#include <stdio.h>

#include<math.h>

int main()

{

float e1,e2,emf,G,m1,m2,w,z;

int n,ch,q;

printf("Enter 1 for calculating EMF,2 for gibbs free energy and 3 for weight of substance \n");

scanf("%d",&ch);

if(ch==1)

{

printf("Enter n,m1 and m2: \n");

scanf("%d%f%f",&n,&m1,&m2);

printf("Enter e1 and e2: \n");

scanf("%f%f",&e1,&e2);

if(e1>e2)

{

emf=(e1-e2)+((0.0592/n)\*log(m1/m2));

printf("Use electrode 1 as cathode \n Use electrode 2 as anode \n");

}

else if(e2>e1)

{

emf=(e2-e1)+((0.0592/n)\*log(m2/m1));

printf("Use electrode 2 as cathode \n Use electrode 1 as anode \n");

}

else{

printf("Invalid entry");

}

}

if(ch==2)

{

printf("Enter n,m1 and m2: \n");

scanf("%d%f%f",&n,&m1,&m2);

printf("Enter e1 and e2: \n");

scanf("%f%f",&e1,&e2);

if(e1>e2)

{

emf=(e1-e2)+((0.0592/n)\*log(m1/m2));

}

else if(e2>e1)

{

emf=(e2-e1)+((0.0592/n)\*log(m2/m1));

}

G=-n\*emf\*96500;

if(G>0)

{

printf("The reaction is Non-Spontaneous \n");

}

else if(G<0)

{

printf("The reaction is Spontaneous \n");

}

else

{

printf("The reaction is in Equilibrium \n");

}

}

if(ch==3)

{

printf("Enter z and charge");

scanf("%f%d",&z,&q);

w=z\*q;

}

switch(ch)

{

case 1: printf("the emf is :%f ",emf);

break;

case 2:printf("The gibbs free energy is: %f",G);

break;

case 3: printf("The mass deposited on electrode is: %f",w);

break;

}

return 0;

}