

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 01

DATE: 21st NOVEMBER 2018

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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Part A – Multiple Choice Questions

(40 marks)

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

1. Which one of the following is not a basic physical quantity?
 - a) Volume
 - b) Length
 - c) Mass
 - d) Time
2. Which one of the following is a derived physical quantity?
 - a) Area
 - b) Density
 - c) Concentration
 - d) All are derived physical quantities
3. The concentration of NaCl solution is $1.2 \times 10^{-1} \text{ mol dm}^{-3}$. What is the concentration of NaCl in SI unit? (1 dm = 10^{-1} m)
 - a) $1.2 \times 10^{-1} \text{ mol dm}^{-3}$
 - b) $1.2 \times 10^2 \text{ mol m}^{-3}$
 - c) $1.2 \times 10^{-1} \text{ mol m}^{-3}$
 - d) $1.2 \times 10^{-2} \text{ mol m}^{-3}$
4. The water in a swimming pool was analyzed for its chlorine content. It was found that 20 mL of a water sample contains 0.5 mg of free chlorine. What is the concentration of chlorine in ppm?
 - a) 25 ppm
 - b) 40 ppm
 - c) 10 ppm
 - d) 0.04 ppm



5. Oxygen (O), Sulfur (S), and Selenium (Se) are grouped together because they:
- have the same boiling point
 - react chemically in a similar manner
 - are all gasses
 - are all metals
6. Which one of the following is the electronic configuration of an atom of a noble gas?
- $1s^1$
 - $1s^22s^2$
 - $1s^22s^22p^6$
 - $1s^22s^22p^2$
7. Which of the following group/family is the least reactive?
- Alkali metals
 - Halogens
 - Alkaline earth metals
 - Noble gases
8. In general, ionization energy _____ as you go from top to bottom in groups, and _____ as you go from left to right across a period in the periodic table.
- decreases, decreases
 - decreases, increases
 - increases, decreases
 - increases, increases
9. What is the predominant intermolecular force in CCl_4 ?
- London-dispersion forces
 - Hydrogen-bonding
 - Ion-dipole attraction
 - Ionic-bonding
10. When NaCl dissolves in water, aqueous Na^+ and Cl^- ions result. What is the force of attraction that exists between Na^+ and H_2O ?
- Hydrogen-bonding
 - Dipole-dipole
 - Ion-dipole
 - London-dispersion forces



11. Which force is predominant in allowing ammonia, NH_3 , to dissolve in water?

- a) Ion-dipole
- b) Hydrogen bonding
- c) Dipole-dipole
- d) Ionic

12. Which of the interpretations of the following balanced equation is TRUE?



- a) 2 atoms of S and 3 atoms of O_2 form 2 atoms of SO_3
- b) 2 grams of S and 3 grams of O_2 form 2 grams of SO_3
- c) 2 moles of S and 3 moles of O_2 form 2 moles of SO_3
- d) None of them are true

13. How many grams of NaOH (Molecular weight = 40 g mol^{-1}) are there in 500.0 mL of 0.175 mol l^{-1} NaOH solution?

- a) 3.50 g
- b) 14.0 g
- c) 40.0 g
- d) 0.175 g

14. How many milliliters of a stock solution of 11.1 M HNO_3 would be needed to prepare 500 mL of 0.500 M HNO_3 ?

- a) 0.04
- b) 44.4
- c) 22.5
- d) 50

15. In the following balanced equation, how many moles of aluminum are needed to form 3.70 moles of aluminum oxide, Al_2O_3 ?



- a) 7.40 moles
- b) 2.00 moles
- c) 3.70 moles
- d) 4.00 moles



16. Which of the following oxidation-reduction equation is balanced?

- a) $\text{Sn}^{2+}(\text{aq}) + \text{Ce}^{4+}(\text{aq}) \longrightarrow \text{Sn}^{4+}(\text{aq}) + \text{Ce}^{3+}(\text{aq})$
- b) $\text{Sn}^{2+}(\text{aq}) + 3\text{Ce}^{4+}(\text{aq}) \longrightarrow \text{Sn}^{4+}(\text{aq}) + 3\text{Ce}^{3+}(\text{aq})$
- c) $\text{Sn}^{2+}(\text{aq}) + 2\text{Ce}^{4+}(\text{aq}) \longrightarrow \text{Sn}^{4+}(\text{aq}) + 2\text{Ce}^{3+}(\text{aq})$
- d) $2\text{Sn}^{2+}(\text{aq}) + \text{Ce}^{4+}(\text{aq}) \longrightarrow 2\text{Sn}^{4+}(\text{aq}) + \text{Ce}^{3+}(\text{aq})$

17. Consider the reaction, $\text{C}_5\text{H}_{12}(\text{l}) + 8\text{O}_2(\text{g}) \longrightarrow 5\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$

If the reactants C_5H_{12} and O_2 are having 2 moles and 8 moles of initial feed respectively, which is the limiting reactant in the reaction?

- a) C_5H_{12}
- b) O_2
- c) CO_2
- d) H_2O

18. If 5 moles of N_2 is combined with 12 moles of H_2 as per given reaction,



How many moles of N_2 are left in the reaction?

- a) 1 mole
- b) 2 moles
- c) 4 moles
- d) 3 moles

19. For the following combustion reaction,



How many moles of CH_4 are required to produce 10 moles of H_2O ? (Consider O_2 is in excess)

- a) 1
- b) 2
- c) 5
- d) 10

20. What volume (mL) of a concentrated solution of NaOH (6.00 M) must be diluted to 200.0 mL to make 1.50 M solution of NaOH ?

- a) 50.0
- b) 100.0
- c) 25.0
- d) 200.0



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Part B –Short Answer Questions

(60 marks)

Write answers in the space provided.

1. a) Which has a higher boiling point: I₂ or Br₂? (02 marks)

- b) Ethanol (C₂H₅OH) and Dimethyl ether (CH₃OCH₃) have the same molar mass. Which one has a higher boiling point? Explain your answer. (07 marks)

- c) Calculate the mass in grams of 0.5 moles of Acetic acid (CH₃COOH) and 0.5 moles Potassium permanganate (KMnO₄). (Atomic masses: C =12.01 gmol⁻¹, H =1.00 gmol⁻¹, O =16.00 gmol⁻¹, K =39.00 gmol⁻¹, Mn =54.90 gmol⁻¹) (06 marks)

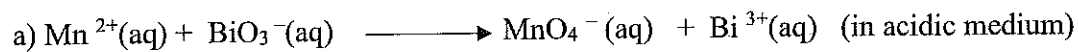


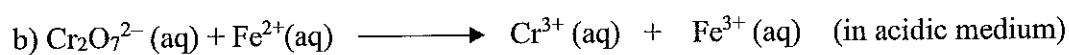
2. a) What volume of 0.12 M NaOH is needed to neutralize 36.00 mL of 0.14 M HCl?
(Provide balanced chemical equation and stepwise calculations) (06 marks)

- b) When 42.00 mL of aqueous HCl is titrated by 0.10 M KOH, it takes 25.00 mL of the KOH solution to reach the end point. What is the concentration of the HCl solution?
(Provide balanced chemical equation and stepwise calculations) (06 marks)

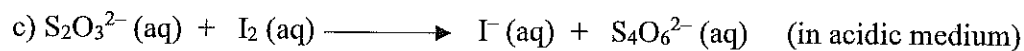


3. Write balanced equations for the following oxidation-reduction reactions. (Show balanced half reactions and the balanced complete reactions) (18 marks)









4. A sample of sodium hydroxide was tested for purity using the following method. Solid NaOH (0.400g) was dissolved in 100.0 cm³ of water and titrated with 0.200 mol l⁻¹ hydrochloric acid using phenolphthalein indicator. 25.00 cm³ of acid was required for complete neutralization.

(Atomic masses: Na=23.00 gmol⁻¹, H=1.00 gmol⁻¹, O=16 gmol⁻¹)

a) Write the balanced chemical equation (01 marks)

b) Calculate the moles of acid used in the titration and the moles of sodium hydroxide titrated. (06 marks)



c) Calculate the mass of sodium hydroxide titrated and the purity of the sample. (08 marks)



Reg No:.....

Name:.....

Address:.....

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