Part 1. Multiple Choice Questions (1 mark each, total marks = 12)

1. What is the maximum ratio of conjugate base to acid in an effective buffer?

   a) 5
   b) 10
   c) 2
   d) 15
   e) 20

2. You wish to prepare a buffer containing CH_3COOH with a pH of 4.24. If the pK_a of acetic acid is 4.74, what ratio of $[CH_3COO^-]/[CH_3COOH]$ must you use?

   a) 0.10
   b) 0.32
   c) 2.0
   d) 2.8
   e) 0.50

3. Determine the pH of the following aqueous solution. Initial concentrations are given.