Indian Institute of Technology, Kharagpur
Computer Science and Engineering Department

Class Test I, Autumn 2012-13
Programming & Data Structure (CS 11002)

Full marks: 30   **Feb 7, 2013**   **Time: 60 mins.**

Name	Roll No.	Section

1. Answer all questions in the space provided. No extra sheet will be provided.

2. First 10 questions carry 1 point each and the next 10 questions carry 2 points each.

1. PB-1 Which one of the following data types requires minimum storage space and which one requires the maximum storage space for representation?
`char, int, float, double`

min: `char`, max: `double`

2. PB-1 What will be displayed when the following program executes?

```
#include<stdio.h>
#define LOW 0.9876
int main() {
  int x = 100*LOW;
  printf("LOW=%f, x=%d\n", LOW, x);
  return 0;}
```

LOW=0.987600, x=98

▶ $\frac{1}{2}$ mark each.

3. PB-1 What will be displayed when the following program executes?

```
#include<stdio.h>
int main() {
  int x = 1, y=2;
  printf("%d, %d\n", x/y*100, 100*x/y);
  return 0;}
```

0, 50

▶ $\frac{1}{2}$ mark each.

1

4. PB-1 Write the unsigned binary representation for the decimal number 7.25, clearly showing the decimal point.

```
111.01
```

▶ If the whole part (111) is correctly written but the fractional part is incorrect, then $\frac{1}{2}$ mark should be awarded.

5. PB-1 What will be displayed when the following program executes?

```c
#include<stdio.h>
int main() {
  int i;
  for (i=0; i<10; i+=3)
    ;
  printf("i=%d\n",i);
  return 0;}
```

```
12
```

▶ No part marking.

6. RM-1 What will be displayed when the following instruction executes:
`printf("%d\n", 'C'-'F');`

```
-3
```

▶ No part marking.

7. RM-1 How many times will the `for` loop of the following C program execute and what will be the output of the program?

```c
main(){
int i;
for(i=10; i=20; i++)
  printf("%d, " ,i);
}
```

Infinite number of times.
Output: 20, 20, 20, ...

▶ No part marking.

8. RM-1 The following code segment contains an error. Underline the part that is erroneous and write only that part corrected in the following blank space.

```
int a=27; int b=11; int c=35;
if (a<b<c) printf("a, b, c are sorted in ascending order.\n\n");
else printf("a, b, c are not sorted in ascending order.\n");
```

```
(a<b && b<c)
```

▶ No part marking.

9. RM-1 What will be the output produced by the following program segment?

```
int x=2, y=17, z=11, result=5;
result -= x/5 * z % 13 *y / 3 * x;
printf( "%d\n", result );
```

```
5
```

10. RM-1 What will be displayed after the following code segment executes?

```
char c='r';
switch(c){
  case 'b': printf("Blue \n");
  case 'r':  printf("Red \n");
  case 'g': printf("Green \n");
  break;
  case 'y': printf("Yellow \n");
  default: printf("Other \n");
}
```

```
Red
Green
```

▶ No part marking.

11. AB-2 What will be printed after the following code segment executes?

```
int total=1, num=5;
while (num>1)
   total = total * --num;
printf ("%d\n", total);
```

```
24
```

▶ No part marking.

12. $\boxed{\text{AB-2}}$ Write the missing part of the `for statement` so that the following code segment displays the same output as in the previous question (Question 11)?

```
int total=1, num=5;

for (_____) /*write the missing code*/
  total = total * --num;
printf ("%d\n", total);
```

```
( ; num>1; )
```

▶ Extra variables should not be introduced.
One may get at most 1/2 marks out of 2 if he/she uses extra vars.

13. $\boxed{\text{PB-2}}$ What will be displayed when the following program executes?

```
#include<stdio.h>
int main() {
  int i = 1;
  int c = 'c';
  while (++i<5) {
    c++;
    printf("%c-",c+i);}
  printf("\n");
  return 0;}
```

```
f-h-j-
```

▶ 1 mark if one writes `fhg` (hyphens monitted), $1\frac{1}{2}$ marks if one writes `f-h-j` (last hyphen omitted).

14. $\boxed{\text{PB-2}}$ The following program is to first read an integer `n`. Then it has to determine the highest perfect square `s` that does not exceed `n`. Fill up the missing code parts.

```
#include<stdio.h>
int main() {
  int n, s = 1;
  printf("Enter a +ve int: ");
  scanf("%d\n",&n);

  while (_____) { /*write the missing code*/
    s++; }

  _____; /*write the missing code*/
  printf("max square <= %d = %d\n\n", n, s);
  return 0;}
```

```
(s*s<=n)
s=(s-1)*(s-1);
```

▶ 1 mark for each.

15. PB-2 For the unsigned 8-bit binary number `1010 0110`, write the equivalent decimal and hexadecimal numbers.

166, `A6`

16. RM-2 What value will be printed after the following loop executes?

```
int i,j;
for (i=j=0; i<10; i++)
  j = i++ + j;
printf("%d\n", j);
```

20

▶ No part marking.

17. RM-2 Consider the following code segment that is intended to compare the fractional parts of two floating point numbers (`num1` and `num2`) and print the one having the larger fractional part. Some parts of the program segment are missing (indicated by dotted line). Fill up the indicated missing parts.

```
float num1=12.314, num2=7.589;

if (_____ >=  _____)
    printf("Number having larger fraction is= f\n", num1);
else
    printf("Number having larger fraction is= f\n", num2);
```

```
(num1-(int)num1) >= (num2-(int)num2)
```

▶ No part marking.

18. RM-2 Determine how many times the word 'Here' will be printed.

```
count1 = 1;
while (count1 < 10) {
  count2 = 2;
  while (count2 <= 20) {
    printf("Here\n");
```

```
      count2++;
    }
    count1++;
  }
```

```
19*9=171
```

► No part marking.

19. RM-2 Write down the output of the following program.

```c
#include <stdio.h>
int main() {
  int i=3;
  printf("%d\n", (--i + 3));
  printf("%d\n", (i++ + 10));
} /* end main */
```

```
5 and 12
```

► 1 mark each.

20. RM-2 In the following code segment, if the user enters any character other than `Y` or `N`, then the program should display: `You must type Y or N (for yes or no)`. However, the program does not work as desired, as there is a mistake in the conditional expression of the `if` statement. Write the correct expression in the empty box provided.

```c
char response;
printf("Please enter your response Y/N (for yes or no)\n");
scanf("%c",&response);
if (response != 'Y' || response != 'N') /* please correct */
  printf("You must type Y or N (for yes or no)\n");
```

```
!(response == 'Y' || response == 'N')
or
(response != 'Y' && response != 'N')
```

► No part marking.