1.

Code

```
#include<stdio.h>
#include<math.h>
#define f(x) 3*x*x-6*x+2
#define E 0.005
int main(){
  int itr=1;
 float x1,xm,xu,fx1,fxu,fxm;
printf("Assume first initial guess:\n");
scanf("%f",&x1);
printf("Assume second initial guess:\n");
scanf("%f",&xu);
fx1=f(x1);
fxu=f(xu);
 if(fx1*fxu>0)
printf("Solution doesnot exist\n");
else{
 begin:
 xm=(x1+xu)/2;
 fxm=f(xm);
 if((fx1*fxm)<0)
  xu=xm;
else{
 x1=xm;
 fx1=fxm;
}
if(fabs(xu-x1/x1)<E){
 xm=(x1+xu)/2;
 printf("\n Root =%.2f",xm);
 printf("\n functional value=%f",f(xm));
 printf("\n Iteration steps=%d",itr);
}else{
 itr++;
 goto begin;}}
 return 0;
}
```

2.

Code

```
#include<stdio.h>
#include<math.h>
float f(float x){
    return 3*x-cos(x)-1;
}
float fd(float x){
    return 3+sin(x);
}
int main(){
int itr=1;
float xi,x1,fxi,fdxi, root,e;
printf("\n Enter the initial value:");
scanf("%f",&xi);
printf("Enter tolerable error:");
scanf("%f",&e);
begin:
fxi=f(xi);
fdxi=fd(xi);
x1=xi-(fxi/fdxi);
if(fabs(x1-xi)/x1)<e){
printf("\nRoot=%f",x1);
printf("\n function value=%f", f(x1));
printf("\n Iteration steps=%d", itr);
}
else{
xi=x1;
fxi=f(x1);
itr++;
goto begin;
}
return 0;
}
```

3.

Code

```
#include<stdio.h>
#include<math.h>
#define E 0.01
float f(float x){
  return cos(x)+2*sin(x)+x*x;
}
int main(){
  int itr=1;
  float x1,x2,x3,f1,f2,f3;
  printf("Enter first initial guess:");
  scanf("%f",&x1);
  printf("Enter second initial guess:");
  scanf("%f",&x2);
   f1 = f(x1);
  f2 = f(x2);
  begin:
x3 =(f2*x1-f1*x2)/(f2-f1);
 f3=f(x3);
   if(fabs((x3-x2)/x3)<E){
 printf("\n Root = %.2f",x3);
printf("\n function value = %.4f", f(x3));
printf("\n Iteration steps = %d", itr);
  }
else{
  itr++;
  x1=x2;
  f1=f2;
  x2=x3;
  f2=f3;
 goto begin;
}
return 0;
}
```

Lab-1)
Solution of Non-linear Equations

4.

Code

```
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
#define E 0.005
float F(float x)
{
 return (x*x*x-x-5);
}
float g(float x){
   return pow((x+5),(2.0/5.0));
}
int main(){
  int itr=0;
  float x0,x1,error;
  printf("Enter the initial guess:");
  scanf("%f",&x0);
  begin:
  x1=g(x0);
  error=fabs(x1-x0)/x1)
  if(error<=E){
    printf("Root =%.3f",x1);
    printf("\n functional value: %4f", f(x1));
    printf("\n Number of steps: %d", itr);
}
 else{
   x0=x1;
   itr++;
  goto begin;
  }
 return 0;
}
```

5.

Code

```
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
#define P(x) (a[4]*x*x*x*x+a[3]*x*x*x+
              a[2]*x*x+a[1]*x+a[0])

float a[100],b[100];
int main(){
  float x;
  int n,i;
 printf("Enter degree of polynomial:\n");
 scanf("%d",&n);
 printf("Enter the coefficients from lower order to
         higher order:\n");
 for(i=n; i>=0; i--){
   scanf("%f",&a[i]);
 }
 printf("Enter the value at which polynomial to be
         evaluated:\n");
 scanf("%f",&x);
  b[n]=a[n];
  while(n>0){
    b[n-1]=a[n-1]+b[n]*x;
    n--;
 }
 printf("Value of polynomial p(%f)=%f",x,b[0]);
 return 0;
}
```