KATHMANDU UNIVERSITY
End Semester Examination
February / March, 2019

Marks Scored:

Level : B.E./B.Sc./B.Tech.
Year : I

Course : COMP 103
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

MAR 0 1 2019

Registration No.:

Date :

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Circle the most appropriate answer.

1. Which of the following identifiers is valid one?
   a. midterm#1 b. 5_degree c. 5degree d. avg_height

2. Which of the following is considered false in C?
   a. -45.12 b. 9.8 c. 0 d. None of the above

3. Complete the following `printf` with appropriate format specifier so it generates the output: 18.634

```
float y = 18.634219;
printf(" ",  y);
```

   a. `%18.634` b. `%f` c. `%.3f` d. `%3f`

4. Which of the following operators has left to right associativity?
   a. `+` b. `->` c. `%` d. `sizeof`

5. What is the output of the following C program?

```
#include <stdio.h>
int main(){
      int a = 5, b = 2; float c;
      c = b/2;
      printf("%f", c);
      return 0;
}
```

   a. 2.500000 b. 2.000000 c. 2.50 d. 2.00

6. Rewrite the following code using a single if statement.

```
if (day > 31)
    if (day <= 60)
        printf("February\n");
```

   a. `if (day > 31 || day <= 60) printf ("February\n");`
   b. `if (day > 31 && day <= 60) printf ("February\n");`
   c. `if (day > 31 AND day <= 60) printf ("February\n");`
   d. None of the above

7. Which of the statements is FALSE about `switch` statement?
   a. Break statement is compulsory in each case.
   b. Default statement is optional in switch statement.
   c. Floating values are not accepted in cases.
   d. Every `switch` statement can be converted into if-else statement.

8. Given the following code snippet:

```
int x, y = 20, m = 100;
scanf("%d", &x);
if (x > 0 || --y) {
      m++;
}
printf("%d %d\n", y, m);
```

What is the output if user enter **100**?

a. 20 100 b. 20 101 c. 19 100 d. 19 101

9. Consider the following code.

```
int main(){
      int i=5;
      for ( ; R ; i--){
            printf("%d\n",i);
      }
      return 0;
}
```

R in *for* loop can be replaced by following code to make it infinite loop.

a. 0 b. i> c. i>=10 d. 1

10. What will be output of the following code?

```
#include <stdio.h>
int main(){
      while ()
            printf("In while loop ");
      printf("After loop\n");
  }
```

a. In while loop
b. After loop
c. This is infinite loop
d. This program will not be compiled

11. Which loop is most suitable to first perform the operation and then test the condition?
   a. *for* loop
   b. *while* loop
   c. *do-while* loop
   d. Either *for* loop or *do-while* loop

12. Consider the following program.

```
void fun_one(){ fun_two(); putchar('1'); putchar('4'); }
void fun_two(){ putchar('2'); putchar('3'); }
void fun_three(){ fun_one(); }
void main(){
      putchar('H');
      putchar('A');
      fun_three();
      putchar('R');
      putchar('K');
}
```

if HARDWORK is the required output, you must replace 1, 2, 3, and 4 by _____ respectively.

a. R, D, W, O b. W, R, D, O c. D, R, W, O d. W, R, O, D

13. What is the built in library function to find the square of a given integer?

a. pow() b. square()
c. sqrt() d. None of the above

14. Following code is a recursive function. What will be the output if n = 5?

```
int recursion(int n){
      if(n == 1) return 5;
      else return ( recursion(n-1) + 10);
}
```

a. 5 b. 10 c. 15 d. 19

15. Which of the following statements are correct about 6 used in the program?

```
int number[6];
number[6] = 21;
```

a. In the first statement, 6 specifies a particular element, whereas in the second statement it specifies a type.
b. In the first statement, 6 specifies a size of an array number, whereas in the second statement it specifies a particular element of an array.
c. In the first statement, 6 specifies a particular element, whereas in the second statement it specifies a size of an array.
d. In both the statements 6 specifies array size.

16. What is the output of the following code?

```
int main(){
    int i;
    int Array[3] = {1};
    for (i = 0; i < 3; i++)
        printf("%d ", Array[i]);
    return 0;
}
```

a. 1 followed by 2 garbage values b. 1 0 0
c. 1 1 1 d. 0 0 0

17. Which of the following cannot be a structure member?

a. Another structure
b. Function
c. Array
d. None of the above

18. Consider the following code:

```
#include <stdio.h>
struct temp{
      int a; int b; int c;
};
int main(){
      struct temp p[] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
}
```

Which of the followings is TRUE about the above code?

a. No Compile time error, generates an array of structure of size 3
b. No Compile time error, generates an array of structure of size 9
c. Compile time error, illegal declaration of a multidimensional array
d. Compile time error, illegal assignment to members of structure

19. What is TRUE about the following code?

```
ptr = (int *)malloc(10 * sizeof(int));
```

a. *ptr* is an ordinary variable that stores integer
b. *ptr* is a pointer to integer
c. *ptr* is a pointer to structure
d. *ptr* is a pointer to malloc

20. What does the following code print?

```
#include <stdio.h>
void main(){
      char *s= "hello";
      char *p = s;
      printf("%c\t%c", *(p + 3),  s[1]);
}
```

a. he
b. ll
c. lo
d. le

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Level : B.E./B.Sc./B.Tech.
Year : I
Time : 2 hrs. 30 mins.

Course : COMP 103
Semester: I
F. M. : 40

SECTION "B"
[6 Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. What are identifiers? List out three rules for defining identifiers. [1+3]

2. What are pre-increment and post-increment operators in C? Explain how they work differently. [1+3]

3. Describe the syntax of *else-if* ladder. How does it differ with *switch* statement? Illustrate with an example. [1+1+2]

4. Describe the process you would use to replace a do -while loop with an equivalent while loop. What problem occurs when you try to replace a while loop with an equivalent do-while loop? Suppose you have been told that you must remove a while loop and replace it with a do-while. What additional control statement would you need to use and how would you use it to ensure that the resulting program behaves exactly as the original? [2+1+1]

5. Describe a syntax of *for* loop. Write a C program to find sum of integers between 9 and 300 that are divisible by 7 but not by 63. Make use of *for* loop. [1+3]

6. What do you mean by recursion? Write a recursive function with prototype that takes an integer argument *n* and returns the power of two i.e. 2^n . We shall assume that $2^0 = 1$. [1+3]

7. Write an implementation for the C function described by the following function prototype.

```
void crazy(char s[ ]);
```

/* Before the call to the function **s** is a null terminated ('\0') string of zero or more characters. After the function has been executed, lower case alphabetic character in **s** have been replaced by # and upper case alphabetic character have been replaced by &. Example: if z[ ]="c=+AB3Y4 prQ", then after crazy(z) has been executed, z[ ] will be "#=+&&3&4##&". */

[Hint: make use of functions `isupper()`, and `islower()`]

SECTION "C"
[2 Q. × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. Define Array with suitable example? How is it different from Structure? Write a C function that accepts an integer array and an integer (that denotes the actual size of the array) as its arguments and reverses the elements of the integer array. For example, if the original array was {3,1,4,2,0,5}, then it would become {5,0,2,4,1,3} upon completion of the function. You must not use any other array inside the function. [2+1+5]

9. Write set of statements to do the following: [8]

a) (3 marks) Declare a struct called ***courseRec*** with four components: (i) a *string* containing the subject code, exactly 7 characters, eg. COMP103, (ii) a *string* containing the subject title, max 30 characters, eg. Structured Programming, (iii) an *int* containing the subject credit, eg, 4, and (iv) an *int* containing the no. of students enrolled, eg. 60

b) (1 mark) Declare a variable **cRec** of the struct type declared in (a).

c) (3 marks) Read the subject code of cRec from the user. Read the student enrollment and assign 4 to the credit of cRec. Read the subject title of cRec from the user.

d) (2 marks) Print out the components of cRec, as shown in the example below:
COMP103 Structured Programming 4 60

10. Differentiate between `malloc` and `calloc` operations. Write programs to demonstrate how these two functions are used. [4 + 4]