Name		**A**
Roll No.	Dept.	Section

Total **50 Marks**

Instructions:

1. This question paper contains a total of **3** pages (**6** sides of paper). Please verify.
2. Write your name, roll number, department, and section on **every sheet** of this booklet
3. Write final answers neatly with a blue/black pen in the given boxes.

Q. 1: Write **T** or **F** in the box for **True** and **False** respectively.   **(1 x 10 = 10 marks)**

For the questions given below, **a = 1, b = 2, c = 3, d = 4, e = 5** are variables of **int** type and **f = 1,000,000,000,000** is a variable of **long** type.

1.		**printf("%d", a++);** will print **1**
2.		The value of the expression **a * b * c * d * e / 2** is 48
3.		The values of the two expressions **a < b < c** and **b < a < c** are different
4.		We can use **%ld** in the format string for printing the value of the variable f
5.		**!(a && b)** and **((!a) || (!b))** will produce the same value for **a=1, b=2**
6.		**!(a && b)** and **((!a) && (!b))** will produce the same value for **a=1, b=2**
7.		It is necessary to have an **else** statement whenever writing an **if** statement
8.		It is necessary to have a **break** statement with every case in a **switch** statement
9.		The value of the expression **(a % 2) + (b % 2) + (c % 2)** is equal to **1**
10.		The value of the expression **c = ((a == 2)?(a = 3):(a == 5))** is **3**

Q. 2.1: Write the output of the following program in the box provided.   **(2 x 1 = 2 marks)**

```c
#include <stdio.h>
int main(){
    int temp = 100;
    if(102 >= temp >= 98)
         printf("FEVER");
    else if(98 <= temp <= 102)
         printf("HEALTHY");
    else printf("UNSURE");
    return 0;
}
```

Q. 2.2: <u>ONLY ONE CHOICE</u> is correct. (**Fill in the circle next to correct option**)

2.2.1. Read the following statements and answer the following question: (**2 x 4 = 8 marks**)

Given: **p, q, r** are integer variables, then for all values of **p, q, r,**

Statement ONE: value of **p + q + r** is equal to **p + (q + r)** is equal to **(p + q) + r**

Statement TWO: value of **p - q - r** is equal to **(p - q) - r** is equal to **p - (q - r)**

A.	Statement **ONE** is **TRUE**, statement **TWO** is **FALSE**
B.	Statement **ONE** is **FALSE**, statement **TWO** is **TRUE**
C.	Both statements are **TRUE**
D.	Both statements are **FALSE**

○
○
○
○

2.2.2.:   The following programs will result in what outcome (printed output/error)?

i
```c
#include <stdio.h>
int main(){
    int a = 1000000;
    int b = 1000000;
    printf("%ld", (long)(a*b));
    return 0;
}
```

A.	1000000
B.	100000000
C.	1000000000000
D.	-727379968

○
○
○
○

ii
```c
#include <stdio.h>
int main() {
    int n = 1;
    switch(n) {
        case 0: printf("zero");
        case 1: printf("one");
        case 2: printf("two"); break;
        case 3: printf("three");
    }
    return 0;
}
```

A.	one
B.	Compilation Error
C.	onetwothree
D.	onetwo

○
○
○
○

iii
```c
#include <stdio.h>
int main(){
    int a = 2, b = 0;
    if(b = 0) a += 2;
    printf("%d", a);
    return 0;
}
```

A.	2
B.	3
C.	4
D.	None of these

○
○
○
○

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Q. 3: <u>MANY CHOICES</u> may be correct. (**Fill circles next to all correct options**) **(3 x 2 = 6 marks)**

3.1. Mark all the correct options by filling in the circles next to all correct options

A.	-1 is considered as FALSE	◯
B.	1 is considered as TRUE	◯
C.	0 is considered as FALSE	◯
D.	Any positive value is considered as TRUE	◯

3.2. Which of the following variable names **are valid** in C language. Mark all that are correct

A.	_esc101	◯
B.	esc_101	◯
C.	101_esc	◯
D.	_101esc	◯
E.	esc_101?	◯
F.	+esc_101	◯

Q. 4: Correcting the program. **(5 x 2 = 10 marks)**

4.1. Find the lines which will result in <u>COMPILATION</u> errors. For such line(s), write the line no. and also a correct version in the respective columns. The corrected program should compile.

```
1:   #include<stdio.h>
2:   int main(){
3:       int 1a = 5;
4:       int b = 1
5:       3 == b;
6:       printf("%d %d", 1a, b);
7:       return 0;
8:   }
```

Line No.	Correct Version
DO NOT SUGGEST CORRECTIONS TO MORE THAN 4 LINES	

4.2. Mr. C wrote a program to calculate the slope of a line joining the two points in the X-Y plane with non-integer coordinates. However, for some pairs of points he is not able to get the correct output. Find all <u>LOGICAL and COMPILATION</u> errors in the program given below and write the line number as well as a correct version of the line in the table provided below. The corrected program must compile and give correct output on all test cases (e.g. vertical/horizontal lines etc).

```
1: #include <stdio.h>
2: #include <math.h>
3: int main(){
4:    int x1, x2, y1, y2;
5:    double slope, eps = 0.00001;
6:    scanf("%d %d", &x1, &y1);
7:    scanf("%d %d", &x2, &y2);
8:    if(fabs(x2 - x1) < eps){
9:        slope = (y2 - y1)/(x2 - x1);
10:       printf("Slope: %.4lf\n", slope);
11:   }else{
12:       if(fabs(y2 - y1) < eps)
13:           printf("Points are same\n");
14:       else
15:           printf("Infinite slope\n");
16:   }
17:    return 0;
18: }
```

Line No.	Correct Version

DO NOT SUGGEST CORRECTIONS TO MORE THAN 5 LINES

DO NOT SUGGEST CORRECTIONS TO MORE THAN 5 LINES

DO NOT SUGGEST CORRECTIONS TO MORE THAN 5 LINES

Q. 5: Fill in the blanks.   **(6 + 2 + 4 + 2 = 14 marks)**

5.1. Recall the problem THE IMPOSSIBLE SWAP where we swapped the values of two integer variables **a** and **b**, i.e. at the end of the program, the value of **a** should be in **b** and vice-versa.

In this question we have 3 variables **a, b, c**. We want to change their values such that final value of **a** should be initial value of **c**, final value of **b** should be initial value of **a** and final value of **c** should be initial value of **b**.

For e.g.: If initially **a** = 1, **b** = 2, **c** = 3 then final values should be **a** = 3, **b** = 1, **c** = 2.

```
#include <stdio.h>
int main() {
    int a = 1, b = 2, c = 3, temp;
    temp = _____;
    c = _____;
    b = _____;
    a = _____;
    printf("%d %d %d", a, b, c);
    return 0;
}
```

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5.2. Fill in the blanks to print the output in the format given here. There is one space between a and =, = and 1, 1 and %%, %% and b and so on. There are no extra spaces after 2 and 4. There is a newline after 2.

```
a = 1 %% b = 2
c = 3 %% d = 4
```

```c
#include <stdio.h>
int main(){
int a = 1, b = 2, c = 3, d = 4;
printf("_____",a,b,c,d);
return 0;
}
```

5.3. Fill in the blank table to print the output of the following program. If your output is in multiple lines, use a different row of the table to fill in different lines of the output.

```c
#include <stdio.h>
int main(){
    int a = 1, b = 2;
    if(a--) printf("ALL IS WELL\n");
    else printf("OLD IS GOLD\n");
    switch(a){
        case 0: printf("BATMAN"); break;
        case 1: printf("SUPERMAN"); break;
        case 2: printf("WONDER WOMAN"); break;
    }
    return 0;
}
```

Output:

5.4. Mr. B wrote the program **(A).** Mr. C being very smart decided to write a program **(B)** which does the same thing but using logical operators. Recall that **&&, ||** and **!** are logical operators. Complete the following program by filling the blank in the **if** statement such that the outputs of both the programs are same for various values of **a, b, c.** For example,

Input # 1: **a** = 1, **b** = 0, **c** = 1   Output # 1: < NO OUTPUT >
Input # 2: **a** = 0, **b** = 1, **c** = 1   Output # 2: THIS QUIZ ROCKS!!
Input # 3: **a** = 1, **b** = 0, **c** = 1   Output # 3: < NO OUTPUT >

A
```c
#include<stdio.h>
int main(){
    int a, b, c;
    scanf("%d %d %d", &a, &b, &c);
    if(a){
        ;
    }
    else if (b) {
        if (c) {
            printf("THIS QUIZ ROCKS!!");
        }
    }
    return 0;
}
```

B
```c
#include<stdio.h>
int main(){
    int a, b, c;
    scanf("%d %d %d", &a, &b, &c);

    if(_____){
        printf("THIS QUIZ ROCKS!!");
    }
    return 0;
}
```

Also write the output of the above program **(A)** for the following inputs. Write <NO OUTPUT> if there is no output for a given set of inputs.

INPUT	OUTPUT
a = 1, **b** = 2, **c** = - 4	
a = 0, **b** = - 1, **c** = 3	

------------------------ **END OF QUIZ** ------------------------------

SPACE FOR ROUGH WORK