Acid/Base test

28

Name _____

All working out must be shown on the paper.

1) What is the pH of a solution, at 25 ^{o}C, with $[H_3O^+]$ = 0.0252 M,
   a) 1.6
   b) 3.0
   c) 4.2
   d) 2.5
   e) None of the above
2) What is the pH of a solution, at 25 ^{o}C, with $[OH^-]$ = 0.001 M
   a) 10
   b) 11
   c) 12
   d) 3
   e) None of the above
3) In a 0.1 M H_2CO_3 solution the dominant species is
   a) H_2CO_3
   b) H_3O^+
   c) OH^-
   d) Both H_3O^+ and CO_3^{-2} exist in equal amount.
   e) None of the above
4) A 6.0 M H_2SO_4 solution can be described as a ;
   a) dilute solution of a weak acid,
   b) concentrated solution of weak acid,
   c) dilute solution of a strong acid
   d) concentrated solution of a strong acid.
   e) None of the above
5) In a 0.1M HCl solution what is the dominant species?
   a) HCl
   b) H_3O^+
   c) OH^-
   d) Both OH^- and H_3O^+ exist in equal amount.
   e) None of the above
6) A 30.0 mL solution, at 25 ^{o}C, has a pH of 8.5. Which comment is true?
   a) $[OH^-] = 10^{-8.5}$, $[H_3O^+] = 10^{-5.5}$
   b) $[OH^-] = 10^{8.5}$, $[H_3O^+] = 10^{5.5}$
   c) $[OH^-] = 10^{-8.5}$, $[H_3O^+] = 10^{-8.5}$
   d) $[OH^-] = 10^{-5.5}$, $[H_3O^+] = 10^{-8.5}$
   e) None of the above

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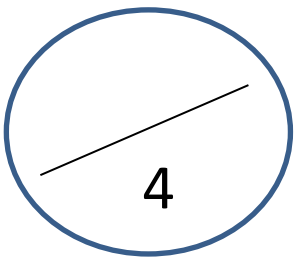
7) A 40.0 mL solution, at 25 ^{o}C, of a 0.001M HCl has 60 mL of distilled water added to it. Which of the options below best describes the change in pH?
   a) pH changes from 3 to 3.4
   b) pH changes from 3 to 5
   c) pH changes from 4 to 6
   d) pH changes from 1 to 1.5
   e) None of the above
8) Which of the following is a conjugate acid/base pair?
   a) HCl/Cl^-
   b) H_2SO_4/SO_4^{2-}
   c) CO_3^{2-}/ H_2CO_3
   d) OH^-/H_3O^+
   e) None of the above
9) What is the pH of a 30.0 mL sample of an unknown weak monoprotic acid with a concentration of 0.02 M.
   a) From the information given, it is impossible to calculate the pH of a weak acid as we do not know how much of the acid has ionised.
   b) The volume given is not necessary to the calculation of the pH of the final solution which is calculated at 5.5.
   c) The volume of the solution is critical to the calculation of the pH.
   d) It is impossible to calculate the pH as it is unclear how many hydrogen ions will come off the acid molecule when it reacts with water.
   e) None of the above
10) Which statement is true?
   a) H_2CO_3 is amphoteric
   b) SO_4^{2-} is amphoteric
   c) HSO_4^- acts as a diprotic acid.
   d) H_2O is amphoteric.
   e) None of the above



1) Nitric acid (HNO_3)solution is added to sodium carbonate powder(Na_2CO_3) at 25 ^oC.
a) Write the overall balanced equation for the reaction. Give states.

3 marks

b) Write the ionic equation for the above reaction.

2 marks

2) What is the pH of a 0.005 M $Ba(OH)_2$ at 25 ^oC?

2 marks

3) 3.65 grams of HCl is added to 200 mL of distilled water.
Atomic mass of Cl =35.5, H = 1.0
a) What is the pH of the resulting solution?

2 marks

b) Calculate the $[OH^-]$ in the solution.

2 marks

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4) 30.0 mL of a 0.01M NaOH is mixed with 70.0 mL of a 0.005M HNO_3.

a) Write a balanced equation for the overall reaction.

2 marks

b) Which reactant is in excess?

1 mark

c) What amount in mol of the excess reactant remains?

2 marks

d) Calculate the pH of the resulting solution

2 marks

End OF Test.