KATHMANDU UNIVERSITY
End Semester Examination
March/April 2017

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

Registration No.:

Date : APR 0 9 2017

SECTION "A"
[20 Q. × 0.5 = 10]

Circle the most appropriate answer.

1. Which one of the following kinds of values does not have a corresponding primitive ("built-in") data type?
   a) integers
   b) floating point numbers
   c) single characters
   d) character strings

2. How many test expressions are needed to selectively execute exactly one of seven alternative statements with chain of if-else statements?
   a) 7 b) 6 c) 5 d) 4

3. Which one of the following statements is true if the return type of function **fun** is int?
   a) function **fun** does not return a value
   b) function **fun** does not work properly
   c) function **fun** has one argument with int data type
   d) function **fun** returns a value with data type int

4. Consider the following erroneous program.

```
#include<stdio.h>
void main()
{
        int *ptr;
        *ptr=2;
        printf("Address of a = %u",*ptr);
        printf("Value = %d\n",*ptr);
}
```

When compiling and running this program, you will receive segmentation fault error. What might be the reason?
   a) main function should have int not void
   b) main function shall contain return 0; statement
   c) A pointer ptr does not point any allocated memory
   d) all of the above

5. What will be the output of the following code?

```
#include <stdio.h>
void main(){
  int i;
  for(i=0;i<5;i++)
      printf("%c",'a' + i);
}
```

   a) abcde b) a0a1a2a3a4a5 c) a0a1a2a3a4 d) none of the above

6. How many bytes are required to store the string "kathmandu university"?
a) 19 b) 20 c) 21 d) 9

7. What is the output of the following code?

```
#include <stdio.h>
void f (int x){
    x = x+5;
}
void main(void){
        int x = 5;
        f(x);
        printf("%d",x);
}
```

a) 5 b) 10 c) x d) %d

8. What is the representation of the third element in an array called a?
a) a(2) b) a[2] c) a(3) d) a[3]

9. What will be printed?

```
#include <stdio.h>
int main()
{
        int array[4] = {10, 20, 30, 40};
        int *ptr = array + 3;
        printf("%d\n", ptr[-2]);
}
```

a) 10 b) 20 c) 0 d) some garbage value

10. What will be output of following C code?

```
#include<stdio.h>
int i=6;
int main(){
   do{
        printf("%d",i--);
   } while(5,4,3,2,1,0);
   return 0;
}
```

a) 543210 b) 654321 c) 6 d) 0

11. Consider the following program.

```
void fun2(){ putchar('1'); }
void fun3(){ putchar('2'); putchar('3'); fun2();}
void fun1(){ fun3(); }
void main(){
   fun1();
   putchar('C');
   putchar('E');
}
```

if **PEACE** is the required output, you must replace 1, 2, and 3 by _____ respectively.
a) P, E, and A b) E, P, and A c) A, P, and E d) P, A, and E

12. What is the built in library function to find the length of a string?
a) string_length() b) get_length() c) length() d) strlen()

13. What function is used to destroy the allocated memory space?
a) destroy() b) free() c) delete() d) deallocate()

14. Fill in the blank so that the following adds up the **odd** numbers from 1 to 99.

```
#include <stdio.h>
void main(){
   int sum = 0, num = 1;
   for (; num <=99; _____ )
       sum += num;
   printf("%d", sum);
}
```

a) num++ b) num += 2 c) num = num + odd d) num = 1 + 99

15. Following code is a recursive function. What will be the output if n = 3?

```
int recursion(int n){
    if(n == 1) return 1;
    else return ( recursion(n-1) + 2*n -1 );
}
```

a) 10 b) 3 c) 9 d) 7

16. Which of the following statements is true about do-while statement?
a) It is a looping statement similar to while loop.
b) It is similar to a while loop, except the fact that it is guaranteed to execute at least one time.
c) It is a looping statement similar to for loop.
d) None of the above.

17. Pointer is a special kind of variable which is used to store _____ of a variable.
a) value b) name c) data type d) address

18. Which of the following is a legal identifier?
a) 2three23 b) this_is_invalid c) logical_&_relational d) final exam

19. Which of the following expression does not evaluate to 3?
a) 2+16%5 b) 7 – 15/4 c) 6 * 5/10 d) none of the above

20. Given the following declarations:

```
int A[10], *ptr = A;
```

what is the difference between ++A and ++ptr?
a) ++A increments the first element of A, while ++ptr increments the pointer to the array.
b) ++A increments by sizeof(int), while ++ptr increments by 1.
c) ++A generates a compiler error, while ++ptr does not.
d) there is no difference between two expressions.

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F.M. : 40

SECTION "B"
[6 Q. × 4 = 24]

Attempt any ***SIX*** questions.

1. What do you mean by Data Types? Explain the difference between 'a' and "a" when used as constants in C. Describe the memory representation of both values. [1+1+2]

2. What is the difference between a local and global variable in C? Write a program that illustrates the use of static variable. [1+3]

3. What do you mean by pass by value? Illustrate with an example, how passing an array to function is different than passing a variable to function. [1+3]

4. Triangle Inequality Theorem simply states that the sum of two sides of a **triangle** must be greater than the third side. If this is true for all three combinations, then you will have a **valid** triangle. You'll have to go through these combinations one by one to make sure that the triangle is possible. Write a program that takes three sides of a triangle and prints whether it is valid triangle or not.

5. Two keywords that are frequently used in looping are **break** and **continue**. Write a C program that illustrates the use of these keywords.

6. Write a function called **how_many_primes_between** that takes two positive numbers as arguments. Assuming that the first argument (arg1) is less than second argument (arg2), your function shall return number of prime numbers in between arg1 and arg2. For example, when calling how_many_primes_between (3, 7) shall return 1 since there is one prime number 5 in between 3 and 7. You do not need to write a main function.

7. What are logical operators? Describe each one. Provide a C snippet that demonstrates use of ! (not-operator). [1+1.5+1.5]

SECTION "C"
[2 Q.×8=16]

Attempt any ***TWO*** questions.

8. Write a program that first takes 4 x 4 square matrix as an input from user and prints the sum of each row.
Following is the output that your program should print.

1	2	3	4	Sum = 10
5	6	7	8	Sum = 26
9	10	11	12	Sum = 42
13	14	15	16	Sum = 58

9. Create a structure called "Student" with attributes **name**, **age** and **birth_place**; name variable stores the name of a student, age stores the age of that student, and birth_place stores the name of the place where that student was born.
In main program, create an array of 10 students. Write a code to input data of 10 students from user.
In addition to that, your program should check whether any two or more students are neighbors or not. Two students are called neighbor if they have same birth place. [1+1+1+ 5]

10. Differentiate between **malloc** and **realloc** functions. Write a complete C program that illustrates the use of those functions including **free** function. [3+5]