

There are 20 questions for a total of 100 points.

Questions 1-15 are multiple choice (4 points each); 16-20 are short answers (8 points each).

Partial credit up to 2 points may be granted in Questions 16-20.

Please write the answer that you think is most appropriate. Assume all variables are properly declared.

Name:

Student ID:

Grade: + =

1. (4 points) Which of the following is a valid variable name?
 - (a) =var3
 - (b) _var_3
 - (c) 3x
 - (d) ``var3''
2. (4 points) Which of the following is a valid declaration?
 - (a) int a; b;
 - (b) float int;
 - (c) int if;
 - (d) int a,b,c;
3. (4 points) Which of the following is a valid statement?
 - (a) 23 = a+b;
 - (b) i == i+1;
 - (c) if (i>1) then a = 5;
 - (d) if (i>i) { } else a=5;
4. (4 points) Which of the following assigns zero to x at the end?
 - (a) a=0; A=5; if (a==A) x=0; else x=5;
 - (b) a=0; A=5; if (a!=A) x=0; else x=4;
 - (c) a=-1; x= a+a;
 - (d) a=1; x=a++;
5. (4 points) What is the value of y at the end of


```
if (a >= 0) y=5; else y=4; y=3;
```

 - (a) 5
 - (b) 4
 - (c) 3
 - (d) depends on value of a
6. (4 points) Which of the following assigns 6 to x?
 - (a) n=5; x=n++;
 - (b) n=5; x=++n;
 - (c) Both (a) and (b)
 - (d) None of the above.
7. (4 points) Which of the following is a valid conditional expression?
 - (a) (x+y)++ >= 0
 - (b) ((a+b)*c) == 0
 - (c) (((a+b)/2) == 0
 - (d) 0.1 < x < 2.8
8. (4 points) What is the value of x after the switch statement below?


```
c=5;
switch (--c) {
  case 0 : x=3;
  case 4 : x=4; break;
  case 5 : x=5;
  default: x=6;}
```

 - (a) 3
 - (b) 4
 - (c) 5
 - (d) 6
9. (4 points) What is the value of i at the end of the following fragment?


```
i=5; while (i > 0) i = i-2;
```

 - (a) 5
 - (b) 3
 - (c) 1
 - (d) -1

10. (4 points) What is the value of x at the end of the following fragment?
- ```
x=5; do x=x-2; while (x > 0);
```
- (a) 5  
(b) 3  
(c) 1  
(d) -1
11. (4 points) What is the value of  $c$  at the end of the following fragment?
- ```
c=5; i=4;
for (y=5; y <= 6; i++)
  for (;i<y;)
    c=c+1;
```
- (a) 6
(b) 5
(c) 3
(d) None of the above
12. (4 points) What is the value of x at the end of the following fragment?
- ```
a=5; b=2; x=a+b;
if ((a+b) > 0)
 {if ((2*b-a) > 0) x=a-1-3*b;}
 else x=a-1-2*b;
```
- (a) 7  
(b) 0  
(c) -2  
(d) None of the above
13. (4 points) What is the value of  $i$  after the statement below?
- ```
x=5; i= (x++ > 5) ? --x : x++;
```
- (a) 5
(b) 6
(c) 7
(d) None of the above
14. (4 points) Which of the following is an integer number?
- (a) 5.25
(b) '0'
(c) All of the above
(d) None of the above
15. (4 points) Which of the following is a valid program fragment that goes into an infinite loop? [an infinite loop is a loop that runs forever]
- (a) `for (;;) { }`
(b) `for(i=5;i<10;i++) x=5;`
(c) `while (0) x=5;`
(d) `while (!5) x=5;`

QUESTIONS 16–20 ARE ON NEXT PAGE.

16. (8 points) Consider the following program fragment. The purpose of the fragment is to compute the factorial $n!$ of a given non-negative integer n , and save it in the variable `nf`, but one crucial statement is missing in the dotted space. Write down that statement in the answer box below. [Mathematically, $n! = n(n-1)(n-2)\cdots 1$. $0! = 1$]

```
nf=1;
i=1;
while (i<=n) {
    .....
    i=i+1;
}
```

ANSWER:

17. (8 points) Consider the following program fragment. The purpose of the fragment is to swap the values of variables `x` and `y`, but one crucial statement is missing in the dotted space. Write down that statement in the answer box below.

```
....
x=y;
y=temp;
```

ANSWER:

18. (8 points) Assume that you are given the mathematical formula $\frac{a}{x} + (1-a)x + (2-\frac{a}{2})x^2 - \frac{a}{3}x^3$, the value of which you want to assign to a variable named `y`. Write down a **single C** statement below to do that. Assume that the values for a and x are kept in variables `a` and `x`, respectively.

ANSWER:

19. (8 points) Assume that you are going to assign the value 3 to the variable `x` only if the following conditions are satisfied: $0 \leq n < 5$ or $x \geq 81$. Assume that the value n is kept in the variable called `n`. Write down a **single if** statement below to do that.

ANSWER:

20. (8 points) Rewrite the following program fragment without the `switch` statement, as **one** nested `if` statement.

```
switch (c) {
    case 2 : x=x+1;
    case 3 : y=y+2; break;
    default : y=y+1;
}
```

ANSWER:

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