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**Part A**

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**Q1.1.****Mark 1**

Which of the following are not valid variable name(s) in C language?  
\_, \_name, 100% valid, while\_for, roll-number, main, invalid

100% valid, roll-number

**Q1.2.****Mark 1**

Write the output of the following statement.

```
printf ("Values = %d %d %f %f ", 8/3*3, 2+5/2%3-1, (float) (7/2), (float)7/2 );
```

Values = 6 3 3.00 3.50

**Q1.3.****Mark 1**

Write the output of the following code statement.

```
printf ("Values = %d %o %x ", 527, 527, 527);
```

527 1017 20f

**Q1.4.****Mark 1**

Write the output of the following code statement.

```
int arr[4] = { 10,20,30,40};  
int *iptr = &arr[1];  
printf(“%d %d %d %d”, sizeof(arr), sizeof(*iptr), *(iptr+2), arr[2] - *iptr);
```

16 4 40 10

**Q1.5.****Mark 1**

Write down the function prototype for which (you can choose any name for the function)

- The return type is a double pointer
- The parameters are as follows (in order): an array of integer variables, a floating-point value, a string and an address of some integer variable

**double\* func (int arr[], float f, char\* str, int\* addr);**

**Q1.6.****Mark 1**

The declaration statement for an *array of character pointer variables with size 5* is written as: `char* arr_ptr[5];`  
Calculate the value of `sizeof (arr_ptr)` and `sizeof (*arr_ptr)`.

**sizeof (arr\_ptr) = 40 sizeof (\*arr\_ptr) = 8**

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**Part B**

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**Q2.1.****Mark 3**

Write down the output of the following code snippet (Collatz conjecture, 1937):

```
int y=12, count=0;
```

```

while (y != 1) {
    y = y%2 ? 3*y+1 : y/2 ;
    count++;
    printf("%d ", y);
}
printf("y = %d", count);           //calculate this output as your answer

```

6 3 10 5 16 8 4 2 1 y = 9

### Q2.2.

Mark 3

Write down the output of the following code snippet:

```

int x = 10;
if (x = 1)           { printf ("1st if case: %d", x); }
if (--x)             { printf ("2nd if case: %d", x); }
else if (x == 1)     { printf ("else-if case: %d", x); }
else                 { printf ("else case: %d", x); }

```

1st if case: 1 else case: 0

### Q2.3.

Mark 3

Write down the output of the following code snippet:

```

int a[] = { 4, 1, 3, 2, 3 }, i=4, j;
i = --a[i];
j = a[++a[i] ];
printf ("%d,%d,%d", a[i], a[--j], sizeof(a)); //calculate this output as your answer

```

4, 1, 20

### Q2.4.

Mark 3

Write down the output of the function call Func (2,-3):

```

void Func (int n, int m) {
    printf ("\n %d %d", n, m);           //this line will generate required output(s)
    if (n==0 && m==0) return;
    if (n>0) return Func (m, n-1);
    if (n<0) return Func (m, n+1);
}

```

2 3

3 1

1 2

2 0

0 1

### Q2.5.

Mark 3

Write down the output of the following code snippet:

```

int x = 3;
switch (x++){
    default: x = 10;
                break;
    case 3:     x -= 2;
    case 100:   if( x== 1) { x = 30; } else { x = 40; }
                break;
    case 40: ++x;
}

```

```
}  
printf("%d", x);
```

//calculate this output as your answer

40

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### Part C

#### Q3.1.

**Mark 4**

*Problem:* Check if the sum of even numbers in an array is equals to the sum of the odd numbers in an array

**Input:** An integer array.

**Output:** Yes or No

**Example:**

[10, 13, 11, 14] → Yes

[11, 25, 27] → No

[0, 20, 15, 5, 10, 11, -1] → Yes

[-11, -20, -30, 0, 11, -23, -27] → Yes

```
#include<stdio.h>
```

```
int main ()
```

```
{
```

```
    int arr[100];
```

```

int i, n;
int even_sum=0, odd_sum=0;
printf ("Enter number of elements(<=100):");
scanf("%d", &n);

if(n<1 || n>100)
{
    printf("invalid size");
    return -1;
}

for(i=0; i<n; i++)
    scanf("%d", &arr[i]);

for (i=0; i <n; i++)
    if (arr[i]%2 == 0)
        even_sum += arr[i];
    else
        odd_sum += arr[i];
if(even_sum == odd_sum)
    printf("Yes");
else
    printf("No");

return 0;
}

```

**Q3.2.****Mark 4***Problem:* Count the number of zero's in a given digit**Input:** An integer value X.**Output:** An integer**Example:**

X = 100 → 2

X = -2000 → 3

X = 124 → 0

X = -10703 → 2

**#include<stdio.h>****int main ()****{****int count, n;****printf ("Enter number:");****scanf ("%d", &n);****count=0;****while (n!=0)****{****if (n%10 == 0)****count++;****n = n/10;****}****printf ("%d", count);****return 0;****}**

**Q3.3.****Mark 4**

*Problem:* Check if the given input is part of some twin prime.

*Definition of twin prime:* Two numbers **x** and **y** are called twin primes if both x and y are individually prime numbers and the difference between **x** and **y** is exactly **2**.

**Input:** An integer value X.

**Output:** Yes or No.

**Example:**

X = 11 → Yes

X = 17 → Yes

X = 12 → No

X = 23 → No

```
#include<stdio.h>
```

```
int is_prime(int n)
```

```
{  
    int i;  
    for (i=2; i <= n/2; i++)  
        if (n%i==0)  
            return 0;  
    return 1;  
}
```

```
int main ()
```

```
{  
    int n;  
  
    printf ("Enter number:");  
    scanf("%d", &n);  
  
    if(is_prime(n))  
        if(is_prime(n-2) || is_prime(n+2))  
            printf("Yes");  
        else printf("No");  
  
    return 0;  
}
```