

03

**THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF BASIC SCIENCES**



**BACHELOR OF PHARMACY HONOURS- LEVEL 03 - 2018/19
BSU3340- PHARMACEUTICAL CHEMISTRY I
NBT 02**

DATE: 2nd JANUARY 2019

DURATION: 1.5 HOURS

TIME: 09.00 a.m. – 10.30 a.m.

REGISTRATION NO:

1. This question paper consists of 12 pages with 20 Multiple Choice Questions (Part A) and 04 Short Answer Questions (Part B).
2. Please fill the address sheet. (See last page)

IMPORTANT INSTRUCTIONS TO CANDIDATES

- Write your Registration Number in the space provided.
- Answer **ALL** questions.
- **Multiple Choice Questions (Part A):** Indicate answers in the answer sheet provided by placing a cross (X) in **INK** in the relevant cage.
- Answers in pencil will **NOT** be marked.
- **Short Answer Questions (Part B):** Write answers within the space provided.
- Do not remove any page/part of this question paper from the examination hall.
- Mobile phones and the electronic equipment are **NOT** allowed. Leave them outside.



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REGISTRATION NO:

ANSWER SHEET FOR PART A

| Q. No. | (a) | (b) | (c) | (d) |
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REGISTRATION NO:

Part A – Multiple Choice Questions

(40 marks)

Choose the most suitable answer and indicate with a 'X' in the answer sheet provided.

1. A Bronsted-Lowry base is defined as
 - a) a proton donor
 - b) a proton acceptor
 - c) an electron pair donor
 - d) a hydroxide ion producer
2. What is the pH of CH_3COONa solution?
 - a) basic
 - b) acidic
 - c) neutral
 - d) 7
3. Of the following solutions, which has the greatest buffering capacity?
 - a) 0.125 M HF and 0.668 M NaF
 - b) 0.861 M HF and 0.909 M NaF
 - c) 0.821 M HF and 0.207 M NaF
 - d) They would all have the same capacity
4. A buffer solution can be made by dissolving equal moles of
 - a) HF and NaF
 - b) HCl and NaOH
 - c) KBr and Na_3PO_4
 - d) CH_3COOH and NaCl
5. How many significant figures does the number 0.008862 have?
 - a) 7
 - b) 4
 - c) 3
 - d) 6



6. The conjugate acid and base of $[\text{HPO}_4]^{2-}$ are, respectively:

- a) $[\text{PO}_4]^{3-}$ and $[\text{H}_2\text{PO}_4]^-$
- b) H_3PO_4 and $[\text{PO}_4]^{3-}$
- c) H_3PO_4 and $[\text{H}_2\text{PO}_4]^-$
- d) $[\text{H}_2\text{PO}_4]^-$ and $[\text{PO}_4]^{3-}$

7. In which direction will the following equilibrium shift if a solution of CH_3COONa is added?



- a) Shift to the right
- b) Shift to the left
- c) No change
- d) Cannot be predicted

8. What is the solubility product constant (K_{sp}) expression for Ag_3PO_4 ?

- a) $K_{sp} = [\text{Ag}^+(\text{aq})] [\text{PO}_4^{3-}(\text{aq})]$
- b) $K_{sp} = [\text{Ag}^+(\text{aq})] [\text{PO}_4^{3-}(\text{aq})]^3$
- c) $K_{sp} = [\text{Ag}^+(\text{aq})]^3 [\text{PO}_4^{3-}(\text{aq})]$
- d) $K_{sp} = [3\text{Ag}^+(\text{aq})]^3 [\text{PO}_4^{3-}(\text{aq})]$

9. The $[\text{OH}^-(\text{aq})]$ is measured to be 3.3×10^{-3} mol/L in a 100 mL sample of a saturated solution of $\text{Al}(\text{OH})_3$. What is the solubility of $\text{Al}(\text{OH})_3$?

- a) 1.1×10^{-4} mol/L
- b) 3.3×10^{-4} mol/L
- c) 1.1×10^{-3} mol/L
- d) 3.3×10^{-3} mol/L

10. Ice is an example of

- a) polar and non-polar molecular solid
- b) non-polar molecular solid
- c) polar molecular solid
- d) neutral molecular solid

11. Substances that can react as both acids and bases are called

- a) neutral compounds
- b) conjugate bases
- c) amphoteric substances
- d) conjugate acids



12. In pure water, concentrations of

- a) $[H^+]$ and $[OH^-]$ ions are equal
- b) H^+ ions is more
- c) OH^- ions is more
- d) Cl^- is more

13. Of the following compounds given below which compound is a diprotic oxyacid??

- a) H_3PO_4
- b) HF
- c) H_2SO_4
- d) CH_3COOH

14. which equation is correct regarding an exothermic reaction?

- a) $\Delta H = 0$
- b) $\Delta H < 0$
- c) $\Delta G > 0$
- d) $\Delta G < 0$

15. Which of the following acid/base titrations cannot determine the equivalence point in an accurate manner?

- a) Strong acid/strong base
- b) Weak acid/weak base
- c) Strong acid/weak base
- d) Weak acid/strong base

16. What is the pH at the neutralization point in the titration of 0.100 M NH_3 solution with 0.100 M HCl?

- a) above pH 7
- b) below pH 7
- c) 7
- d) cannot determine

17. Properties of a primary standard for use in acid-base titrations include

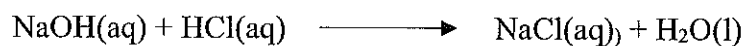
- a) reactive with oxygen and low molar mass
- b) stability and high purity
- c) high purity and low solubility
- d) low molar mass and low solubility



18. What is the $[\text{OH}^-(\text{aq})]$ of a solution with pH of 8.0?

- a) $1 \times 10^{-7} \text{ M}$
- b) $1 \times 10^{-8} \text{ M}$
- c) $1 \times 10^{-6} \text{ M}$
- d) $1 \times 10^{-4} \text{ M}$

19. Which one is the correct pair of spectator ions involved in the following neutralization reaction?



- a) Na^+ and OH^-
- b) H^+ and OH^-
- c) H^+ and Cl^-
- d) Na^+ and Cl^-

20. What is the result of the following calculation, reported to the correct number of significant figures? $0.12\text{g} + 0.003\text{g} = ?$

- a) 0.123g
- b) 0.12g
- c) 0.1g
- d) 0.g



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Part B –Short Answer Questions

(60 marks)

Write answers in the space provided.

1. a) Consider a weak acid, HF. Provide the chemical equation for the ionization of HF in aqueous solution. (05 marks)

b) Derive the Henderson-Hasselbalch equation for HF. (05 marks)



c) Calculate the pH of a buffer solution containing a mixture of 0.15 M HF and 0.20 M F^- . (K_a for HF is 6.8×10^{-4}) (10 marks)

d) Explain whether NH_4Cl solution is acidic or basic. (05 marks)



2. a) Write the expression for the solubility product, K_{sp} , of the saturated solution of $Mg(OH)_2$. (05 marks)

b) If the solubility of $Mg(OH)_2$ is 7.6 mg/L, Calculate the K_{sp} for $Mg(OH)_2$. Molar mass of $Mg(OH)_2$ is 58.3 g/ mol. (10 marks)



3. A portion of 20.0 mL was withdrawn from a saturated calcium hydroxide solution. This was completely neutralized by 19.00 cm³ of hydrochloric acid solution with a molar concentration of 0.050 mol dm⁻³. Calculate the solubility product of calcium hydroxide. (10 marks)



4. Balance the following equation. (Show balanced half reactions and the balanced complete reactions) (10 marks)



Reg No:.....

Name:.....

Address:.....

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