CHEMISTRY- HONOURS
Paper: CEMA-CC-3-5
(Physical Chemistry-2)
Full Marks – 10

Attempt all the questions.

1. The Joule's experiment suggests that –
   a) The internal energy (u) of an ideal gas is dependent temperature only
   b) u is dependent of an ideal gas on volume and temperature only
   c) the process is isothermal and adiabatic both
   d) both a and c.

2. If $\left(\dfrac{\partial u}{\partial v}\right)_T = 0$, then one may concludes that –
   a) The gas must be ideal
   b) The gas must be real
   c) The nature of the gas may be ascribed to be real or ideal with the help of the enthalpy
   d) None of the above.

3. The enthalpy change of a real gas during an adiabatic irreversible compression
   a) Decreases
   b) Increases
   c) Does not change
   d) Can't be said without knowing the entropy change of the surrounding.

4. If $\mu_{J,T} = 0$ then the gas involved in the throttling experiment is –
   a) Ideal
   b) H_2 (under normal T, P)
   c) Under certain conditions real
   d) Both a and c.

5. If a gas (one mole) obeys P(V-b) = RT, then $\left(\dfrac{\partial H}{\partial P}\right)_T$ related to the gas is
   a) Zero
   b) $\dfrac{a}{v^2}$
   c) b
   d) none of the above.

6. Molar conductance (Λ_m) of 0.2 M solution of a weak acid HA is 10 $\Omega^{-1}cm^2 mol$. The pH of the solution is ($\Lambda_m^\infty = 200\Omega^{-1}cm^2 mol$)

    a) 2.3
    b) 2.5
    c) 3.0
    d) 2.0

7. Calculate the pH of the final mixture when 50 ml of 0.1 M NaOH is added to a solution containing 100 ml 0.1 M HCl

    a) 2.04
    b) 1.48
    c) 3.50
    d) 1.20

8. In an electrochemical cell, the electrode with a lower reduction potential will acts as

    a) Anode
    b) Cathode
    c) Salt bridge
    d) Liquid junction

9. Which of the following is not a concentration cell

    a) Ag|AgCl(s)|FeCl₂(aq), FeCl₃(aq)|Pt
    b) Ag|AgCl(s)|HCl(a1)⋮ HCl(a2)| AgCl(s)| Ag
    c) Ag(Hg)|AgNO₃(aq)| Ag(Hg)
    d) Both a and c

10. Which of the following is true for mixing of two ideal gases at constant temperature and pressure

    a) $\Delta H_{mix} = 0$ and $\Delta S_{mix} > 0$
    b) $\Delta H_{mix} < 0$ and $\Delta S_{mix} > 0$
    c) $\Delta H_{mix} < 0$ and $\Delta S_{mix} < 0$
    d) $\Delta H_{mix} = 0$ and $\Delta S_{mix} = 0$