QUIZ-01

1. A(n) ____ is a word that is predefined by the programming language for a special purpose and can only be used in a specified manner for its intended purpose.
   1) variable
   2) identifier
   3) reserved word
   4) data type

2. Main memories combine 1 or more bytes into a single unit, referred to as a(n) ____.
   1) bit
   2) character
   3) opcode
   4) word

3. ____ identifiers are words that are predefined in C.
   1) Standard
   2) Programmer-created
   3) Reserved
   4) Primitive

4. The collections of patterns consisting of 0s and 1s used to represent letters, single digits, and other single characters are called ____.
   1) bytes
   2) character codes
   3) words
   4) opcodes

5. The names of functions, as well as all of the words that are permitted in a program, that have special meaning to the compiler are collectively referred to as ____.
   1) variables
   2) identifiers
   3) reserved words
   4) keywords

6. Messages are known as ____ in C.
   1) characters
   2) text
   3) banners
   4) strings

7. A ____ is placed at the top of a C program using the `#include` command.
   1) header file
   2) `main()` function
   3) return statement
   4) data type

8. A repetition structure is also known as a(n) ____ structure.
   1) sequence
   2) selection
   3) looping
   4) invocation

9. An expression containing only floating-point values as operands is called a floating-point expression, and the result of such an expression is a(n) ____ value.
   1) single-precision
   2) double-precision
   3) integer
   4) long integer

10. Built-in types are also known as ____.
    1) data types
    2) primitive types
    3) literals
    4) basic

11. A(n) ____ is any combination of operators and operands that can be evaluated to yield a value.
    1) expression
    2) statement
    3) operation
    4) argument

12. The grouping of 8 bits to form a larger unit is an almost universal computer standard and is referred to as a ____.
    1) byte
    2) character
    3) word
    4) opcode

13. A(n) ____ is an acceptable value for a data type.
    1) identifier
    2) variable
    3) escape sequence
    4) literal

14. A ____ value is sometimes referred to as a single-precision number.
    1) `float`
    2) `double`
    3) `int`
    4) `short int`

15. The program that translates a high-level source program as a complete unit before any individual statement is executed is called a(n) ____.
    1) interpreter
    2) assembler
    3) compiler
    4) linker

16. ____ is the order in which operators of the same precedence are evaluated.
    1) Associativity
    2) Priority
    3) Syntax
    4) Precision

17. A(n) ____ value can be the number zero or any positive or negative number that contains a decimal point.
    1) integer
    2) floating-point
    3) boolean
    4) character

18. Translator programs that translate assembly language programs into machine language programs are known as ____.
    1) assemblers
    2) linkers
    3) compilers
    4) interpreters

19. When writing a program, a(n) ____ structure defines the order in which instructions are executed by the program.
    1) sequence
    2) selection
    3) iteration
    4) invocation

20. A(n) ____ is defined as a set of values and a set of operations that can be applied to these values.
    1) variable
    2) identifier
    3) data type
    4) literal

QUIZ-02

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. ____ statements are also called equivalence statements.
   1) Assignment
   2) Prompt
   3) `#include`
   4) `#define`
2. Programs that detect and respond effectively to unexpected user input are formally referred to as ____ programs.
   1) standard
   2) robust
   3) cost-effective
   4) abstract
3. If you are using a Unix or Linux operating system, you must include the ____ option when compiling a C program that uses the mathematical functions like `log` and `sqrt`.
   1) `-lm`
   2) `-l math.h`
   3) `-math`
   4) `-lib = math`
4. The ____ sign is a signal to a C preprocessor.
   1) `!`
   2) `&`
   3) `;`
   4) `#`
5. To access the mathematical functions such as `log` and `sqrt`, you must include the following preprocessor statement in your program: ____.
   1) `#define <mathematical.h>`
   2) `#include <mathematical.h>`
   3) `#define <math.h>`
   4) `#include <math.h>`
6. The term ____ refers to any quantity that is valid on the left side of an assignment operator.
   1) leftv
   2) lval
   3) variable
   4) lvalue
7. The C function ____ yields the result of a value raised to the power of another value.
   1) `pow`
   2) `exp`
   3) `abs`
   4) `sqrt`
8. On most computer systems characters read by the keyboard are stored in a temporary holding area called a ____ immediately after they are pressed.
   1) register
   2) buffer
   3) stack
   4) RAM
9. The statement ____ shows an implicit conversion.
   1) `int total = (int) sum;`
   2) `double avg = 0.0;`
   3) `float price = 9.90f;`
   4) `int answer = 2.745;`
10. Which of the following statements about rvalues and lvalues is NOT true?
    1) Any expression that yields a value can be an rvalue.
    2) A variable declared for an array cannot be an rvalue, but individual array variables can be.
    3) A variable declared for an array can be an lvalue.

4) Individual numbers can only be an rvalue.

11. The expression `sum = sum + 10` can be written as ____.
    1) `sum =+ 10`
    2) `sum += 10`
    3) `sum = sum ++ 10`
    4) `sum ++ 10`

12. ____ is a valid statement in C.
    1) `a = 10 = c = 25;`
    2) `a = b = c = 25;`
    3) `2 = b;`
    4) `a - 1 = c;`

13. The operator used to force the conversion of a value to another type is the ____ operator.
    1) conversion
    2) cast
    3) assignment
    4) increment

14. The ____ function requires a control string as the first argument inside the function name parentheses.
    1) `sqrt()`
    2) `pow()`
    3) `scanf()`
    4) `log()`

15. Literal values that appear many times in the same program are referred to by programmers as ____ numbers.
    1) symbolic
    2) magic
    3) constant
    4) literal

16. The increment operator is ____.
    1) +=
    2) =+
    3) ++
    4) --

17. In C, the ____ symbol is called the assignment operator.
    1) =
    2) ++
    3) --
    4) ()

18. The cast operator has the syntax ____.
    1) `(dataType expression)`
    2) `(expression dataType)`
    3) `(dataType) expression`
    4) `expression (dataType)`

19. The conversion control sequence ____ would cause an integer number to both display its sign and be left-justified in a field width of 10 spaces.
    1) `%-+10d`
    2) `%-10d`
    3) `%+10d`
    4) `%*10d`

20. A previously stored number, if it has not been initialized to a specific and known value, is frequently referred to as a ____.
    1) garbage value
    2) literal
    3) bogus value
    4) buffer

21. A(n) ____ is a message that tells the person at the screen what should be typed.
    1) prompt
    2) input statement
    3) `scanf`
    4) `printf`

22. Format modifiers, if used, must always be placed immediately after the ____ symbol.
    1) !
    2) =
    3) %
    4) .

23. When the ++ operator appears before a variable, it is called a ____ increment operator.
    1) basic
    2) standard
    3) postfix
    4) prefix

24. The expression `price *= rate + 1` is equivalent to the expression ____.
    1) `price = price * (rate + 1)`
    3) `price = (price * rate) + 1`

2) `price = price * rate + 1`

4) `price = price ^ (rate + 1)`

25. Formatted floating-point numbers require ____ field width specifier(s).

1) one
2) two
3) three
4) four

QUIZ-03

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. The ____ operator is used to change an expression to its opposite state.
1) ||
2) &&
3) !
4) %%

2. Which of the following operators has the lowest precedence?
1) !
2) *
3) &&
4) ||

3. The logical OR operator is ____.
1) ||
2) &&
3) !
4) %%

4. A(n) ____ loop is a condition-controlled loop that terminates when a value within a valid range is entered.
1) input-validation
2) sentinel-controlled
3) condition-controlled
4) counter-controlled

5. It is a good practice to terminate the last `case` in a `switch` statement with a ____.
1) `switch`
2) `break`
3) `default`
4) `case`

6. The ____ statement literally loops back on itself to recheck the expression until it evaluates to 0 (becomes false).
1) `for`
2) `switch`
3) `do-while`
4) `while`

7. Omitting the ____ expression in a `for` statement results in an infinite loop.
1) initializing
2) altering
3) tested
4) break

8. What will the following program print on screen?

```
int age = 0;
if (age = 40)
   printf("Happy Birthday!");
else
   printf("Sorry");
```

1) `Happy Birthday!`
2) `Sorry`
3) `Runtime error.`
4) Nothing; the program will not compile.

9. In Unix operating systems, the EOF mark is generated whenever the ____ keys are pressed simultaneously.

1) Ctrl and D
2) Ctrl and E
3) Ctrl and F
4) Ctrl and Z

10. In computer programming, data values used to signal either the start or end of a data series are called ____.

1) input values
2) limits
3) sentinels
4) iterators

11. In IBM-compatible computers, the EOF mark is generated whenever the ____ keys are pressed simultaneously.

1) Ctrl and D
2) Ctrl and E
3) Ctrl and F
4) Ctrl and Z

12. The use of ____ in a C program will result in a compiler error.

1) `if (age == 40)`
2) `if (40 == age)`
3) `if (age = 40)`
4) `if (40 = age)`

13. The logical AND operator is ____.

1) ||
2) &&
3) !
4) %%

14. In a `switch` statement, the word ____ is optional and operates the same as the last `else` in an `if-else` chain.

1) `if`
2) `break`
3) `case`
4) `default`

15. A ____ statement is a specialized selection statement that can be used in place of an `if-else` chain where exact equality to one or more integer constants is required.

1) `case`
2) `break`
3) `switch`
4) nested `if`

16. Which of the following operators has right to left associativity?

1) !
2) *
3) &&
4) ||

17. What will the following program print on screen?

```
int tenure = -5;
if (tenure + 5)
   printf("Congratulations!");
else
   printf("Sorry");
```

1) `Congratulations!`
2) `Sorry`
3) `Runtime error.`
4) Nothing; the program will not compile.

18. ____ is an accumulating statement.

1) `total += num;`
2) `total++;`
3) `++total;`
4) `total *= num;`

19. The second loop of a nested loop is called the ____ loop.

1) inner
2) outer
3) slave
4) conditioned

20. A(n) ____ is a condition-controlled loop where one specific value is required to terminate the loop.

1) input-validation
2) sentinel-controlled
3) condition-controlled
4) counter-controlled

QUIZ-04

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. The purpose of a ____ is to operate on the passed data and return, at most, one value directly back to the calling function.
1) function declarator
2) prototype
3) function body
4) function header

2. Scaling a random number as an integer value between 1 and N is accomplished using the expression ____.
1) `1 + (int)rand() / N`
2) `1 + (int)rand() % N`
3) `(int)rand() / N`
4) `(int)rand() % N`

3. ____ is a prototype of a function that returns no value.
1) `void funcA();`
2) `funcA();`
3) `int funcA();`
4) `null funcA();`

4. The function ____ converts an ASCII string to an integer.
1) `string itoa(int)`
2) `double atof(string)`
3) `int atoi(string)`
4) `int toupper(int)`

5. The portion of the function header that contains the function name and parameters is known as a ____.
1) function body
2) prototype
3) function declarator
4) stub

6. A ____ is the beginning of a final function that is used as a placeholder for the final function until the function is completed.
1) function header
2) function declarator
3) prototype
4) stub

7. ___ is an example of a calling statement.

1) `float roi(int, double);`
2) `printf("%f", roi(3, amt));`
3) `float roi( int yrs, double rate);`
4) `float roi( int yrs, double rate)`

8. ____ reads the computer's internal clock time, in seconds.

1) `stime()`
2) `time(SECONDS)`
3) `time()`
4) `time(NULL)`

9. ___ is an example of a function prototype.

1) `float roi(int, double);`
2) `printf("%f", roi(3, amt));`
3) `roi(3, amt);`
4) `float roi( int yrs, double rate)`

10. A function that is called or summoned into action by its reference in another function is a ____.

1) function prototype
2) called function
3) calling function
4) function declarator

11. The function ____ returns a non-0 number if the argument is a letter or a digit; otherwise it returns a 0.

1) `int isalnum(int)`
2) `int isalpha(int)`
3) `int isdigit(int)`
4) `int isxdigit(int)`

12. To return a value, a function must use a(n) ____ statement.

1) `exit`
2) `throw`
3) `break`
4) `return`

13. When a function simply receives copies of the values of the arguments and must determine where to store these values before it does anything else, this is known as a ____.

1) pass by value
2) pass by reference
3) stub
4) function declarator

14. ___ is an example of a function header line.

1) `float roi(int, double);`
2) `printf("%f", roi(3, amt));`
3) `float roi( int yrs, double rate);`
4) `float roi( int yrs, double rate)`

15. The method for adjusting the random numbers produced by a random-number generator to reside within a specified range is called ____.

1) scaling
2) stubbing
3) prototyping
4) converting

16. The ____ function can be used to generate a random number in C.

1) `rand()`
2) `srand()`
3) `random()`
4) `rnd()`

17. All C compilers provide ____ function(s) for creating random numbers, defined in the `stdlib.h` header file.

1) one
2) two
3) three
4) four

18. A function that calls another function is referred to as the ____.

1) function prototype
2) called function
3) calling function
4) function declarator

19. The purpose of a ____ is to identify the data type of the value returned by the function, if any, provide the function with a name, and specify the number, order, and type of values expected by the function.

1) function declarator
2) prototype
3) function body
4) function header

20. ___ is the correct way to include a header file in your program.

1) `#include <header-file-name>`
2) `#include <header-file-name>;`
3) `#include header-file-name`
4) `#include header-file-name;`

21. The items enclosed within the parentheses in a function call statement are called ____ of the function.

1) parameters
2) formal parameters
3) arguments
4) formal arguments

22. The function ____ returns the absolute value of its double-precision argument.

1) `double ceil(double)`
2) `double fmod(double)`
3) `double fabs(double)`
4) `double abs(double)`

23. The argument names in the header line of a function are known as ____.

1) arguments
2) parameters
3) actual arguments
4) actual parameters

24. The minimum requirement of a ____ is that it compile and link with its calling module.

1) function body
2) function prototype
3) stub function
4) function declarator

25. The function ____ returns the common logarithm of its argument.

1) `double exp(double)`
2) `double log(double)`
3) `double log10(double)`
4) `double fmod(double)`

QUIZ-05

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. In ____ initialization, initialization occurs each time the declaration statement is encountered.
1) dynamic
2) static
3) compile-time
4) run-time

2. Coding a function prototype as ____ makes sense when the function is used by a number of other functions in a source code file.
1) private
2) global
3) local
4) `void`

3. If `numAddr` is a pointer, ____ means the variable whose address is stored in `numAddr`.
1) `*numAddr`
2) `numAddr*`
3) `&numAddr`
4) `*&numAddr`

4. To use a stored address, C provides us with an indirection operator, ____.
1) %
2) ^
3) &
4) *

5. A local variable that is declared as ____ causes the program to keep the variable and its latest value even when the function that declared it is through executing.
1) `auto`
2) `static`
3) `extern`
4) `register`

6. Variables created inside a function are ____ variables.
1) recursive
2) private
3) local
4) global

7. ____ is a high-speed storage area physically located in the computer's processing unit.
1) A reserved variable
2) RAM
3) A register
4) A stack

8. The variable `secnum` is ____.
```
int main()
{
  int secnum;
  . . .
}
```
1) local to `main()`
3) local to the program

2) global to `main()`
4) global to the program

9. A declaration statement that specifically contains the word ____ is different from every other declaration statement in that it does not cause the creation of a new variable by reserving new storage for the variable.

1) `auto`
2) `static`
3) `extern`
4) `register`

10. A variable that can store an address is known as a(n) ____ variable.

1) register
2) pointer
3) static
4) extern

11. The ____ of a variable defines the location within a program where that variable can be used.

1) storage class
2) time dimension
3) scope
4) data type

12. Where and how long a variable's storage locations are kept before they are released can be determined by the ____ of the variable.

1) storage class
2) time-dimension
3) scope
4) data type

13. ____ can only be members of the `auto`, `static`, or `register` storage classes.

1) Constants
2) `int` variables
3) Local variables
4) Global variables

14. The declaration statement ____ declares `milesAddr` to be a pointer variable that can store the address of (that is, will point to) an integer variable.

1) `int milesAddr&;`
2) `int milesAddr*;`
3) `int *milesAddr;`
4) `int &milesAddr;`

15. When a function invokes itself, the process is called ____ recursion.

1) direct
2) mutual
3) self-referential
4) indirect

16. The purpose of the ____ storage class is to extend the scope of a global variable declared in one source code file into another source code file.

1) `auto`
2) `static`
3) `extern`
4) `register`

17. A ____ variable is one whose storage has been created for it by a declaration statement located outside any function.

1) local
2) global
3) module
4) function

18. ____ variables have the same time duration as automatic variables.

1) Static
2) Register
3) Extern
4) Global

19. The four available storage classes are called `auto`, `static`, `extern`, and ____.

1) `stack`
2) `intern`
3) `void`
4) `register`

20. When the function returns control to its calling function, its ____ variables "die".

1) local `static`
2) `extern`
3) `local extern`
4) local `auto`

21. ____ variables allow the programmer to "jump around" the normal safeguards provided by functions.

1) Global
2) Local
3) Static
4) `void`

22. Functions that call themselves are referred to as ____ functions.

1) nested
2) recursive
3) loop-back
4) rolling

23. A function can invoke a second function, which in turn invokes the first function; this type of recursion is referred to as ____ recursion.

1) direct
2) mutual
3) self-referential
4) tail

24. A variable with a ____ scope is simply one that has had storage locations set aside for it by a declaration statement made within a function body.

1) function
2) module
3) local
4) global

25. ____ is defined as the section of the program where the variable is valid or "known."

1) Scope
2) Resolution
3) Domain
4) Reach

QUIZ-06

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. ____ refers to the first grade stored in the `grades` array.
1) `grades[0]`
2) `grades[1]`
3) `grades(0)`
4) `grades{1}`

2. In C, the array name and index of the desired element are combined by listing the index in ____ after the array name.
1) parentheses
2) square braces
3) curly braces
4) dashes

3. The individual elements of all global and `static` arrays are, by default, set to ____ at compilation time.
1) NULL
2) -1
3) 0
4) 1

4. The ____ character is automatically appended to all strings by the C compiler.
1) `'\NULL'`
2) `'\1'`
3) `'\n'`
4) `'\0'`

5. A(n) ____ is a data type with two main characteristics: (1) its values can be decomposed into individual data elements, and (2) it provides an access scheme for locating individual data elements.
1) data structure
2) scalar data type
3) array
4) atomic data type

6. The initialization of a two-dimensional array is done in ____ order.
1) ascending
2) descending
3) row
4) column

7. ____ declares an array of three rows and four columns.
1) `int val[3,4];`
2) `int val[4,3];`
3) `int val[3][4];`
4) `int val[4][3];`

8. In a one-dimensional array in C, the first element has an index of ____.
1) NULL
2) -1
3) 0
4) 1

9. All ____ arrays are created and destroyed each time the function they are local to is called and completes its execution.
1) global
3) `auto`

2) `static` 4) `extern`

10. `char codes[] = "sample";` sets aside ____ elements in the `codes` array.
1) 5 3) 7
2) 6 4) 8

11. A(n) ____, is used to store and process a set of values, all of the same data type, that forms a logical group.
1) data structure 3) array
2) scalar variable 4) atomic variable

12. A two-dimensional array is sometimes referred to as a ____.
1) list 3) queue
2) vector 4) table

13. Any individual element in an array can be accessed by giving the name of the array and the element's position; this position is called the element's ____ value.
1) component 3) index
2) variable 4) element

14. A(n) ____ variable, is a variable whose value cannot be further subdivided or separated into a built-in data type.
1) data structure 3) array
2) scalar 4) class

15. A ____ is a list of values of the same data type that is stored using a single group name.
1) one-dimensional array 3) three-dimensional array
2) two-dimensional array 4) matrix

16. The term ____ uniquely identifies the element in row 1, column 3.
1) `val[3][1]` 3) `val[3,1]`
2) `val[1][3]` 4) `val[1,3]`

17. ____ shows a correct array initialization statement.
1) `char codes[6] = ['s', 'a', 'm', 'p', 'l', 'e'];`
2) `char codes[] = ('s', 'a', 'm', 'p', 'l', 'e');`
3) `char codes[] = "sample";`
4) `char codes[*] = {'s', 'a', 'm', 'p', 'l', 'e'};`

18. In a function prototype that has a two-dimensional argument, the ____ size is optional.
1) column 3) array
2) row 4) subscript

19. A ____ loop is very convenient for cycling through array elements.
1) `while` 3) `switch`
2) `do-while` 4) `for`

20. ____ is a correct statement.
1) `int grades[5] = {98, 87, 92, 79, 85};`
2) `int grades[5] = 98, 87, 92, 79, 85;`
3) `int grades[5] = (98, 87, 92, 79, 85);`
4) `int grades[5] = [98, 87, 92, 79, 85];`

21. For one-dimensional arrays, the offset to the element with index `i` is calculated as ____.

1) Offset = i * the size of the array
2) Offset = i * the size of the subscript
3) Offset = i * the size of a component + 1
4) Offset = i * the size of an individual element

22. A ____-dimensional array can be viewed as a book of data tables.

1) one
2) two
3) three
4) four

23. Any expression that evaluates a(n) ____ may be used as a subscript.

1) character
2) `double`
3) boolean
4) integer

24. ____ shows a correct array initialization statement.

1) `char codes[4] = {'s', 'a', 'm', 'p', 'l', 'e'};`
2) `char codes[] = {'s', 'a', 'm', 'p', 'l', 'e'};`
3) `char codes = {'s', 'a', 'm', 'p', 'l', 'e'};`
4) `char codes[*] = {'s', 'a', 'm', 'p', 'l', 'e'};`

25. Each item in an array is called a(n) ____ of the array.

1) subscript
2) variable
3) index
4) element

QUIZ-07

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. The maximum allowable filename in the DOS operating system is ____.
1) 8 characters plus an optional period and 3-character extension
2) 14 characters
3) 155 characters
4) 255 characters

2. Line ____ in the following section of code checks for the end-of-string character.

```
 1 void strcopy (char string1[], char string2[])
 2 {
 3   int i = 0;
 4
 5   while (string2[i] != '\0')
 6   {
 7     string1[i] = string2[i];
 8     i++;
 9   }
10   string1[i] = '\0';
11 }
```

1) 3
2) 5
3) 7
4) 10

3. ____ causes the same display as the statement `printf("Hello World!");`.
1) `fprintf(stdout,"Hello World!");`
2) `fprintf(stdin,"Hello World!");`
3) `fprintf(stderr,"Hello World!");`
4) `fprintf(NULL,"Hello World!");`

4. To write to a binary file you use the ____ function.
1) `fput()`
2) `fputb()`
3) `fwrite()`
4) `write()`

5. The actual declaration of the `FILE` structure is contained in the ____ standard header file.
1) `stdio.h`
2) `stdlib.h`
3) `file.h`
4) `stream.h`

6. A ____ is a one-way transmission path that is used to connect a file stored on a physical device, such as a disk or CD-ROM, to a program.

1) data file
2) text file
3) binary file
4) file stream

7. The statement ____ displays the message `Have a Happy Day`, right-justified, in a field of 25 characters.

1) `printf("%s25","Have a Happy Day");`
2) `printf("%s-25","Have a Happy Day");`
3) `printf("%25s","Have a Happy Day");`
4) `printf("%-25s","Have a Happy Day");`

8. The array `char message[81];` can be used to store a string of up to ____ characters.

1) 79
2) 80
3) 81
4) 82

9. The string `"Good Morning!"` is stored in memory using a character array of size ____.

1) 13
2) 14
3) 15
4) 16

10. Programs that use the `gets()` routine must include the ____ header file.

1) `stdio.h`
2) `stdlib.h`
3) `string.h`
4) `ctype.h`

11. Typically, the ____ function is used to "assemble" a string from smaller pieces until a complete line of characters is ready to be written, either to the standard output device or to a file.

1) `strcpy()`
2) `strcat()`
3) `sscanf()`
4) `sprintf()`

12. Programs that use the `atoi()` routine must include the ____ header file.

1) `stdio.h`
2) `stdlib.h`
3) `string.h`
4) `ctype.h`

13. The value assigned to the NULL constant is ____.

1) `'\n'`
2) `'\0'`
3) `'\NULL'`
4) `"NULL"`

14. Data that is stored together under a common name on a storage medium other than the computer's main memory is called a ____.

1) database
2) data file
3) text file
4) binary file

15. Notice that each file stream name, when it is declared, is preceded by a(n) ____.

1) pipe
2) underscore
3) ampersand
4) asterisk

16. ____ reads values for the listed arguments from the file, according to the format.

1) `fgetc()`
2) `fgets()`
3) `fprintf()`
4) `fscanf()`

17. When using `#include`, the characters _____, tell the compiler to start looking in the default directory where the program file is located.

1) `""`
2) `<>`
3) `//`
4) `\\`

18. ____ files store each individual character, such as a letter, digit, dollar sign, decimal point, and so on, using an individual character code.

1) Data
2) Text
3) Binary
4) ASCII

19. A file stream is closed using the ____ function.

1) `exit()`
2) `osclose()`
3) `fclose()`
4) `close()`

20. `fputc()` is the general form of ____.

1) `fput()`
2) `putc()`
3) `putchar()`
4) `fputchar()`

QUIZ-08

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. The expression ____ adds 3 to "the variable pointed to by `gPtr`."
1) `*(gPtr + 3)`
2) `*gPtr + 3`
3) `gPtr + 3`
4) `&gPtr + 3`

2. The ____ in the expression `*(gPtr + 1)` is an offset.
1) `*`
2) `gPtr`
3) `+`
4) `1`

3. Assuming `grade` is an array of ten integers, the statement ____ is invalid.
1) `grade = &grade[2];`
2) `*grade = *(grade + 2);`
3) `*grade = *grade + 2;`
4) `*grade = *(&grade[2]) + 2;`

4. The indirection operator in C is ____.
1) `&`
2) `*`
3) `->`
4) `.`

5. After creating two variables as follows:
```
char message1[81] = "this is a string";
char *message2 = "this is a string";
```
The statement ____ is not valid in C.
1) `message1 = "A new message";`
2) `message2 = "A new message";`
3) `message2 = message1;`
4) `message2[0] = 'T';`

6. The header line ____ declares `calc` to be a pointer to a function that returns an integer.
1) `int *calc()`
2) `int (*calc)()`
3) `int &calc()`
4) `int calc(*)`

7. A suitable equivalent to the function header `calc(int pt[2][3])` is ____.
1) `calc(int *(*pt))`
2) `calc(int (*pt)[])`
3) `calc(int (*pt)[2])`
4) `calc(int (*pt)[3])`

8. When working with pointers, the ____ tells the number of variables that are to be skipped over.
1) indirection operator
2) address operator
3) offset
4) address

9. You can replace lines 5 and 6 in the following function with ____.

```
1 /* copy string2 to string1 */
2 void strcopy(char string1[], char string2[])
3 {
4   int i = 0;
5   while (string1[i] = string2[i])
6     i++;
7 }
```

1) `while (*string1 = *string2) ;`
2) `while (*string1 = string2) ;`
3) `while (*string1++ = *string2++) ;`
4) `while (*++string1 = *++string2) ;`

10. When an array is created, the compiler automatically creates an internal ____ for it and stores the base address of the array in it.

1) pointer constant
2) pointer
3) symbolic constant
4) location

11. Consider the declarations

```
int nums[100];
int *nPtr;
```

The statement ____ produces the same result as `nPtr = nums;`.

1) `nPtr = &nums[0];`
2) `nPtr = nums[0];`
3) `nPtr = *nums[0];`
4) `nPtr = &nums;`

12. `&grade[3]` is equivalent to ____; assume that `grade` is an array of integers, and each integer requires 4 bytes of storage..

1) `&grade[0] + 3`
2) `&grade[0] + 4`
3) `&grade[0] + (3 * 4)`
4) `&grade[0] + (3 / 4)`

13. The address operator in C is ____.

1) `&`
2) `*`
3) `->`
4) `.`

14. If `nums` is a two-dimensional integer array, ____ refers to element `nums[0][0]`.

1) `*nums`
2) `*(*nums)`
3) `*(&nums)`
4) `&(*nums)`

15. ____ uses the pointer and then increments it.

1) `*ptNum--`
2) `*--ptNum`
3) `*ptNum++`
4) `*++ptNum`

16. If numPtr is declared as a pointer variable, the expression ____ can also be written as numPtr[i].

1) *numPtr + i
2) (numPtr + i)
3) *numPtr
4) *(numPtr + i)

17. Consider the following declarations of a function that receives an array of integers and finds the element with the maximum value:

(i) `findMax(int *vals, int numEls)`
(ii) `findMax(int vals[], int numEls)`

The address in `vals` may be modified ____.
1) only if the function is declared as in (i)
2) only if the function is declared as in (ii)
3) if either (i) or (ii) is used
4) in neither case because an array variable cannot be modified (it is a pointer constant)

18. Of the following expressions, ____ is the most commonly used. This is because such an expression allows each element in an array to be accessed as the address is "marched along" from the starting address of the array to the address of the last array element.
1) `*ptNum--`
2) `*--ptNum`
3) `*ptNum++`
4) `*++ptNum`

19. If `nums` is a two-dimensional integer array, ____ refers to element `nums[1][0]`.
1) `*nums[1]`
2) `*nums[0]`
3) `*nums + 1`
4) `*nums++`

20. `int *ptNum = &miles;` is ____.
1) always valid
2) never valid
3) only valid if `miles` is declared as an integer variable before `ptNum` is declared
4) only valid if `miles` is declared as an array of integers before `ptNum` is declared

21. Pointers ____ be initialized when they are declared.
1) must
2) must not
3) can
4) cannot

22. If `gPtr` is a pointer that points to the first element of an integer array (and each integer requires four bytes of storage), ____ references the variable that is three integers beyond the variable pointed to by `gPtr`.
1) `*gPtr + 3`
2) `*(gPtr + 3)`
3) `*(gPtr + 3 * 4)`
4) `*(gPtr + 3 / 4)`

23. If we store the address of `grade[0]` in a pointer named `gPtr` (using the assignment statement `gPtr = &grade[0];`), then, the expression ____ references `grade[0]`.
1) `gPtr(0)`
2) `gPtr`
3) `&gPtr`
4) `*gPtr`

24. Adding ____ to a pointer causes the pointer to point to the next element of the original data type being pointed to.
1) `1`
2) `1 * sizeof(data type being pointed to)`
3) `2`
4) `2 * sizeof(data type being pointed to)`

25. In performing ____ on pointers, we must be careful to produce addresses that point to something meaningful.

1) comparisons
2) arithmetic
3) subscript operations
4) duplication

QUIZ-09

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

1. Structures that are "linked" together by including the address of the next structure in the structure immediately preceding it are known as ____ structures.
1) linked
2) self-referencing
3) dynamic
4) sequential

2. ____ arrays are two or more arrays, where each array has the same number of elements and the elements in each array are directly related by their position in the arrays.
1) Two-dimensional
2) Multi-dimensional
3) Parallel
4) Complex

3. If `pt` is declared as a pointer to a structure of type `Employee`, ____ refers to the variable whose address is in the `pt.idNum` variable.
1) `(*pt).idNum`
2) `*pt.idNum`
3) `pt->idNum`
4) `(*pt.)idNum`

4. ____ is not a valid C statement.
1) `struct {int month; int day; int year;} birth;`
2) `struct {int month; int day; int year;} birth, current;`
3) `struct Date {int month; int day; int year;};`
4) `struct {int month, int day, int year} birth;`

5. Stacks and queues are two special forms of a more general data object called a(n) ____.
1) array
2) table
3) deque
4) heap

6. ____ memory allocation makes it unnecessary to reserve a fixed amount of memory for a scalar, array, or structure variable in advance.
1) Dynamic
2) Static
3) Partial
4) Advanced

7. The operation of removing a structure from a stack is called a ____.
1) PUSH
2) POP
3) DELETE
4) REMOVE

8. A ____ is a special type of linked list in which objects can only be added to and removed from the top of the list.
1) heap
2) stack
3) queue
4) set

9. The function call ____ passes a copy of the complete `emp` structure to `calcNet()`.

1) `calcNet(struct emp);`
2) `calcNet(*emp);`
3) `calcNet(&emp);`
4) `calcNet(emp);`

10. The following function cycles through a linked list and displays its contents. Line 3 can be replaced with ____.

```
1 void display(struct myStruct *contents)
2 {
3   while (contents != NULL)
4   {
5     printf("%-30s\n",contents->name, contents->phoneNum);
6     contents = contents->nextaddr;
7   }
8 }
```

1) `while (isValid(contents))`
2) `while (contents != EOF)`
3) `while (!contents)`
4) `while (contents != NIL)`

11. ____ is equivalent to `(*pointer).member`.

1) `*pointer.member`
2) `pointer>member`
3) `pointer->member`
4) `pointer@member`

12. Each member of a structure is accessed by giving both the structure name and individual data item name, separated by a ____.

1) `@`
2) `->`
3) `:`
4) `.`

13. If you have declared a structure named `Date`, you can then make the name `DATE` a synonym for the terms struct `Date`, by using the statement ____.

1) `typedef struct Date DATE;`
2) `typedef DATE struct Date;`
3) `#define struct Date DATE`
4) `#define DATE struct Date`

14. The expression `t1.nextaddr->name` can be replaced by the equivalent expression ____.

1) `(*t1.nextaddr).name`
2) `(&t1.nextaddr).name`
3) `*(*t1.nextaddr).name`
4) `*((*t1.nextaddr).name)`

15. ____ reserves space for an array of n elements of the specified size.

1) `malloc()`
2) `calloc()`
3) `realloc()`
4) `nalloc()`

16. A(n) ____ is a set of structures in which each structure contains at least one member whose value is the address of the next logically ordered structure in the list.

1) array
2) stack
3) queue
4) linked list

17. The operation of removing a structure from a dynamically linked list is called a(n) ____.

1) POP
2) SERVE
3) REMOVE
4) DELETE

18. In C, a record is referred to as a(n) ____.

1) data field
2) union
3) structure
4) tuple

19. A union reserves sufficient memory locations to accommodate ____.

1) its smallest member's data type
2) its largest member's data type
3) all of its members' data types
4) none of its members' data types

20. ____ reserves the number of bytes requested by the argument passed to the function.

1) `malloc()`
2) `calloc()`
3) `realloc()`
4) `balloc()`

QUIZ-10

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. The conditional preprocessor directive ____ means "if not defined".
   1) `#ifdef`
   2) `#ifndef`
   3) `#ifnotdef`
   4) `#ifnotdefined`

2. The operator ____ is a ternary operator.
   1) `?:`
   2) `->`
   3) `&`
   4) `[]`

3. `ARRAY first, second;` is equivalent to the two definitions `int first[100];` and `int second[100];` if ____.
   1) you are using a pre-ANSI C compiler
   2) you are using a C/C++ compiler
   3) the statement `typedef int ARRAY[100];` is used before
   4) the statement `#define ARRAY int[100];` is used before

4. For unsigned integers, each left shift (using the << operator) corresponds to ____.
   1) multiplication by 2
   2) division by 2
   3) multiplication by 4
   4) division by 4

5. Enumerated lists are identified by the reserved word ____ followed by an optional, user-selected name and a required list of one or more constants.
   1) `list`
   2) `typedef`
   3) `enumerate`
   4) `enum`

6. A conditional expression uses the conditional operator, ____, and provides an alternate way of expressing a simple `if-else` statement.
   1) `->`
   2) `?:`
   3) `?`
   4) `:`

7. The equivalence produced by a `typedef` statement can frequently be produced equally well by a ____ statement.
   1) `enum`
   2) `#define`
   3) `struct`
   4) `alias`

8. ____ bit operations are extremely useful in masking, or eliminating, selected bits from an operand.
   1) `&`
   2) `|`
   3) `>>`
   4) `<<`

9. Explicit values can be assigned to each enumerated constant, with unspecified values automatically continuing the integer sequence from the last specified value. For example, ____.

1) `enum {Mon: 1, Tue, Wed, Thr, Fri, Sat, Sun};`
2) `enum {Mon, Tue, Wed, Thr, Fri, Sat, Sun};`
   `Mon = 1;`
3) `enum {Mon = 1, Tue, Wed, Thr, Fri, Sat, Sun};`
4) `enum {Mon 1, Tue, Wed, Thr, Fri, Sat, Sun};`

10. ____ is the most frequently used conditional preprocessor directive.

1) `#define`
2) `#else`
3) `#ifdef`
4) `#ifndef`

11. In an arithmetic right shift (using the >> operator), each right shift corresponds to ____.

1) multiplication by 2
2) division by 2
3) multiplication by 4
4) division by 4

12. `1 0 1 1 0 0 1 1 ____ 1 1 0 1 0 1 0 1` results in `1 0 0 1 0 0 0 1`.

1) `&`
2) `|`
3) `>>`
4) `<<`

13. `1 0 1 1 0 0 1 1 ____ 1 1 0 1 0 1 0 1` results in `1 1 1 1 0 1 1 1`.

1) `&`
2) `|`
3) `>>`
4) `<<`

14. The definition `REAL val;` is ____.

1) not valid in C
2) will generate a compiler warning
3) is equivalent to `double val;` if it comes after `typedef double REAL;`
4) defines a macro instance if it comes after `#define REAL double`

15. The ____ statement provides an unconditional transfer of control to some other statement in a program.

1) `jump`
2) `goto`
3) `label`
4) `transfer`

16.
```
#define SQUARE(x) x * x
val = SQUARE(num1 + num2);
```

results in the equivalent statement ____.

1) `val = num1 + (num2 * num1 + num2);`
2) `val = (num1 + num2 * num1) + num2;`
3) `val = (num1 + num2) * (num1 + num2);`
4) `val = num1 + num2 * num1 + num2;`

17. ____ is the exclusive `OR` operator.

1) `&`
2) `|`
3) `^`
4) `~`

18. The conditional preprocessor directive ____ means “if defined”.

1) `#ifdef`
2) `#ifndef`
3) `#ifdefined`
4) `#if_def`

19. Upon encountering the command line `pgm14.3 three blind mice`, the operating system stores it as a sequence of ____ strings.

1) one
2) three
3) four
4) five

20. The ____ operator causes a bit-by-bit AND comparison between its two operands.

1) `~`
2) `^`
3) `&&`
4) `&`

21. `1 0 1 1 0 0 1 1` ____ `1 1 0 1 0 1 0 1` results in `0 1 1 0 0 1 1 0`.

1) `&`
2) `|`
3) `^`
4) `~`

22. `typedef` can be used to create ____.

1) structures
2) variables
3) aliases
4) macros

23. Using even one ____ statement in a program is almost always a sign of bad programming structure.

1) `enum`
2) `typedef`
3) `goto`
4) `#define`

24. The statement ____ makes the name `REAL` a synonym for `double`.

1) `typedef double REAL;`
2) `#define double REAL`
3) `enum REAL double`
4) `typedef REAL double;`

25. In the equivalence statement `#define SQUARE(x) x * x`, `x` is ____.

1) fixed
2) an error
3) a variable
4) an argument