

Chemical Thermodynamics-II

JEE Previous year questions

1. A piston filled with 0.04 mol of an ideal gas expands reversibly from 50.0 mL to 375 mL at a constant temperature of 37.0 °C. As it does so, it absorbs 208 J of heat. The values of q and w for the process will be: ($R = 8.314 \text{ J/mol K}$) ($\ln 7.5 = 2.01$) (JEE,2013)

a) $q = -208 \text{ J}$, $w = -208 \text{ J}$

b) $q = -208 \text{ J}$, $w = +208 \text{ J}$

c) $q = +208 \text{ J}$, $w = +208 \text{ J}$

d) $q = +208 \text{ J}$, $w = -208 \text{ J}$

Solutions:

1. By 1st law of thermodynamics, $q = \Delta U - W$

At constant T, $\Delta U = 0$ $q = -W$

Heat absorbed = 208 J

$$\therefore q = +208 \text{ J} \quad W = -208 \text{ J}$$