VII. Calculate the heat of formation of HCl at 348K from the following data. (7½)

$\frac{1}{2}H_{2(g)} + \frac{1}{2}Cl_2(g) \rightarrow HCl$; $\Delta H^0_{298} = -22060$ cal

The mean heat capacities over this temperature range are

$H_{2(g)}$; $C_p = 6.82$ cal/mole/degree

$Cl_{2(g)}$; $C_p = 7.71$ cal/mol/degree

$HCl_{(g)}$; $C_p = 6.81$ cal/mol/degree

VIII. Write down the preparation, properties and applications of any three industrial polymers. (7½)

OR

IX. (a) What are lubricants? List any four properties of lubricants. (4)

(b) Discuss thick-film lubrication mechanism. (3½)

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