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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
T1- EXAMINATION (September - 2017)  
M. Tech. (I- SEM.)

COURSE CODE: 14M31CE113

MAX. MARKS: 15

COURSE NAME: Water Supply and Treatment

COURSE CREDIT: 3

MAX. TIME: 1 HRS

*Note: Attempt all questions. Assume suitable data if required. Carrying of mobile phone during examinations will be treated as case of unfair means*

1. Derive the expressions for species distribution of (a) monoprotic acid and (b) diprotic acid. From the two formulations made, generate the general polynomial expression for predicting the species distribution (3+3+1)
2. Calculate the  $[H^+]$  concentration in a 0.92M acetic acid solution given  $K_a = 2.5 \times 10^{-5}$ . Also find the  $[H^+]$  concentration if 0.3 M solution of sodium acetate is added to the solution. Determine the fraction of decrease in the  $[H^+]$  ion concentration (3)
3. Calculate the ionic strength of a solution containing 35 mg/l of NaCl, 60 mg/l of  $Na_2SO_4$  and 20 mg/l of  $Mg(NO_3)_2$ . Also determine the activity of  $Na^+$  and  $SO_4^{2-}$  (3). Given (GMW of Na = 23; Cl = 35.5; S = 32; O = 16; N = 14; Mg = 24)
4. Derive the fundamental relationship of Ostwald's Dilution Law. Explain the significance of the above formulation (2)

CE-16, MT