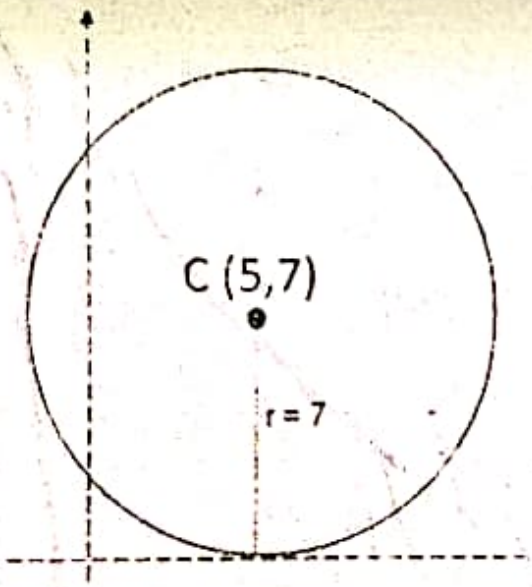
4. Write a C program to check whether a given point (X, Y) is placed inside or outside of the below rectangle.



5. Write a runnable C program according to the following algorithm.

```
Algorithm:
Average ( list, size_of_list):
{
        Sum => 0;

        For each item x in list
        begin
                Sum => Sum+x;
        end

        Avg => Sum / size_of_list ;

        return Avg;
}
```

SET A

1. Given that $f(x) = 3x^4 + 2\left(1/x^2\right) - 2$ and $g(x) = 5x^3 - 4$. Write a C program that estimates the value of $(gof)(x)$ for a given x.

2. Write a C program that reads a seller's fixed salary and the sale's total made by himself in a month. Considering that this seller receives 15% over the sale's total as bonus and needs to pay 12% tax based on the fixed salary. Write the final salary (total) of this seller with two decimal places.

3. Write a C program for the following pseudocode:

```
1.  input n
2.  print n
3.  if n = 1 then STOP
4.      if n is odd then n ⟵ 3n + 1
5.      else n ⟵ n/2
6.  GOTO 2
```

Given the input 22, the following sequence of numbers will be printed

22 11 34 17 52 26 13 40 20 10 5 16 8 4 2 1

SET B

1. Given that $f(x) = 4x^2 + 2\left({}^{1}/_{x^2}\right) - 3$ and $g(x) = 7x - 6$. Write a C program that estimates the value of $(fog)(x)$ for a given x.

2. Write a C program in Java that computes an employee's gross pay and net pay for a given hour and rate using the following formulas:

   Gross = Hours * Rate
   Net = Gross + Bonus – Tax

   The bonus is 7% of gross pay and the tax rate is 5% of gross pay.

3. Write a program that generates the below series up to an integer N and count the available odd and even numbers within this range.

   1 4 7 10 13 16 19 22 ..... N

Sample Input: 15
Sample Output:
1 4 7 10 13
Even Number Available: 2
Odd Number Available: 3

10. Mention the name of the loop that can execute at least once without satisfying the condition. 1

11. Choose the correct output for the following program: 1

```
int main()
{
    int _ = 5;
    int __ = 10;
    int ___;
    ___ = _ + __;
    printf("%i", ___);
    return 0;
}
```

A. 5
B. 10
C. 15
D. Compilation error

12. Rewrite the following code using conditional operator. 2

```
int a = 1, b = 2, ans;
if (a == 1) {
   if (b == 2) {
      ans = 3;
   } else {
      ans = 5;
   }
} else {
   ans = 0;
}
printf ("%d\n", ans);
```

13. Write the output of the following program? 2

```
#include <stdio.h>
void main ( ){
int a=10, c;
c = a++;
printf("c= %d\n", c);
c= ++a;
printf("c= %d\n", c);
c=a--;
printf("c= %d\n", c);
c = --a;
printf("c= %d\n", c);
}
```

14. Optimize the following code: 2

```
for(i=0;i<100;i++)
   if(i<50)
      a[i]=…
   else
      b[i]=…
```

15 Write the output of the following program. 1

```
void main( ) {
  char choice = 'W';
  switch(choice){
        case 'R':
          printf("RED");
        case 'W':
          printf("WHITE");
        case 'B':
          printf("BLUE");
    }
}
```

Name: Student ID:

Course Code: CSE 114 Course Title: Structured Programming Lab

Tota: 20 Marks Time: 20 minutes

[Answer all the questions. Figures in the right hand side indicates full marks.]

1. Write your name and student ID on top of the script. 1

2. Differentiate NULL and VOID. 1.5

3. Does *P++ increment P and what it points to? 1

4. What is the value of the expression 5["CHATTOGRAM"]? 1

5. A binary search algorithm begins at the _____ of a list. 1
   a) Middle b) Top c) Bottom d) Start e) End

6. Will the program given on the right side compile? Explain. 1

```
#include <stdio.h>
int main() {
   int i;
   scanf("%d", i);
   printf("%d", i);
   return 0; }
```

7. Write a C program without using a semicolon to print your name. 2

8. Write the output of the program with proper explanations? 1.5

```
#include <stdio.h>
void main ( ){
unsigned long a = 100000;
long b = -1;
if (b>a)
    printf("Yes \n");
else
    printf("No \n");
}
```

9. Write the output of the following program? 1

What will be the output of the program assuming that the array begins at the location 1002 and size of an integer is 4 bytes?

```
#include<stdio.h>
int main()
{
   int a[3][4] = { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 };
   printf("%u, %u, %u\n", a[0]+1, *(a[0]+1), *(*(a+0)+1));
   return 0;
}
```