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SET 2 –

1. Enthalpy is defined as –
   a) Total energy of the system
   b) Heat content of the system
   c) Internal energy of the surroundings
   d) Potential energy only

2. Symbol for enthalpy is –
   a) E
   b) H
   c) Q
   d) U

3. Relation between enthalpy and internal energy is –
   a) H = U + PV
   b) H = U – PV
   c) H = PV – U
   d) H = U / PV

4. The unit of enthalpy is –
   a) J
   b) Calorie
   c) kJ mol^{-1}
   d) All of these

5. Enthalpy is a –
   a) State function
   b) Path function
   c) Extensive property
   d) Both (a) and (c)

6. The heat change at constant pressure represents –
   a) Internal energy change
   b) Enthalpy change
   c) Free energy change
   d) Work done

7. For an ideal gas, $\Delta H = \Delta U + \Delta nRT$. Here, Δn is –
   a) Number of moles of solids
   b) Number of moles of gases
   c) Total number of moles
   d) None

8. When $\Delta n = 0$, then –
   a) $\Delta H = \Delta U$

b) $\Delta H = \Delta U + RT$
c) $\Delta H = \Delta U - RT$
d) $\Delta H = 0$

9. The enthalpy of an element in its standard state is –
   a) Zero
   b) One
   c) Negative
   d) Positive

10. The enthalpy of formation is –
   a) Heat change when one mole of a compound is formed from its elements
   b) Heat change during decomposition
   c) Heat absorbed during melting
   d) Heat released during combustion

11. The enthalpy of combustion is always –
   a) Positive
   b) Negative
   c) Zero
   d) Infinite

12. Enthalpy of neutralization is –
   a) Heat change when one mole of water is formed
   b) Heat change when an acid reacts with a base
   c) Both (a) and (b)
   d) None

13. The standard enthalpy of formation of $H_2(g)$ is –
   a) 0
   b) 1
   c) 2
   d) 3

14. The enthalpy of combustion of CH_4 is –
   a) +890 kJ mol^{-1}
   b) –890 kJ mol^{-1}
   c) +44 kJ mol^{-1}
   d) –44 kJ mol^{-1}

15. Exothermic reactions have –
   a) Positive ΔH
   b) Negative ΔH
   c) Zero ΔH
   d) Variable ΔH

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16. Endothermic reactions have –
    a) Positive ΔH
    b) Negative ΔH
    c) Zero ΔH
    d) None

17. The heat required to melt 1 mole of solid at constant pressure is –
    a) Enthalpy of vaporization
    b) Enthalpy of fusion
    c) Enthalpy of sublimation
    d) None

18. The heat required to change 1 mole of liquid into vapor is –
    a) Enthalpy of vaporization
    b) Enthalpy of fusion
    c) Enthalpy of combustion
    d) Enthalpy of formation

19. The enthalpy of sublimation is equal to –
    a) Enthalpy of fusion + enthalpy of vaporization
    b) Enthalpy of fusion – enthalpy of vaporization
    c) Enthalpy of combustion
    d) None

20. For exothermic reactions –
    a) Heat is absorbed
    b) Heat is released
    c) No heat change
    d) Heat fluctuates

21. Enthalpy of reaction depends on –
    a) Nature of reactants and products
    b) Physical state
    c) Temperature and pressure
    d) All of these

22. The enthalpy of neutralization for strong acid and strong base is approximately –
    a) –13.7 kJ mol^{-1}
    b) –37 kJ mol^{-1}
    c) –57.1 kJ mol^{-1}
    d) –100 kJ mol^{-1}

23. The enthalpy of solution is –
    a) Heat change when solute dissolves in solvent
    b) Heat absorbed on evaporation
    c) Heat released on cooling

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d) None

24. If heat is evolved, the process is –
    a) Exothermic
    b) Endothermic
    c) Isothermal
    d) Adiabatic

25. If $\Delta H = +40$ kJ mol^{-1}, then reaction is –
    a) Exothermic
    b) Endothermic
    c) Adiabatic
    d) Isothermal

26. For combustion of carbon:
    $C(s) + O_2(g) \rightarrow CO_2(g)$, $\Delta H = -393.5$ kJ mol^{-1}
    This means –
    a) 393.5 kJ heat absorbed
    b) 393.5 kJ heat released
    c) No heat change
    d) None

27. Hess's law is based on –
    a) Law of conservation of mass
    b) Law of conservation of energy
    c) Law of constant proportion
    d) None

28. Hess's law states that –
    a) Total enthalpy change is independent of path
    b) Depends on steps of reaction
    c) Depends on catalyst
    d) None

29. Hess's law is useful for –
    a) Indirect determination of enthalpy changes
    b) Measuring work done
    c) Calculating pressure
    d) None

30. If a reaction takes place in two or more steps, total enthalpy change –
    a) Is sum of enthalpy changes of each step
    b) Depends on order
    c) Cannot be calculated
    d) None

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31. Enthalpy of a reaction is equal to –
    a) Enthalpy of products – enthalpy of reactants
    b) Reactants – products
    c) Sum of reactants
    d) Sum of products

32. Which of the following is an example of exothermic reaction?
    a) Combustion of methane
    b) Electrolysis of water
    c) Photosynthesis
    d) Dissolution of ammonium chloride

33. Which of the following is an endothermic reaction?
    a) Formation of H_2O
    b) Combustion of C_2H_6
    c) Photosynthesis
    d) Neutralization

34. Heat change accompanying dissolution of NH_4Cl in water is –
    a) Positive
    b) Negative
    c) Zero
    d) Constant

35. In a calorimeter, heat lost by hot substance = – heat gained by cold substance. This follows –
    a) Hess's law
    b) First law of thermodynamics
    c) Second law
    d) None

36. In an endothermic reaction, energy of products is –
    a) Greater than reactants
    b) Less than reactants
    c) Equal
    d) Zero

37. In an exothermic reaction, energy of products is –
    a) Greater than reactants
    b) Less than reactants
    c) Equal
    d) None

38. The enthalpy of atomization is –
    a) Heat change when 1 mole of atoms formed from element
    b) Heat absorbed when molecule breaks into atoms
    c) Both (a) and (b)

d) None

39. The enthalpy of bond dissociation is –
    a) Heat absorbed when 1 mole of bonds is broken
    b) Heat released when bond formed
    c) Both (a) and (b)
    d) None

40. Enthalpy of bond formation is always –
    a) Positive
    b) Negative
    c) Zero
    d) Infinite

41. When one mole of ionic compound forms from gaseous ions, the enthalpy is –
    a) Lattice enthalpy
    b) Ionization enthalpy
    c) Electron gain enthalpy
    d) Sublimation enthalpy

42. When a gaseous atom loses an electron, the enthalpy change is –
    a) Ionization enthalpy
    b) Electron gain enthalpy
    c) Lattice energy
    d) None

43. When a gaseous atom gains an electron, the enthalpy change is –
    a) Electron gain enthalpy
    b) Ionization enthalpy
    c) Lattice enthalpy
    d) Sublimation energy

44. Heat change accompanying formation of gaseous ions from solid metal and gaseous nonmetal is called –
    a) Born-Haber process
    b) Ionization process
    c) Enthalpy of solution
    d) None

45. Hess's law helps in calculation of –
    a) Lattice enthalpy
    b) Enthalpy of formation
    c) Enthalpy of combustion
    d) All of these

46. The enthalpy of formation of CO_2 from C and O_2 is –
    a) +393.5 kJ mol^{-1}

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b) –393.5 kJ mol^{-1}
c) +283 kJ mol^{-1}
d) –283 kJ mol^{-1}

47. The standard enthalpy of formation of $H_2O(l)$ is –
a) –285.8 kJ mol^{-1}
b) +285.8 kJ mol^{-1}
c) 0
d) +100 kJ mol^{-1}

48. For an exothermic reaction, ΔH is –
a) Negative
b) Positive
c) Zero
d) None

49. Enthalpy is an example of –
a) Extensive property
b) Intensive property
c) Both
d) None

50. Hess's law can be used to calculate –
a) Enthalpy of indirect reactions
b) Free energy
c) Entropy
d) None

✅ ANSWER KEY – SET 2

1–b 2–b 3–a 4–c 5–d 6–b 7–b 8–a 9–a 10–a
11–b 12–c 13–a 14–b 15–b 16–a 17–b 18–a 19–a 20–b
21–d 22–c 23–a 24–a 25–b 26–b 27–b 28–a 29–a 30–a
31–a 32–a 33–c 34–a 35–b 36–a 37–b 38–c 39–a 40–b
41–a 42–a 43–a 44–a 45–d 46–b 47–a 48–a 49–a 50–a