(1) Consider the following program:
#include <iostream.h>

void main() {
    int a=1, b=2;
    a++;
    b += a;
    if (b==4) a++;
    else a--;
    cout << a << endl << b << endl;
}

Put the output of the program in the space below:

3
4
(2) Consider the following program:
```cpp
#include<iostream.h>

void main() {
    char c1, c2, c3;
    cout << "Enter three characters: ";
    cin >> c1 >> c2 >> c3;
    c1++;
    c2++;
    c3++;
    cout << c1 << endl << c2 << endl << c3 << endl;
}
```

After the prompt `Enter three characters:` appears on the screen, the user types in the five keystrokes `7 ENTER d E ENTER` in that order. What is the output of the last line of the program (the last `cout` line)? Put your answer in the space below:

8
e
F

Multiple choice: circle the correct answer.

(3) A megabyte consists of approximately how many bytes?
(a) 1024
(b) 1000
(c) one million
(d) one billion
(4) Let \( a \) and \( b \) be double type variables. The mathematical expression
\[
\frac{1}{ab + 2}
\]
can be written in C++ as
(a) \( \frac{1}{a \cdot b + 2} \)
(b) \( \frac{1}{ab + 2} \)
(c) \( \frac{1}{a \cdot b + 2} \)
(d) \( \frac{1}{a \cdot b + 2} \)

(5) The char type constant representing the lower-case letter a is
(a) a
(b) 'a'
(c) "a"
(d) None of the above

(6) Each of the following is a valid C++ identifier (variable name) EXCEPT
(a) _23a
(b) if
(c) variable_name
(d) X14

(7) This expression evaluates to 20 in C++
(a) \( 4 \cdot 5 \)
(b) \( 4/5 + 20 \)
(c) \( 3 \cdot 5 + 6 \)
(d) \( 40 \% 2 \)

(8) All of the following are examples of software EXCEPT
(a) compiler
(b) ROM
(c) operating system
(d) your program Program1.cpp

(9) Which of the following statements about C++ is false?
(a) C++ uses a interpreter, not a compiler.
(b) C++ is an extension of C.
(c) C++ is an object-oriented programming language.
(d) Every C++ program is required to have a \texttt{main} function.

(10) The real number one third is represented by this C++ expression.
(a) \( 1/3 \)
(b) \( 1\%3 \)
(c) \( 1./3. \)
(d) \( 1.*3. \)
(11) What is the syntax error in the following program?

```cpp
#include <iostream.h>

void main {
    cout << "'I have an error in me!'";
}
```

(a) There should be a space between # and include.
(b) There should be () between main and {.
(c) The << in the cout statement should be >> instead.
(d) All of the above.

(12) An algorithm is

(a) An early military computer.
(b) A unit of permanent memory whose contents cannot be changed.
(c) A set of grammar rules for a programming language.
(d) A list of steps to solve a problem.

(13) _______ is a programming language only one level above machine language.

(a) Assembly language
(b) C
(c) Executable file
(d) Object-oriented language

(14) The following piece of code prints out YES to the screen if the variable a is equal to 4 and does nothing if a is not equal to 4.

(a) if (4==a);
    cout << "YES" << endl;

(b) if (4=a)  
    cout << "YES" << endl;

(c) if (4==a)  
    cout << "YES" << endl;

(d) if (4==a);  
    else cout << "YES" << endl;
(15) True/False. Circle T or F to the left of each expression.

T F Register is a type of memory.
T F In a C++ program, a++ always has exactly the same meaning as ++a.
T F 'B'+2 represents the character 'D'.
T F The decimal number 11 is represented by the hexadecimal digit A.
T F In a C++ program using the standard header file cmath, \( \tan(45) \) gives the tangent of 45 degrees.
T F The octal number system uses the eight digits 1 to 8.
T F In order to use a cout statement in a C++ program, you must include the header file iomanip.h.

(16) Fill in the blanks:

(a) To declare the int variable days_per_week to be 7 to be a constant variable that cannot be changed in the course of the program, fill in the blank.

\[
\text{const int days\_per\_week} = 7;
\]

(b) Each octal digit represents 3 bits.

(c) The value of the variable a after the following code fragment executes is 10.

```
int a = 5;
a = a*2;
```

(d) The value of the C++ expression 6./5 is 1.2.

(e) Our pegasus system uses the ASCII code to assign a different character to each integer between 0 and 255.