**AIM:TO ESTABLISH T^3 LAW**

**SOURCE CODE:**

clc

clear

clf

R=8.314

thD=input("Enter Debye temperature:")

t0=1

tm=500

N=500

t=linspace(t0,tm,N)

function y=f(z)

y=(z^4\*exp(z))/((exp(z)-1)^2);

endfunction

for k=1:N

T2=thD/t(k)

I(k)=intg(0,T2,f)

Cd(k)=9\*R\*I(k)/(T2^3)

end

n=20

for j=1:n

a(j)=t(j)

b(j)=Cd(j)

al(j)=log(a(j))

bl(j)=log(Cd(j))

ab(j)=al(j)\*bl(j)

end

sa=0;sb=0;sa2=0;sab=0

for j=1:n

sa=sa+al(j)

sb=sb+bl(j)

sa2=sa2+al(j)^2

sab=sab+ab(j)

end

plog=(sa2\*sb-sa\*sab)/((n\*sa2)-sa^2)

B=(n\*sab-sa\*sb)/((n\*sa2)-sa^2)

A=%e^plog

disp("For Debye temperature="+string(thD)+"K")

disp("For low temperatures(from"+string(a(1))+"K to"+string(a(n))+"K)")

disp("Molar heat capacity Cv="+string(A)+"\*(T^"+string(B)+")")

plot2d(a,b,-3)

b2=A.\*(a.^B)

plot2d(a,b2,2)

legends(["Debye","T^3 law"],[-3,2],"ur")

xlabel("T(K)","fontsize",3)

ylabel(" Specific heat","fontsize",3)

title("T^3 LAW","fontsize","5")

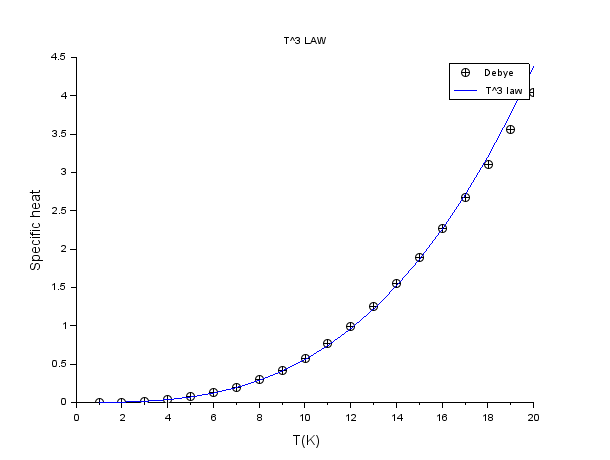
**OUTPUT:**

Enter Debye temperature:150

For Debye temperature=150K

For low temperatures(from1K to20K)

Molar heat capacity Cv=0.0005978\*(T^2.9712071)

****