Definition Matching – (10 Points)

1. (10 pts) Match the words with their definitions. Choose the best definition for each word.

   Declaration _____ Syntax _____
   Semantics _____ Algorithm _____
   Literal Value _____ Named Constant _____
   Expression _____ Type Coercion _____
   Variable _____ Assignment Statement _____

   A) Definition is not listed below (This answer can be used more than once if necessary)
   B) A statement that stores the value of an expression into a variable
   C) A Name associated with a function or data object and used to refer to that function or data object.
   D) A location in memory, referenced by an identifier, that contains a data value that can be changed.
   E) A location in memory, referenced by an identifier, that contains a data value that cannot be changed.
   F) The formal rules governing how valid instructions are written in a programming language.
   G) The set of rules that determines the meaning of instructions written in a programming language.
   H) Any constant value written in a program.
   J) A specific set of values along with a set of operations on those values
   K) A statement that associates an identifier with a data object, a function or a data type
   L) The explicit conversion of a value from one data type to another.
   M) The mechanism that transfers control to a function
True or False – (10 Points)

2. (10 pts) Circle T for true and F for false:

T F a) The C++ compiler finds syntax errors in a program?

T F b) The function main() is required for every C++ program.

T F c) Type coercion is the explicit conversion of one data type to another.

T F d) The statement cin.get(charVar); reads the next character from the input stream – regardless of what that character is.

T F e) The statement cin.ignore(100*2, ‘\n’) is syntactically correct and will compile.

T F f) Algorithms are a step-by-step procedure for solving a problem in a finite amount of time.

T F g) The extraction operator skips all leading whitespace characters when reading from the input stream.

T F h) A void function can be invoked (called) within an expression.

T F i) A C++ program is written during the implementation phase of a programs life.

T F j) The statement getline(cin,str1) reads an entire line into string variable str1.

Multiple choice (16 points) – Questions 3 – 18

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) 4bit B) _Homes C) two_bits D) 123/456 E) All are invalid

4. Which of the following are not valid identifiers in C++?

A) #Abc B) MyMoney C) _TwoBit_ D) PI-- E) All are valid

5. Which of the following header files is required for using cin and cout?

A) fstream B) cmath C) iostream D) iomanip 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 ensures a decimal point is output for all floating-point numbers?
   A) setw  B) setprecision  C) showpoint  D) endl  E) None of the above

8. Which output manipulator can be used to specify the output justification?
   A) setw  B) center  C) showpoint  D) endl  E) None of the above

9. Which output manipulator specifies how many character positions the next data item should occupy when it is output?
   A) setw  B) center  C) showpoint  D) endl  E) None of the above

For questions 10-12, consider the following C++ declarations. In the code, a □ indicates a space

```cpp
string str1 = "This□Class□is□CPE112";
string str2 = "CPE112";
string str3;
string::size_type num, Position;
```

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

10. What is the output of the following program fragment listed below? (a □ indicates a space)
    ```cpp
    num = str2.size(); cout << num;
    ```
    A) 7  B) 6  C) 5  D) 4  E) string::npos

11. What is the output of the following program fragment listed below? (a □ indicates a space)
    ```cpp
    Position = str2.find("CPE"); cout << Position;
    ```
    A) 0  B) 1  C) 5  D) 6  E) string::npos

12. What is the output of the following program fragment listed below? (a □ indicates a space)
    ```cpp
    str3 = str1.substr(4,10); cout << str3;
    ```
    A) s□Class□is  B) □is□  C) □Class□is□  D) s□is
    E) None of the above
13. After the following code segment executes, what value is stored in the variable `result`?

```c
float result;
int num = 5;
result = num/4 + 1.5;
```

A) 2   B) 1   C) 2.75   D) 2.5   E) a runtime error   F) None of These

14. The following C++ statements are to be included in a program. What is the best correct data type needed for the variable `mystery`? (only one possible answer for this question)

```c
float radius = 5.0;
????? mystery;
mystery = “answer = int(2*3.14159*radius)”;
```

A) float   B) string   C) int   D) char   E) None of these

15. The statement that associates an identifier with a Data Type is known as a(n)

A) Declaration Statement   B) Assignment Statement   C) Naming statement   D) Expression Statement   E) All of these   F) None of these

16. Which of the following are ways used to structure (arrange) statements in a program?

A) Looping   B) Indexing   C) Execution   D) Selection   E) Subprograms   F) Compiling   G) Coupling   H) Sequential

17. C++ is an example of a(n)

A) Meta Language   B) Machine language   C) Assembly Language   D) Low Level Language   E) Compiler   F) None of the above

18. A(n) ________________ is a function that returns a function value to its caller and is invoked within an expression.

A) Main Function   B) Value-returning function   C) Void Function   D) Subprogram   E) None of these
Unix Commands (6 points) – Questions 19 – 24

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

20. Give the Unix command to create the directory Programs.

21. Give the Unix command to delete the empty directory Programs

22. Give the Unix command that is used to rename the file in.txt to in.txt bk

23. Give the Unix command to compile the C++ program Program_04.cpp and create an executable named Program_04?

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

Short Answer (58 points) – Questions 25 – 35

25. (3pts) Identifiers can consist of what types of characters (three distinct answers)?

26. (3pts) An expression is an arrangement of ___________________, ___________________ and ___________________ that can be evaluated to compute a value of a given type.

27. (2 pts) What are two methods used to indicate comments in a C++ program?
28. (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) <<left << "Hello" <<setw(3) << right << "World" << "A";`

b) `cout << right << setw(6) <<"Name" << setw(8) << left << "please";`

29. (8 pts) Assignment and declaration statements

a) Provide a constant declaration for a char identifier of INIT with a value of ‘A’.

b) Provide a int variable declaration for the identifier count.

c) Write a statement that assigns "Maple" to the string variable tree.

d) Write a statement that assigns the value 3.14159 to the float variable pi.

30. (4 pts) Write a valid C++ mathematical expression for the following algebraic expressions.

   a) \[
   \frac{\sqrt{a^2 + b^2}}{a + b - (d + e)}
   \]

   b) \[a + b / c*(d - e)\]
31. (6 pts) The input stream buffer contains the following characters (\n represents the new line character): A B C \n 1 2 3 \n D E F \n. What is the output to the terminal when the code segment below is executed? Place one character in each box. Hint: Some variables have their value changed as the input is read. A □ indicates a space.

```cpp
int num1; char ch1, ch2;
cin >> ch1;
cin.ignore(200,'1');
cin >> num1;
cin.ignore(200,'\n');
cin >> ch2 >> ch2;

cout << ch1 << "-" << num1 << "-" << ch2;
```

32. (6 pts) Write a segment of code that prompts the user to enter in any ten characters (assume that there are no new line characters contained in the ten characters entered). Use the Ignore and/or get functions to read the 2\textsuperscript{nd}, 7\textsuperscript{th} and 8\textsuperscript{th} characters entered (regardless of what they are) into char variables ch1, ch2 and ch3. Use the standard output and input streams (cout, cin) and assume that all variables have been declared previously. A □ indicates a space.

Sample input: ABCDEFG\□PT
After reading the above input, ch1 contains B, ch2 contains G and ch3 contains □
33. (6 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: S p o t r u n.

```
cout << "This\is\nThe\first\line." << endl;
cout << "\nthe\next" << endl;
cout << setw(8) << "line\is\not" << endl;
cout << setw(6) << left << "this" << setw(8) << right << "one" << endl;
```

34. (6 pts) What is the output for the following segment of code? Place the answers in the spaces provided one character per box. A □ indicates a space.

```
int num = 10;
cout << "num\=\n" << num << endl;
num--;
cout << "num\=\n" << num*2 << endl;
++num;
cout << "num\=\n" << num + num << endl;
```
35. (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:

- Prompt the user for an integer, (use cout)
- Input the response to the integer variable first, (use cin)
- Prompt the user for a second integer, (use cout)
- Input the response to the integer variable last, (use cin)
- Calculate the harmonic mean (harmonic mean = \[ \frac{2 \times \text{first} \times \text{second}}{\text{first} + \text{second}} \]) of the numbers and store the value in the float variable hMean,
- Output the value of the variable hMean to the screen to 3 decimal places.
- Do not forget the necessary header files. Be careful of integer division
- Comments are not necessary for this program.

Sample input/output #1: The user enters in 4 and 4, the output is hMean = 4.000
Sample input/output #2: The user enters in 1 and 2, the output is hMean = 1.333
Extra Credit #1 (2 pts)
a) Which of the following characters **CANNOT** be used as part of an identifier?

A) ! B) b C) v D) _ E) 9
F) 4 G) * H) L I) % J) None can be used

b) Which of the following are functions that **operate on** string variables?

A) substitute B) substr C) position D) find
E) size F) getline G) get H) None of these

Extra Credit #2 (2 pts)

What is the output for the code segment below. Write one character in each block

```cpp
string str1 = "This-string-is-for-testing";
string str2;
string::size_type len=10;

str2 = str1.substr(str1.find("test"),len);
cout << setw(12) << right << str2 << endl;
```

```
|   |   |   |   |   |   |   |   |   |   |
```

Extra Credit #3 (3 pts)

What is the output for the code segment below. Fill in the blanks with the correct values.

```cpp
int num1, num2;
num1 = 11; num2 = 0;

num2 = num1 - num1/2*2;
cout << "num2_1 = " << num2 << endl;

num2 = num2 + num1/4*4;
cout << "num2_2 = " << num2 << endl;

num2 = num2 - num1%6;
cout << "num2_3 = " << num2 << endl;
```

num2_1 = ___________________
num2_2 = ___________________
num2_3 = ___________________