

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



BACHELOR OF PHARMACY HONOURS- LEVEL 03 - 2020/21
BSU3340- PHARMACEUTICAL CHEMISTRY I
NBT 01

DATE: 23rd November 2021

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

(20 marks)

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

1. The elements in which electrons are gradually filled in 4f-orbital are called
a) lanthanoids b) transition elements c) Noble gases d) halogens
2. Which of the following statements is **NOT** correct?
a) Helium has the highest first ionization enthalpy in the periodic table
b) Chlorine has less negative electron gain enthalpy than fluorine
c) Bromine is a liquid at room temperature
d) In any period, atomic radius of alkali metal is the highest
3. Which of the following group/family is the least reactive?
a) Alkali metals
b) Halogens
c) Noble gases
d) Alkaline earth metals
4. How many electrons are there in the valence shell of the O^{2-} ion?
a) 10 b) 8 c) 6 d) 18
5. Which one of the following is **NOT** a basic physical quantity?
a) Volume
b) Length
c) Mass
d) Time
6. Which one of the following is a derived physical quantity?
a) Area
b) Density
c) Concentration
d) All are derived physical quantities



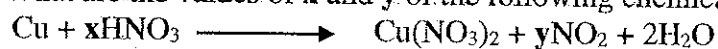
7. Which of the followings is/are indicator/s of a chemical reaction?

- a) change in state
- b) change in color
- c) change in temperature
- d) all of the above

8. A balanced chemical equation is in accordance with

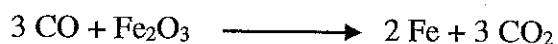
- a) Avogadro's law
- b) Law of multiple proportion
- c) Law of conservation of matter
- d) Gaseous law

9. What are the values of x and y of the following chemical equation?



- a) 4 and 2
- b) 8 and 6
- c) 7 and 1
- d) 3 and 5

10. Which statement is true if 18 moles CO and 18 moles Fe_2O_3 are allowed to react?



- a) The limiting reactant is CO and 12 mol of CO_2 will be formed.
- b) The limiting reactant is Fe_2O_3 and 8 mol Fe will be formed.
- c) The limiting reactant is CO and 12 mol of Fe will be formed.
- d) The limiting reactant is Fe_2O_3 and 8 mol CO_2 will be formed.

11. A water sample was taken from a pool to analyze the concentration of chlorine. It was found that 25 mL of a pool water sample contains 0.25 mg of free chlorine. What is the concentration of chlorine in ppm?

- a) 25 ppm
- b) 4 ppm
- c) 10 ppm
- d) 0.04 ppm

12. Of the following substances which compound has the highest solubility in CCl_4 ?

- a) C_8H_{18} (Octane)
- b) H_2O
- c) NH_3
- d) NaCl



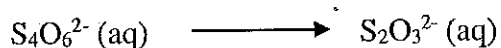
13. The ratio of the actual yield to the theoretical yield is known as the

- a) Experimental yield
- b) Percent yield
- c) Excess yield
- d) Reagent yield

14. In a concentrated solution, there is

- a) No solute
- b) No solvent
- c) A small amount of solute
- d) A large amount of solute

15. How many electrons appear in the following half-reaction when it is balanced?



- a) 1
- b) 2
- c) 4
- d) 6

16. What volume of a 7.00 M NaCl solution must be diluted to 200.0 mL to make a 0.70 M solution of NaCl?

- a) 10.0 mL
- b) 5.0 mL
- c) 50.0 mL
- d) 20.0 mL

17. How many grams of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) are there in 35.5 mL of a 4.32M sucrose solution?

- a) 22.5 g
- b) 44.8 g
- c) 52.5 g
- d) 180 g

18. What is the predominant intermolecular force in I_2 ?

- a) London-dispersion forces
- b) Hydrogen-bonding
- c) Ion-dipole attraction
- d) Ionic bonding



19. Which of the following statements is/are **TRUE** regarding oxidation and reduction reactions?

- I. Electrons are transferred from one substance to another
- II. Reduction involves the gain of electrons
- III. The number of electrons lost/gained must be equal

- a) I only
- b) II only
- c) I and III only
- d) All are correct

20. Which one of the following is a correct expression for molarity?

- a) Mole solute / kg solvent
- b) Mole solute / L solvent
- c) Mole solute / kg solution
- d) Mole solute / L solution



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Part B –Short Answer Questions

(80 marks)

Write answers in the space provided.

1. a) Write the electron configurations of the following atoms/ions. (09 marks)

Atomic numbers: K = 19, Cr = 24, Cu = 29

K =

Cr =

Cu¹⁺ =

b) All transition elements are d-block elements, but all d-block elements are not transition elements. Explain. (5 marks)

c) Name three (03) metals which activate enzymes. (03 marks)

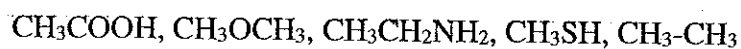
d) Provide three (03) toxic elements to human body. (03 marks)



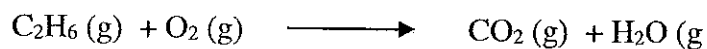
2. a) Explain why ICl has a higher boiling point than Br₂. (5 marks)

b) Ethanol (C₂H₅OH) and Dimethyl ether (CH₃OCH₃) have the same molar mass. Which one has a higher boiling point? Explain your answer. (5 marks)

c) Which of the following will have intermolecular hydrogen-bonding? (5 marks)



d) The combustion equation of ethane gas (C₂H₆) is given below. Calculate the amount of heat produced in the complete combustion of 60.6 g of ethane. The heat of combustion of ethane is 1560 kJ/mol and the molar mass of ethane is 30.0 g/mol. (5 marks)



3. In an attempt to analyze Fe (II) percentage in a drug sample, following procedure was performed. The drug (1.52 g) was dissolved in water and diluted up to 25.0 mL with dilute sulfuric acid. This solution was titrated against 0.025 M KMnO_4 solution. The volume required to reach the end-point was 33.2 mL. (20 marks)

a) Write the balanced half-reactions for both KMnO_4 and Fe (II) in acidic medium.

b) Write the balanced redox reaction between permanganate ion and Fe (II) in the acidic medium.

c) Calculate the number of moles of KMnO_4 consumed in the titration.

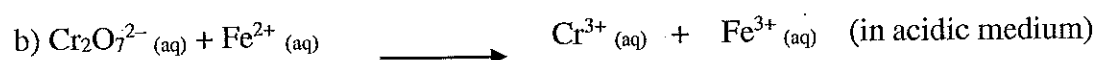
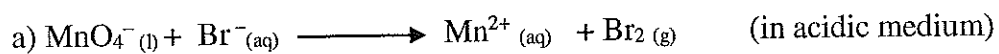


d) Calculate the number of moles of Fe (II) titrated.

e) What is the mass percentage of Fe (II) in the iron supplement sample? (Atomic mass of iron is 56 g/mol)



4. Write balanced equations for the following oxidation-reduction reactions. (Show balanced half-reactions and the balanced complete reactions) (20 marks)



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Name:.....

Address:.....

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