Date Planned : __ / __ / __	Daily Tutorial Sheet-10	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-2	Exact Duration :_____

116. If ΔH_f° of $N_2O = 82\,kJ/mol$. Bond energy of $N \equiv N$, $N = N$, $O = O$ and $N = O$ bonds is 946, 148, 498 and 607 kJ/mol respectively, then the resonance energy of N_2O will be :

(A) $-88\ kJ\ mol^{-1}$ **(B)** $-178\ kJ\,mol^{-1}$ **(C)** $-252\,kJ\,mol^{-1}$ **(D)** $-36\,kJ\ mol^{-1}$

117. When a certain amount of ethylene was combusted, 6226 kJ heat was evolved. If heat of combustion of ethylene is 1411 kJ, the volume of O_2 (at NTP) that entered into the reaction is

(A) 296.5 mL **(B)** 296.5 litre

(C) 6226×22.4 litre **(D)** 22.4 litre

***118.** For which of the following reaction $\Delta H^\circ_{reaction}$ is not equal to ΔH_f° of product ?

(A) $2CO(g) + O_2(g) \longrightarrow 2CO_2(g)$ **(B)** $N_2(g) + O_3(g) \longrightarrow N_2O_3(g)$

(C) $CH_4(g) + 2Cl_2(g) \longrightarrow CH_2Cl_2(\ell) + 2HCl(g)$

(D) $Xe(g) + 2F_2(g) \longrightarrow XeF_4(g)$

119. The enthalpy of hydrogenation for 1-pentene is +126 kJ/mol. The enthalpy of hydrogenation for 1, 3-pentadiene is +230 kJ/mole. Hence estimate the resonance energy of 1, 3-pentadiene.

(A) –22 kJ **(B)** –104 kJ

(C) –252 kJ **(D)** cannot be calculated from this information

120. A 1 L sample of CH_4 and O_2 measured at 25°C and 740 torr were allowed to react at constant pressure in calorimeter which together with its contents had a heat capacity of 1260 cals/K. The complete combustion of CH_4 to CO_2 and H_2O caused a temperature rise in calorimeter 0.667 K. What was the mole per cent of CH_4 in the original mixture? (ΔH) combustion of $CH_4(g) = -210.8$ kcals/mole.

(A) 15% **(B)** 10% **(C)** 18% **(D)** 21%

121. The commercial production of water gas utilizes the reaction under standard conditions: $C + H_2O(g) \longrightarrow H_2 + CO$. The heat required for this endothermic reaction may be supplied by adding a limited amount of air and burning some carbon to CO_2. How many grams of carbon must be burnt to CO_2 to provide enough heat for the water gas conversion of 100g carbon. Neglect all heat losses to environment. ΔH_f^o of CO, $H_2O(g)$ and $CO_2(g)$ are –110.53, –241.81 and –393.51 kJ/mol respectively.

(A) 30.5 g **(B)** 39.7g **(C)** 33.36g **(D)** 42.5 g

122. Calculate heat of neutralization from following data.
200 ml of 1 M HCl is mixed with 400 ml of 0.5 M NaOH and the temperature rise in calorimeter was found to be 4.4°C. Water equivalent of calorimeter is 12 g and specific heat is 1 cal ml^{-1} $degree^{-1}$ for solution.

(A) –13.464 Kcal **(B)** –12.02 Kcal **(C)** –15.262 Kcal **(D)** –20.92 Kcal

123. A cylinder of gas is assumed to contain 11.2 kg butane. If a normal family needs 20,000 kJ of energy per day for cooking, how long will the cylinder last if the enthalpy of combustion $\Delta H = -2658$ kJ for butane?

(A) 25.66 days **(B)** 31 days **(C)** 28.5 days **(D)** 22.0 days

124. The heat of combustion of glycogen is about 476 kJ/mole of carbon. Assume that average rate of heat loss by an adult male is 150 watt. If we were to assume that all the heat comes from oxidation of glycogen, how many units of glycogen (1 mole carbon per unit) must be oxidized per day to provide for this heat loss?

(A) 29.6 units **(B)** 27.22 units

(C) 25.9 units **(D)** 21.8 units

125. The following equilibrium in a saturated solution of NH_4Cl.

$$NH_4Cl(s) \rightleftharpoons NH_4^+(aq) + Cl^-(aq) \qquad \Delta H_{25^\circ C} = 3.5 \text{ K cal mol}^{-1}$$

A change that will shift the equilibrium to the right is :

(A) Increase in temperature **(B)** Decrease in temperature

(C) Addition of NH_4Cl crystals **(D)** Addition of NH_4OH solution