Karimpur Pannadevi College

UG 2nd Semester Examination 2022

CHEMISTRY [HONOURS] (Internal Assessment)

Course Code: CHEM-HCC-3

Full Marks: 10

Answer any five questions (HCC-3-Hons.) [5 X 2 = 10]

1. Estimate the pH of a 10^{-8} M solution of HCl in water?

2. In the Lineweaver-Burk plot of (initial rate)$^{-1}$ *vs.* (initial substrate concentration)$^{-1}$ for an enzyme catalysed reaction following Michaelis Menten mechanism, the y-intercept is 5000 M^{-1} s. If the initial enzyme concentration is 1 x 10^{-9} M, the turnover number is

(a) 2.5 x 10^5 (b) 1.0 x 10^4 (c)2.5 x 10^4 (d)2.0 x 10^5

3. The Maxwell's relationship derived from the equation dG = VdP – SdP is

(a) $\left(\frac{\partial V}{\partial T}\right)_P = \left(\frac{\partial S}{\partial P}\right)_T$ (b) $\left(\frac{\partial P}{\partial V}\right)_T = \left(\frac{\partial T}{\partial S}\right)_P$ (c) $\left(\frac{\partial V}{\partial T}\right)_P = -\left(\frac{\partial S}{\partial P}\right)_T$ (d) $\left(\frac{\partial P}{\partial V}\right)_T = -\left(\frac{\partial T}{\partial S}\right)_P$

4. The slope and intercept obtained from (1/Rate) against (1/substrate) concentration of an enzyme catalyzed reaction is 300 and 2 x 10^5, respectively. The Michaelis- Menten constant of the enzyme in this reaction is

(a) 5 x 10^6 M (b) 5 x 10^{-6} M (c) 1.5 x 10^3 M (d) 1.5 x 10^{-3} M

5. The solubility product (K_{sp}) of $Ca(OH)_2$ at 25ºC is 4.42 x 10^{-5} M. A 500 ml of saturated solution of $Ca(OH)_2$ is mixed with equal volume of 0.4 M NaOH. How much $Ca(OH)_2$ in milligrams is precipitated?

6. The concentration of HCN and NaCN in a solution is 0.01 M each. Calculate the concentration of hydrogen and hydroxyl ions if the dissociation constant of HCN is 7.2 x 10^{-10}.