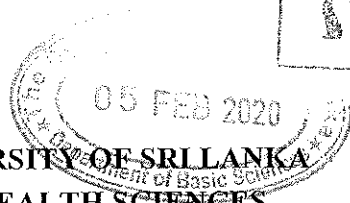


03



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

BACHELOR OF PHARMACY HONOURS- LEVEL 03 - 2019/20
BSU3340- PHARMACEUTICAL CHEMISTRY I
NBT 01

DATE: 05th FEBRUARY 2020

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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NBT 01

REGISTRATION NO:

ANSWER SHEET FOR PART A

Q. No.	(a)	(b)	(c)	(d)
1				
2				
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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.

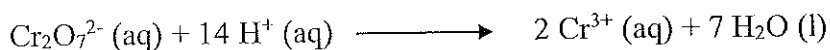
- Which one of the following is the electronic configuration of an atom of a noble gas?
 - $1s^1$
 - $1s^22s^2$
 - $1s^22s^22p^6$
 - $1s^22s^22p^2$
- Which of the following properties is shared by all the noble gasses?
 - They are inert.
 - They are metallic.
 - They are highly reactive.
 - They have lower ionization energies.
- Elements in the same vertical group in the periodic table have the same
 - atomic number.
 - atomic radii.
 - atomic mass.
 - number of valence electrons.
- Sodium (Na) does not occur in nature as Na (s) because:
 - it reacts with water with greater difficulty.
 - it is easily oxidized to Na^+ .
 - it is easily reduced to Na^- .
 - it is a gas.
- Which one of the following is not a basic physical quantity?
 - Molar mass
 - Temperature
 - Mass
 - Time
- Which one of the following is a derived physical quantity?
 - Volume
 - Molality
 - Force
 - All are derived physical quantities



7. Which of the following is not considered as a potentially toxic element?
- Arsenic
 - Cadmium
 - Mercury
 - Calcium
8. The concentration of glucose solution is $1.8 \times 10^{-2} \text{ mol dm}^{-3}$. What is the concentration of glucose in the SI unit? ($1 \text{ dm} = 10^{-1} \text{ m}$)
- $1.8 \times 10^{-1} \text{ mol dm}^{-3}$
 - 1.8 mol m^{-3}
 - $1.8 \times 10^{-3} \text{ mol m}^{-3}$
 - $1.8 \times 10^{-2} \text{ mol m}^{-3}$
9. A sample of drinking water was analyzed to find out the concentration of chlorine. It was found that 25 mL of a water sample contains 0.25 mg of free chlorine. What is the concentration of chlorine in ppm?
- 25 ppm
 - 4 ppm
 - 10 ppm
 - 0.04 ppm
10. In a balanced chemical equation, each side of the equation should have the same number of
- molecules.
 - atoms.
 - moles.
 - coefficients.
11. One of the reactants in a combustion reaction is _____.
- nitrogen
 - oxygen
 - hydrogen
 - carbon dioxide
12. Which one of the following solutions contains the largest number of moles of chloride ions?
- 10.0 mL of 0.100 M BaCl_2
 - 10.0 mL of 0.100 M NaCl
 - 10.0 mL of 0.200 M KCl
 - 10.0 mL of 0.200 M FeCl_3

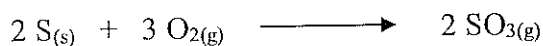


13. How many electrons appear in the following half-reaction when it is balanced?



- a) 2
- b) 6
- c) 3
- d) 4

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



- a) 2 atoms of S and 3 atoms of O₂ form 2 atoms of SO₃
- b) 2 grams of S and 3 grams of O₂ form 2 grams of SO₃
- c) 2 moles of S and 3 moles of O₂ form 2 moles of SO₃
- d) None of them are true

15. How many grams of NaOH (Molecular weight = 40 gmol⁻¹) are there in 500.0 mL of 0.175 mol⁻¹ NaOH solution?

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

16. What volume of a 6.00 M HCl solution must be diluted to 200.0 mL to make a 1.50 M solution of HCl?

- a) 5.0 mL
- b) 10.0 mL
- c) 50.0 mL
- d) 6.0 mL

17. 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) $2\text{Sn}^{2+}(\text{aq}) + \text{Ce}^{4+}(\text{aq}) \longrightarrow 2\text{Sn}^{4+}(\text{aq}) + \text{Ce}^{3+}(\text{aq})$



18. Which one of the following is a correct expression for molarity?
- Mole solute / kg solvent
 - Mole solute / L solvent
 - Mole solute / kg solution
 - Mole solte / L solution
19. Which one of the following should have the lowest boiling point?
- $\text{CH}_3\text{CH}_2\text{CH}_3$
 - CH_3OCH_3
 - $\text{CH}_3\text{CH}_2\text{OH}$
 - CH_3CN
20. Hydrogen-bonding is considered as a special case of _____.
- ion-ion interactions
 - dipole-dipole interactions
 - London-dispersion forces
 - ion-dipole interaction



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REGISTRATION NO:

Part B –Short Answer Questions

(60 marks)

Write answers in the space provided.

1. a) Write the electron configurations of the following atoms/ions. (06 marks)
Atomic numbers: K = 19, Cr = 24, Fe = 26

K =

Cr =

Fe²⁺ =

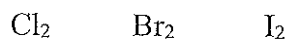
- b) Why is Zinc (Zn) not considered as a transition metal? (04 marks)

- c) Which of the following will have intermolecular hydrogen-bonding? (02 marks)

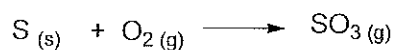
CH₃CH₂OH, CH₃OCH₃, CH₃CH₂NH₂, CH₃SH, CH₃-CH₃



d) Arrange the following compounds in the order of **increasing** boiling point. (03 marks)



2. a) Sulfur trioxide is produced via the reaction given below.



When a mixture of 16.0 g of sulfur and 64.0 g of oxygen are allowed to react,

I. Which is the limiting reagent? (05 marks)

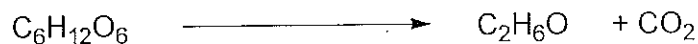
(Atomic masses: S=32 gmol^{-1} , O=16 gmol^{-1})

II. What is the theoretical yield (gram amount) of sulfur trioxide? (03 marks)



- b) The fermentation of glucose produces ethanol and carbon dioxide. How many grams of ethanol would be produced if 240 g of glucose undergoes complete fermentation?
(04 marks)

(Molar masses: Glucose = 180 g/mol, Ethanol = 46 g/mol)



- c) Give two reasons as to why the actual yield of a reaction is less than the theoretical yield. (02 marks)

3. A simple acid-base titration was performed to test the purity of a NaOH sample using the following method. Solid NaOH (1.00g) was dissolved in 100.0 cm³ of water and 25.00 cm³ of the solution was titrated with 0.100 mol l⁻¹ hydrochloric acid using phenolphthalein indicator. 20.40 cm³ of acid was required for the complete neutralization.

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

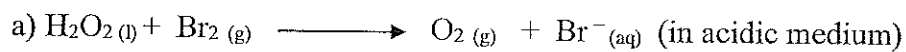
- a) Write the balanced chemical equation (01 marks)

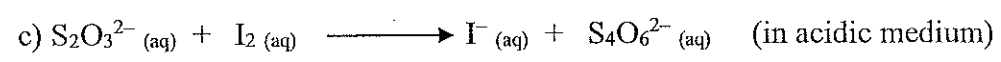
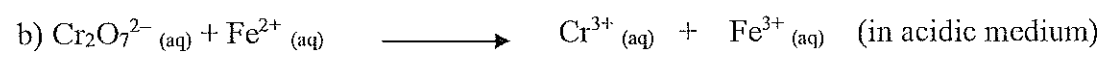


b) Calculate the moles of acid used in the titration and the moles of sodium hydroxide titrated. (06 marks)

c) Calculate the mass of sodium hydroxide titrated and the purity of the sample. (06 marks)

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





Reg No:.....
Name:.....
Address:.....
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