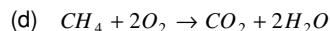


Thermochemistry Assignment

- In thermodynamics, a process is called reversible when
 - Surroundings and system change into each other
 - There is no boundary between system and surroundings
 - The surroundings are always in equilibrium with the system
 - The system changes into the surroundings spontaneously
- Energy equivalent to one erg, one joule and one calorie is in the order
 - $1\text{erg} > 1\text{joule} > 1\text{calorie}$
 - $1\text{erg} > 1\text{calorie} > 1\text{joule}$
 - $1\text{calorie} > 1\text{joule} > 1\text{erg}$
 - $1\text{joule} > 1\text{calorie} > 1\text{erg}$
- In an isobaric process ratio of heat supplied to the system (dQ) and work done by the system (dW) for diatomic gas is
 - 1 : 1
 - 7 : 2
 - 7 : 5
 - 5 : 7
- Out of P , V and T
 - P and V are independent variables and T is dependent variable
 - P and V are independent variables
 - P and T are independent variables and V is dependent variable
 - None of these
- Zeroth law is connected with
 - Thermodynamic equilibrium
 - Isothermal process
 - Heterogeneous system
 - None of these
- Which is not state function
 - q
 - H
 - E
 - G
- For the reaction, $\text{CH}_3\text{COOH}(l) + 2\text{O}_2(g) \rightleftharpoons 2\text{CO}_2(g) + 2\text{H}_2\text{O}(l)$ at 25°C and 1 atm pressure, $\Delta H = -874\text{ kJ}$. Then the change in internal energy (ΔE) is
 - -874 kJ
 - -871.53 kJ
 - -876.47 kJ
 - $+874\text{ kJ}$
- First law of thermodynamics does not show
 - Flow of light
 - Change in ice water to liquid water
 - Process of engine
 - All of these
- The work done to contract a gas in a cylinder, is 462 Joules , 128 Joule energy is evolved in the process. What will be the internal energy change in the process
 - $+590\text{ Joules}$
 - -334 Joules
 - $+334\text{ Joules}$
 - -590 Joules
- According to Hess's law, the heat of reaction depends upon
 - Initial condition of reactants
 - Initial and final conditions of reactants
 - Intermediate path of the reaction
 - End conditions of reactants
- Calculate the work done during isothermal expansion of one mole of an ideal gas from 10 atm to 1 atm at 300K
 - -1382 cal
 - -1382 Joule
 - -13.82 cal
 - -1.382 cal
- Find out the energy which is supplied to Carnot cycle if it is working between 95° to 15°C . Maximum work of this engine is 214 cal .
 - 984.4 cal
 - 982.2 cal
 - 980.2 cal
 - 978.2 cal
- The volume of a gas decreases from 500 cc to 300 cc when a sample of gas is compressed by an average pressure of 0.6 atm . During this process 10 J of heat is liberated. The change in internal energy is
 - -2.16 J
 - 12.56 J
 - 2.16 J
 - 101.3 J
- Ozone is prepared by passing silent electric discharge through oxygen. In this reaction
 - Energy is given out
 - Energy is absorbed
 - Oxygen is loaded with energy
 - Oxygen is dissociated into atoms
- Which of the following statements is correct about heat of combustion
 - It may be exothermic in some cases and endothermic in other cases
 - It is applicable to gaseous substances only
 - It is always an exothermic reaction
 - Its value does not change with temperature
- Which of the following is an endothermic reaction
 - $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
 - $\text{N}_2 + \text{O}_2 \rightarrow 2\text{NO}$
 - $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$
 - $3\text{O}_2 + \text{C}_2\text{H}_5\text{OH} \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$
- Which of the following reaction is endothermic
 - $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
 - $\text{Fe} + \text{S} \rightarrow \text{FeS}$

GRAVITY CLASSES

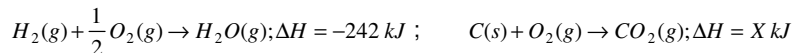
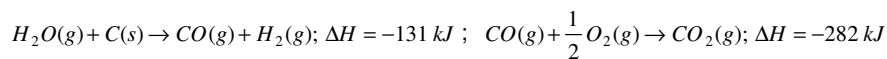


18. The equation $\frac{1}{2}\text{H}_2 + \frac{1}{2}\text{Cl}_2 \rightarrow \text{HCl}$ ($\Delta H_{298} = -22060 \text{ kcal}$) means
- The heat absorbed when one gram molecule of HCl is formed from its elements at 25°C is 22.060 kcal
 - The heat given out when one gram molecule of HCl is formed from its elements at 298 K is 22.060 kcal
 - The heat absorbed when one atom of hydrogen reacts with one atom of chlorine to form one molecule of HCl at 25°C and one atmosphere pressure is 22.060 kcal
 - The heat absorbed when one gram equivalent of HCl is formed from its elements at 298 K is 22.060 kcal
 - The intrinsic heat of one molecule of HCl is 22.060 kcal more than the intrinsic heats of one atom of hydrogen and one atom of chlorine
19. (I) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
 (II) $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$ (III) $\text{NH}_4\text{Cl} \rightarrow \text{NH}_3 + \text{HCl}$
 Which is endothermic process
- I
 - II
 - III
 - None of these
20. Ionisation process and formation process are called
- Endothermic, exothermic process
 - Endothermic process
 - Exothermic process
 - None of these
21. Which of the following is not an endothermic reaction
- $\text{C}_2\text{H}_6 + \frac{7}{2}\text{O}_2 \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$
 - $\text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \frac{1}{2}\text{O}_2$
 - $\text{C}_2\text{H}_6 \rightarrow \text{C}_2\text{H}_4 + \text{H}_2$
 - All of these
22. Evaporation of water is
- An endothermic change
 - An exothermic change
 - A process where no heat change occurs
 - A process accompanied by chemical reaction
23. The total entropy change for a system and its surroundings increases if the process is
- Reversible
 - Irreversible
 - Exothermic
 - Endothermic
24. Enthalpy of formation of two compounds x and y are -84 kJ and -156 kJ respectively. Which of the following statements is correct
- x is more stable than y
 - x is less stable than y
 - Both x and y are unstable
 - x and y are endothermic compounds
25. If $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$; ($\Delta H = -298.2$)
 $\text{SO}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{SO}_3$; ($\Delta H = -98.2$)
 $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$; ($\Delta H = -130.2$)
 $\text{H}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{H}_2\text{O}$; ($\Delta H = -287.3$)
 then the enthalpy of formation of H_2SO_4 at 298 K will be
- -433.7 kJ
 - -650.3 kJ
 - $+320.5 \text{ kJ}$
 - -813.9 kJ
26. The heat evolved in the combustion of benzene is given by $\text{C}_6\text{H}_6 + 7\frac{1}{2}\text{O}_2 \rightarrow 6\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l})$; $\Delta H = -3264.6 \text{ kJ}$ Which of the following quantities of heat energy will be evolved when 39 g C_6H_6 are burnt
- 816.15 kJ
 - 1632.3 kJ
 - 6528.2 kJ
 - 2448.45 kJ
27. The standard molar heat of formation of ethane, CO_2 and water (l) are respectively -21.1 , -94.1 and -68.3 kcal . The standard molar heat of combustion of ethane will be
- -372 kcal
 - 162 kcal
 - -240 kcal
 - 183.5 kcal
28. Which is the best definition of "heat of neutralization"
- The heat set free when one gram molecule of a base is neutralized by one gram molecule of an acid in dilute solution at a stated temperature
 - The heat absorbed when one gram molecule of an acid is neutralized by one gram molecule of a base in dilute solution at a stated temperature
 - The heat set free or absorbed when one gram atom of an acid is neutralized by one gram atom of a base at a stated temperature
 - The heat set free or absorbed when a normal solution containing one gram equivalent of an acid is neutralized by a normal solution containing one gram equivalent of a base at a stated temperature

GRAVITY CLASSES

- (e) The heat set free when one gram equivalent of an acid is neutralized by one gram equivalent of a base in dilute solution at a stated temperature
29. One of the phenomena which cannot be described as combustion is
 (a) Oxidation of coal in air (b) Burning of magnesium in nitrogen
 (c) Reaction of antimony in chlorine (d) Lighting of an electric lamp
30. Which of the following fuels will have the highest calorific value (kJ/kg)
 (a) Charcoal (b) Kerosene (c) Wood (d) Dung
31. Which of the following fuels will have the highest calorific value (kJ/kg)
 (a) H_2 (b) C_2 (c) CH_4 (d) Kerosene
32. The heat content of a system is called
 (a) Internal energy (b) Entropy (c) Free energy (d) Enthalpy
33. Heat of reaction at constant volume is measured in the apparatus
 (a) Bomb calorimeter (b) Calorimeter (c) Pyknometer (d) Pyrometer
34. Conditions of standard state used in thermochemistry is
 (a) 0°C and 1 atm (b) 20°C and 1 atm (c) 25°C and 1 atm (d) 0 K and 1 atm
35. A Beckmann thermometer is used to measure
 (a) High temperature (b) Low temperature (c) Normal temperature (d) All temperature
36. Compounds with high heat of formation are less stable because
 (a) High temperature is required to synthesize them (b) Molecules of such compounds are distorted
 (c) It is difficult to synthesis them (d) Energy rich state leads to instability
37. The first ionization energy for Li is 5.4 eV and electron affinity of Cl is 3.61 eV . The ΔH (in kJ/mol) for the reaction $\text{Li(g)} + \text{Cl(g)} \rightarrow \text{Li}^+ + \text{Cl}^-$ is (if resulting ions do not combine with each other) ($1\text{ eV} = 1.6 \times 10^{-19}\text{ J}$)
 (a) 70 (b) 100 (c) 170 (d) 270
38. Heat of neutralisation for the given reaction $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ is 57.1 kJ mol^{-1} . What will be the heat released when 0.25 mole of NaOH is titrated against 0.25 mole of HCl
 (a) 22.5 kJ mol^{-1} (b) 57.1 kJ mol^{-1} (c) 14.3 kJ mol^{-1} (d) 28.6 kJ mol^{-1}
39. The enthalpies of the elements in their standard states are assumed to be
 (a) Zero at 298 K (b) Unit at 298 K (c) Zero at all temperatures (d) Zero at 273 K
40. $\text{H}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{H}_2\text{O}; \Delta H = -68.39\text{ kcal}$
 $\text{K} + \text{H}_2\text{O} + \text{Water} \rightarrow \text{KOH(aq)} + \frac{1}{2}\text{H}_2; \Delta H = -48\text{ kcal}$
 $\text{KOH} + \text{Water} \rightarrow \text{KOH(aq)}; \Delta H = -14\text{ kcal}$
 The heat of formation of KOH is (in kcal)
 (a) $-68.39 + 48 - 14$ (b) $-68.39 - 48 + 14$ (c) $68.39 - 48 + 14$ (d) $68.39 + 48 + 14$
41. Equal volumes of methanoic acid and sodium hydroxide are mixed. If x is the heat of formation of water, then heat evolved on neutralisation is
 (a) More than x (b) Equal to x (c) Twice of x (d) Less than x
42. In the reaction for the transition of carbon in the diamond form to carbon in the graphite form, ΔH is -453.5 cal . This points out that
 (a) Graphite is chemically different from diamond (b) Graphite is as stable as diamond
 (c) Graphite is more stable than diamond (d) Diamond is more stable than graphite
43. The difference between heats of reaction at constant pressure and at constant volume for the reaction $2\text{C}_6\text{H}_6(\text{l}) + 15\text{O}_2(\text{g}) \rightarrow 12\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$ at 25°C in kJ is
 (a) -7.43 (b) $+3.72$ (c) -3.72 (d) $+7.43$
44. Which of the following equations correctly represents the standard heat of formation (ΔH_f°) of methane
 (a) $\text{C(diamond)} + 2\text{H}_2(\text{g}) = \text{CH}_4(\text{g})$ (b) $\text{C(graphite)} + 2\text{H}_2(\text{g}) = \text{CH}_4(\text{l})$
 (c) $\text{C(graphite)} + 2\text{H}_2(\text{g}) = \text{CH}_4(\text{g})$ (d) $\text{C(graphite)} + 4\text{H} = \text{CH}_4(\text{g})$
45. Values of heats of formation for SiO_2 and MgO are -48.4 and -34.7 kJ respectively. The heat of the reaction $2\text{Mg} + \text{SiO}_2 \rightarrow 2\text{MgO} + \text{Si}$ is
 (a) 21.16 kJ (b) -21.10 kJ (c) -13.62 kJ (d) 13.6 kJ
46. Based on the following thermochemical equations

GRAVITY CLASSES



The value of X is

- (a) -393 kJ (b) -655 kJ (c) $+393 \text{ kJ}$ (d) $+655 \text{ kJ}$
47. For the allotropic change represented by equation $C(\text{diamond}) \rightarrow C(\text{graphite})$; the enthalpy change is $\Delta H = -1.89 \text{ kJ}$. If 6 g of diamond and 6 g of graphite are separately burnt to yield carbon dioxide, the heat liberated in the first case is
- (a) Less than in the second case by 1.89 kJ (b) More than in the second case by 1.89 kJ
(c) Less than in the second case by 11.34 kJ (d) More than in the second case by 0.945 kJ
48. If enthalpies of formation of $C_2H_4(g)$, $CO_2(g)$ and $H_2O(l)$ at $25^\circ C$ and 1 atm pressure be 52, -394 and -286 kJ mol^{-1} respectively, the enthalpy of combustion of $C_2H_4(g)$ will be
- (a) $+1412 \text{ kJ mol}^{-1}$ (b) $-1412 \text{ kJ mol}^{-1}$ (c) $+141.2 \text{ kJ mol}^{-1}$ (d) $-141.2 \text{ kJ mol}^{-1}$
49. 2.2016 gm of acetaldehyde produced 13.95 kcal of heat on combustion in O_2 . Calculate the heat of combustion of CH_3CHO
- (a) 279 kcal (b) 972 kcal (c) 27.9 kcal (d) 2.79 kcal
50. Standard molar enthalpy of formation of CO_2 is equal to
- (a) Zero
(b) The standard molar enthalpy of combustion of gaseous carbon
(c) The sum of standard molar enthalpies of formation of CO and O_2
(d) The standard molar enthalpy of combustion of carbon (graphite)