University of Gaziantep
Department of Engineering of Physics
EP241 Final exam 10/01/11
Answer all questions. Duration 90 min.

Q1	Q2	Q3	Q4	Q5	Q6	Q7	TOTAL	out of
					xxx	xxx		100

To be completed only by the lecturer

STUDENT	**EDUCATION TYPE:**
Name :	☐ **First Education**
Surname :	☐ **Second Education**
Id no :	

[20] Question 1
Write down the output of the program given right.
Place a single character in each square.

```
#include <iostream>
#include <cmath>
#include <iomanip>
using namespace std;

#define TOL 1.0e-4

double f1(double p){ return (p*p - 25.0); }
double f2(double p){ return (2.0*p);      }

int main(){
  double x = 2.0, err;

  cout << setprecision(3) << fixed;

  do{
    err = f1(x)/f2(x);
    cout << setw(5) << x
         << setw(7) << err << endl;
    x = x - err;
    if(fabs(err)<TOL) break;
  }while(1);
}
```

[20] Question 2
Write down the output of the program given right.
Place a single character in each square.

```
#include <iostream>
#include <vector>
#include <iomanip>
using namespace std;

float step(int p){
  float h;
  switch(p){
     case 1: h = 0.50; break;
     case 2: h = 0.10; break;
     case 3: h = 0.05; break;
    default: h = 1.00;
  }
  return h;
}
int main(){
  vector<float> x(6);
  for(unsigned int j=0; j<x.size(); j++)
     x[j] = step(j)/(1+j);

  x.pop_back();
  x.insert(x.begin()+3, 0.8 );
  x.erase (x.begin()+2 );
  x.push_back(1.5);

  for(unsigned int k=0; k<x.size(); k++){
     cout << setw(3) << k << setprecision(2)
          << fixed << setw(8) << x[k] << endl;
  }
}
```

[20] Question 3

(a) Consider a file `kelvin.tmp` contains 100 lines of temperature values in Kelvin.

```
100.2
102.3
 99.4
100.0
.
.
.
101.0
101.9
 98.7
```

Write a program that reads the data from the file and outputs the mean temperature to the screen.

(b) Assume that the program is saved as `read.cpp`. Write down how to compile and run `read.cpp` under *linux operating system* using `g++` compiler.

Compile:

run:

[20] Question 4

(a) Complete the body of the function given right such that the function returns the sum of first *n* terms of the following series

`1 + 1/2 + 1/5 + 1/14 + 1/41 + ...`

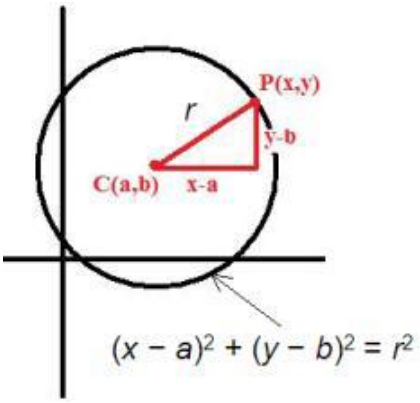
(b) write down the output of the program

```
#include <iostream>
using namespace std;

double sum(int n){
  // write your code here









}

int main()
{
  cout << sum(1) + sum(5) + sum(10) << endl;
  return 0;
}
```

[20] Question 5

In x-y plane, general equation of a circle of radius r is given by:

$$(x - a)^2 + (y - b)^2 = r^2.$$



where (a, b) is the center coordinates of the circle. Implement a `Circle` class. Each object of this class will represent a circle, storing its radius (r) and a and b coordinates of its center as doubles.

The class must include

- a default constructor function whose prototype is
  `Circle(double radius, double centerX, double centerY);`
  to set (initilize) radius and center coordinates.
- a member function named `double area()` that returns the area.
- a member function named `double circ()` that returns circumference.
- a member function named `int isin(double x, double y);`
  that returns 1 if the given point (x, y) is inside the circle and returns 0 otherwise.

Write down ONLY the class declaration and class members. NO MAIN PROGRAM IS REQUIRED.