For Question No. 159 – 164

(A) Statement-I is True, Statement-II is True and Statement-II is a correct explanation for Statement-I.

(B) Statement-I is True, Statement-II is True and Statement-II is NOT a correct explanation for Statement-I.

(C) Statement-I is True, Statement-II is False.

(D) Statement-I is False, Statement-II is True.

159. **Statement : I** Heat of neutralization for both HNO_3 and HCl with NaOH is –57.3 kJ per mol^{-1}.

   Statement : II NaOH is a strong electrolyte/base.

160. **Statement : I** The heat of neutralization of perchloric acid, $HClO_4$, with NaOH is same as that of HCl with NaOH.

   Statement : II Both HCl and $HClO_4$ are strong acids.

161. **Statement : I** The heat of ionization of water is equal of the heat of neutralization of strong acid with a strong base.

   Statement : II Water ionizes to a very small extent while H^+ ions from an acid combine very rapidly with OH^- from a base to from H_2O,

162. **Statement : I** The enthalpy of formation of HCl is equal to the bond energy of HCl.

   Statement : II The enthalpy of formation and the bond energy both involve formation of one mole of HCl from the elements.

163. An initial mixture of Fe_2O_3 and Al is used in solid rocket fuel. Calculate the fuel value per gram and per ml of mixture. $\Delta H_{Al_2O_3}$ = 399.0 kcal, $\Delta H_{Fe_2O_3}$ = 199.0 kcal, density of Fe_2O_3 and Al are 5.2 g/ml and 2.7 g/ml respectively.

   (A) 0.9436 Kcal/g ; 3.94 Kcal/ml   **(B)** 0.82 Kcal/g ; 4.9 Kcal/ml

   (C) 0.792 Kcal/g ; 7.8 Kcal/ml   **(D)** 0.98 Kcal/g ; 3.16 Kcal/ml

164. The heats of formation of PCl_3 and PH_3 are 306 kJ $mole^{-1}$ and +8 kJ $mole^{-1}$ respectively and the heats of atomization of phosphorus, chlorine and hydrogen are given by

   $P_{(s)} \rightarrow P_{(g)}$ ΔH = 314 kJ $mole^{-1}$

   $Cl_2(g) \rightarrow 2Cl_g$ ΔH = 242 kJ $mole^{-1}$

   $H_2(g) \rightarrow 2H_g$ ΔH = 433 kJ $mole^{-1}$

   Calculate E_{P-Cl} and E_{P-H}.

   (A) 328, 319.33 kJ mol^{-1} **(B)** 396, 325 kJ mol^{-1}

   (C) 381, 320 kJ mol^{-1} **(D)** 359, 386 kJ mol^{-1}