(1) Calculate the change in entropy when I kg of "ice at o'c is converted into water, of the Some deseparature. (Lof ice = 0.336 ×1016 3kg1 Sol: we know that , S-S, =(L/T) L= 0.336 x 106 J kg-1  $= \frac{0.336 \times 10^6}{4.2} \text{ cal } \text{ kg}^{-1}$ = 0.336 ×106 4-2×1000 Glg-1 L = 80 Gl g-1  $S_2 - S_1 = \frac{80}{273}$ = 0.2930 Cal/k So, increase in entropy for 1 kg (= 1000g) = 1000×0-2930 = 293 Cal/k.

10-1

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1) The efficiency of a Count's engine is 60%. Colculate the increase in the Temperature of the Source so that the efficiency below to/. sel: we know that  $\eta = 1 - \frac{T_2}{T}$ T, is Temp of source. The temp of sink  $\eta = \frac{60}{100} = 0.6$ , then 0.6 = 1-12 Then To = (1-0.6) T, T2 = 0-4 T1 Pricales ing efficiency is 70%. then source of the be increased from T, to (T, +x) 0.7 = 1- 12 (T+X) T2 = 1-0.7

Share 
$$T_2 = 0.3$$

Ushare  $T_2 = 0.4T$ , then substituting above

Countries

 $0.4T_1 = 0.3$ 
 $0.4T_1 = 0.3$ 
 $0.4T_1 = 0.3T_1 + 0.3 \times 0.4T_1 = 0.3T_1 + 0.3 \times 0.4T_1 = 0.3 \times 0.3 \times 0.1 = 0.3 \times 0.3 \times 0.3 \times 0.1 = 0.3 \times 0.3 \times 0.3 \times 0.1 = 0.3 \times 0$ 

In second efficiency 
$$\frac{50}{100} = 1$$
 $0.5 = 1 - (\overline{12} - 50)$ 

Subtracting Substituting  $\frac{50}{100} = 1$ 
 $0.5 - 0.25 = 1 - (\overline{12} - 50) - 1 + \frac{71}{71}$ 
 $0.25 = (\overline{12} - 50) + \frac{72}{71}$ 
 $= -\frac{72 + 50}{71} + \frac{72}{71}$ 
 $= -\frac$ 

The efficiency of a Gomot's Engine Gick is

$$T_{2} = 150^{\circ}\text{C}$$

The efficiency of a Gomot's Engine Gick is

If an exclusing the Temp of sink is 65 %

We efficiently becomes  $y_{3}$  find the state Temp

of souther and sink

of souther and sink

of  $y_{3} = 1 - \frac{1}{11}$ 

The first ase

 $y_{3} = 1 - \frac{1}{6}$ 
 $y_{4} = 1 - \frac{1}{6}$ 
 $y_{5} = 1 - \frac{1}{6}$ 
 $y_{7} = 1 - \frac{1}{6}$ 
 $y_{7} = 1 - \frac{1}{6}$ 

Now decreasing the sink Temp at 65°C

Now decreasing the sink Temp at 65°C

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$$= (t_{2} + 2 + 3) - 65$$

$$= T_{2} - 65 + \text{then}$$

$$NOW (ficional)$$

$$N = 1 - \frac{T_{2} - 65}{T_{1}} = \frac{1}{3}$$

$$\frac{T_{2} - 65}{T_{1}} = \frac{3 - 1}{3}$$

$$\frac{T_{2} - 65}{T_{1}} = \frac{2 + 3}{3}$$

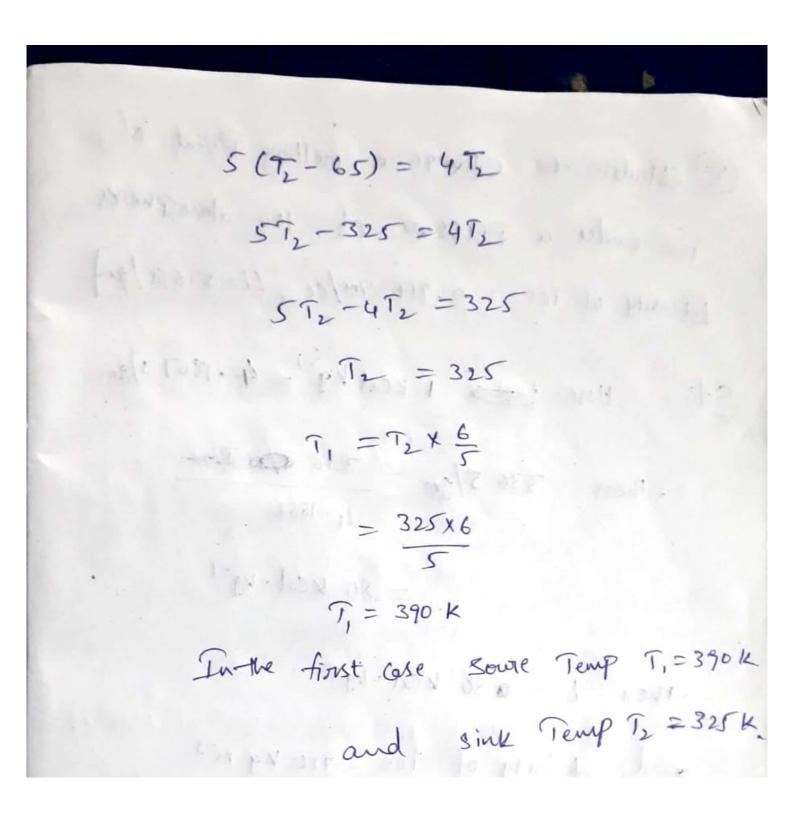
$$\frac{T_{2} - 65}{T_{1}} = \frac{2 + 3}{3}$$

$$\frac{T_{2} - 65}{T_{1}} = \frac{2 + 3}{3}$$

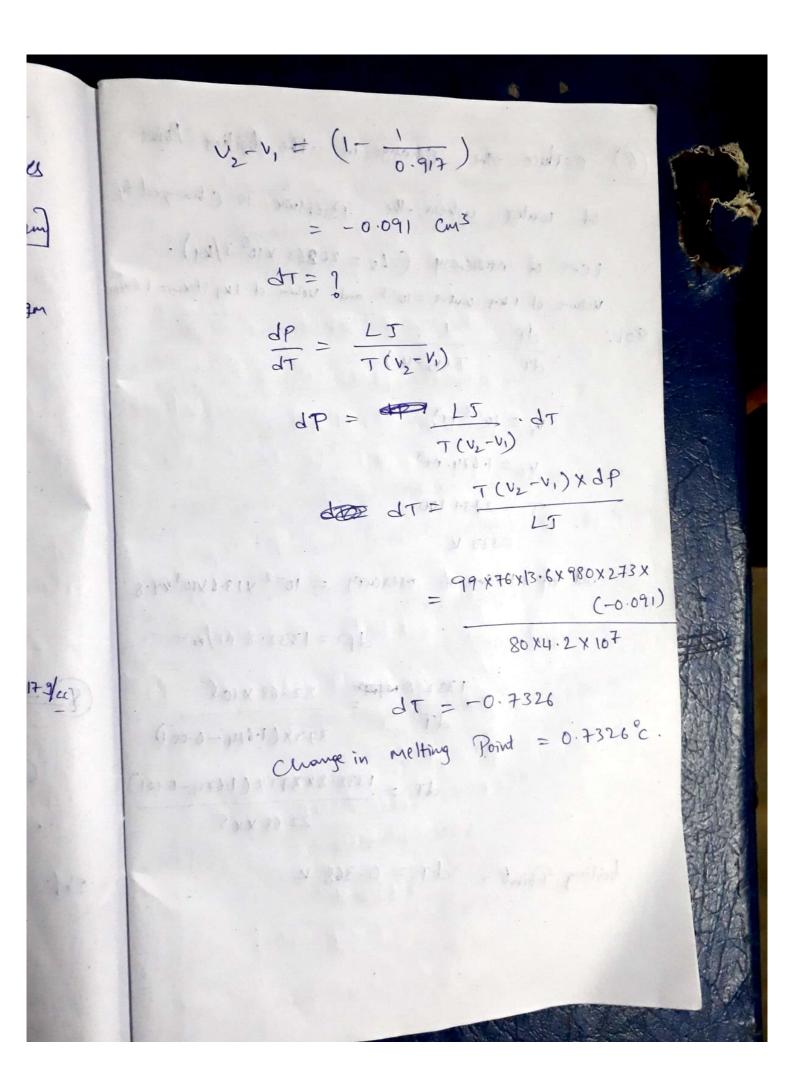
$$\frac{T_{2} - 65}{T_{1}} = \frac{4}{3} \times \frac{12}{5}$$

$$\frac{T_{2} - 65}{T_{2}} = \frac{4}{5} \times \frac{12}{5}$$

$$T_{2} - 65 = \frac{4}{5} \times \frac{12}{5}$$



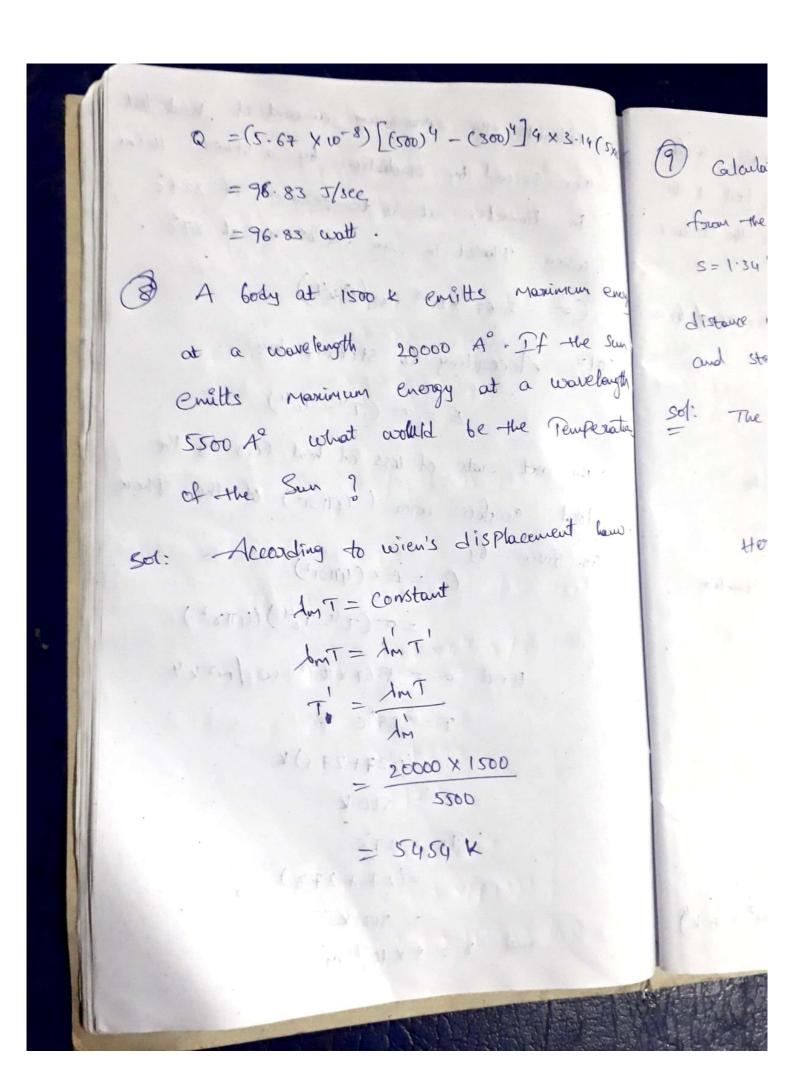
(5) Calculate the change in melting Point of ice under a Bresswie of 100 atmospheres Density of ice = 0.917 gm/cc, Li=336 J/gm Sol: Here 1 kcal kg-1 = 4.1867 J/gm then 336 3/gm = 336 1 4 - 1867 = 80 Kcal·kg-1 then L = @ 80 kCal·kg-1 and density of ice = 920 kg m<sup>-3</sup> ρ = 0.917 9/cc T = 273 k, L = 80 kcal. kg-1, and then density of ice = 920 kg m<sup>-3</sup>. dP = (100-) =99 =99 x 76 x 13-6 x980 dyne/cm2  $V_2 = 1$   $V_1 = \frac{1}{9} = \frac{1}{0.917}$ 



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B) Deduce the change in the boiling Point of water when the Pressure is Changed 1 cm of mesicony ( Ls = 20268 × 106 5/kg). Volume of 1 kg water = 10-3, and volume of 1 kg stoream=1.  $\frac{dP}{dT} = \frac{L}{T(v_2 - v_i)}$ 10, = 10-3 m3 76 x 02=1.674 m3 T = 243 + 100= 373 K and dp=1 cm of mercury = 10-2 x13.6 x103 x9.4 dp=1332.8 N/m2 FOIX ST. DX 107 1332-8 MART 22.68 × 105 dt 373×(1.674-373×(1.674-0.00) . 3° 0 SV 1.0 = total pollers wie dT = 1332.8x373x(1.674-0.60) 22.68 × 105 boiling Point. dT = 0.368 K.

(2) Calculate the maximum amount of heat lost Per second by Tradiation by a sphere 10 cm in diameter at a temperature of 227°C when Placed in an enclosure at 27°c. (==5.67 ×10-8 w/m2 ×4) According to stefan's law  $E = - (T4 - T_04)$ The net mate of loss of heat (Q) by the total scorface area (4TT912) of the sphere is given by Q = Ex (4TT or 2) = o (T4\_To4) (4TT82) Here = 5.67 × 10-8 w/m2ky T=227°C =(227+273) L -1088 = 500 K To = 27°C =(27+273) and 8 = 5 × 10 - 2 m



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