << n + k << endl;
cout << n << endl;
cout << k << endl;

cout << n*n; 
cout << n*n << endl;
```

Place a single character in each box, skip a box to indicate a space, skip a row to indicate a blank line.