Question:

When 20 g of $CaCO_3$ were put into 10 litre flask & heated to 800 degree Celsius, 30% of $CaCO_3$ remained unreacted at equilibrium . Kp for decomposition of $CaCO_3$ will be?
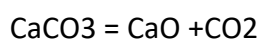
Ans given is 1.231. Please explain.

Solution:

$n(CaCO_3) = m/M = 20/100 = 0.2$ mol;

$T = 800+273 = 1073$ K;

$R = 0.082$ atm/(mol*K);

V=10 L;

n(unreacted) = 0.2 *0.3 = 0.06 mol;

$CaCO_3 = CaO + CO_2$

0.2   0   0

0.14   0.14   0.14

0.06   0.14   0.14

$Kp = pCO_2$;

$Kp = nRT/V = 0.14*0.082*1073/10 = 1.231$

Answer: 1.231