JEE previous year questions:

Chemical Thermodynamics -III

1. 200 mL of 0.2 M HCl is mixed with 300 mL of 0.1 M NaOH. The molar heat of neutralization of this reaction is −57.1 kJ. The increase in temperature in °C of the system on mixing is $x \times 10^{-2}$. The value of x is _____. (Nearest integer)
   [Assume no volume change on mixing] (JEE Mains'21)

Ans: 82

Explanation:

Millimoles of HCl = 200 × 0.2 = 40
Millimoles of NaOH = 300 × 0.1 = 30
Heat released = (301000×57.1×1000) = 1713 J
Mass of solution = 500 ml × 1 gm/ml = 500 gm

$\Delta T = q/(m \times c) = 1713J/(500g \times 4.18Jg^{-}K) = 0.8196$ K

$= 81.96 \times 10^{-2}$ K