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**Assignment – I**

1. If hydrogen ion concentration in a solution is 1 x 10 – 5 moles/Litre, calculate the concentration of OH – ion in this solution. (Kw = 10 – 14 moles2/Litre2).
2. Calculate the pH value of

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| (i) 10 – 2 molar HNO3 solution | (ii) 0.03 N HCl solution | (iii) 0.001 N H2SO4 solution. |

1. The concentration of hydrogen ion in a sample of soft drink is 3.8 x 10 – 3 M. What is its pH ?
2. A solution is found to contain 0.63 g of nitric acid per 100 ml of the solution. What is the pH of the solution if the acid is completely dissociated ?
3. Calculate the H3O+ and OH –  ion concentrations at 25˚C in

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| (i) 0.02 N HCl solution | (ii) 0.005 N NaOH solution |  |

1. Calculate the pH value of 0.001 N HNO3 solution.
2. Calculate the pH value of 10 – 3 M HCl solution.
3. What is the pH of the solution whose H+ ion concentration is 2 x 10 – 5 g ions/litre ?
4. 0.049 g of H2SO4 is dissolved per litre of the given solution. Calculate the pH of the solution.
5. Calculate the pH of a solution which is 1 x 10 – 3 M with respect to sulphuric acid.
6. 13.5 g of an acid HA of molecular mass 135 was dissolved in 10 litres of aqueous solution. Calculate the pH of the solution, assuming the acid to be completely dissociated.
7. Calculate the pH value of a 4.9 x 10 – 4 N monobasic acid solution assuming completely ionization.
8. The concentration of hydronium ions in a cup of black coffee is 1.3 x 10 – 5 M. Find the pH of the coffee. Is this coffee acidic or alkaline ?
9. Calculate the pH of N/1000 sodium hydroxide solution assuming complete ionization (Kw = 1.0 x 10 – 14).
10. 4 g of NaOH are dissolved per litre. Find : (i) molarity of the solution (ii) OH –  ion concentration (iii) pH value of the solution . (At. mass : Na = 23 , O = 16 , H = 1).
11. Calculate the pH value of

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| (i) 0.0001 M NaOH | (ii) 0.01 M NaOH | (iii) 0.04 M NaOH solution at 25˚C. |

1. Calculate the pH value of a solution containing 2 g caustic soda/litre of water.
2. How many grams of sodium hydroxide must be dissolved in one litre of water to prepare its N/10 solution? What will be its pH value ?
3. Calculate the pH value of a 0.01 N solution of acetic acid. Ka for CH3COOH is 1.8 x 10 – 5 at 25˚C.
4. Calculate the pH value of 0.1 M solution of acetic acid if the degree of dissociation of the acid is 0.0132.
5. Acetic acid has a dissociation constant of 1.8 x 10 – 5 . Calculate the pH value of the decinormal solution of acetic acid.
6. A 0.05 N solution of acetic acid is found to be 1.9 % ionized at 25˚C. Calculate

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| (i) Ka for acetic acid | (ii) the pH of the solution. |  |

1. Calculate the pH value of a solution of 0.1 M NH3 (Kb = 1.8 x 10 – 5 ).
2. A sample of sour milk was found to be 0.1 M solution of lactic acid CH3CH(OH)COOH. What is the pH of the sample of milk? Ka for lactic acid at 25˚C is 1.37 x 10 – 4 .
3. Calculate the pH of 0.15 M solution of hypochlorous acid HClO (Ka = 9.6 10 – 7 ).

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**Answers**

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| 1. 10 – 9 moles/L | | 2. (i) 2 (ii) 1.5229 (iii) 3 3. 2.42 | | 4. 1 5. (i) 5 x 10 – 13 M (ii) 2 x 10 – 12 M | |
| 6. 3 7. 3 | | 8. 4.699 | 9. 3 10. 2.699 | 11. 2 12. 3.31 | 13. 4.89 , acidic |
| 14. 11 15. (i) 0.1 M (ii) 0.1 M (iii) 13 16. (i) 10 (ii) 12 (iii) 12.6 | | | | | 17. 12.699 |
| 18. 4 g , 13 | 19. 3.37 20. 2.8794 21. 2.87 22. (i) 1.8 x 10 – 5  (ii) 3.0223 | | | | |
| 23. 11.12 | 24. 2.43 25. 3.42 | | | | |

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