CLASS TEST – 4

Time: 15 minutes **Marks: 15**

1. The bond angle in a water molecule (H_2O) is approximately:
   A. 109.5° B. 104.5° C. 120° D. 180°
2. The molecular geometry of ammonia (NH_3) molecule is:
   A. Trigonal Pyramidal B. Bent C. See-Saw D. Trigonal planar
3. The bond order of the nitrogen molecule (N_2) is:
   A. 1 B. 2 C. 3 D. 0
4. The VSEPR theory is used to predict:
   A. Molecular shapes based on the repulsion between lone pairs and bond pairs
   B. The electronic configuration of elements
   C. The hybridization of atomic orbitals
   D. The bond dissociation energy of molecules
5. Which type of hybridization is present in BCl_3?
   A. sp B. sp^2 C. sp^3 D. dsp^2
6. In which of the following molecules, all bonds are sigma (σ) bonds?
   A. C_2H_4 B. C_2H_2 C. CH_4 D. O_2
7. Considering x-axis as the internuclear axis which out of the following will not form a sigma bond?
   A. 1s and 1s B. 1s and $2p_x$ C. $2p_x$ and $2p_y$ D. 1s and 2s.
8. Which of the following is a state function?
   A. Heat B. Work C. Enthalpy D. Distance
9. The value of ΔG (Change in Gibbs Free Energy) for a spontaneous reaction is:
   A. Negative B. Positive C. Zero D. Cannot be determined
10. When a liquid turns into a gas in an isolated system, the entropy of the system:
    A. Increases B. Decreases C. Becomes Zero D. Stays the same
11. Which of the following is the correct expression for the first law of thermodynamics?
    A. $\Delta U = q + w$
    B. $\Delta U = q - w$
    C. $\Delta U = w - q$
    D. $\Delta U = q / w$
12. A reaction, $A + B \rightarrow C + D + q$ is found to have a positive entropy change the reaction will be:
    A. Possible at high temperature
    B. Possible only at low temperature
    C. Not possible at any temperature
    D. Possible at any temperature
13. Which of the following processes is isothermal?
    A. Melting of ice at 0°C C. Combustion of fuel
    B. Dissolution of NaCl in water D. Heating of water

14. Which of the following best describes an adiabatic process?
    A. No exchange of matter or energy with surroundings
    B. No change in temperature
    C. No exchange of heat with surroundings
    D. Constant pressure
15. Two litres of an ideal gas at a pressure of 10 atm expands isothermally into a vacuum until its total volume is 10 litres. How much heat is absorbed and how much work is done in the expansion?
    A. Work done = 0; Heat absorbed = 0
    B. Work done = Positive; Heat absorbed = Positive
    C. Work done = Negative; Heat absorbed = Negative
    D. Work done = 0; Heat absorbed = Positive