CINEC
CAMPUS
Beyond A Graduate

<u>PAST PAPERS</u>

Faculty	Department / Section/Division
Not Applicable	Learning Resource Centre

Past Papers

Faculty of health science

Bachelor of Science honours in Industrial Pharmaceutical Sciences

Year 1 – Semester II

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Sciences

BSM 1213 – Personality Development

Batch – 05

1st Year 2nd Semester

End semester SEQ Examination

INDEX NUMBER: .... *07* ....

Date   : 23rd of March 2022
Time   : 9.00 am. – 12.00 pm. (Three Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

QUESTION 01 (100 marks)

1.1. Mention five soft skills required to interact with your friends. (15 marks)
1.2. Relate the manner in which the parental characteristics affects your personality. (25 marks)
1.3. Discuss the importance of clarity for effective communication. (30 marks)
1.4. Describe the importance of personality development for professional life. (30 marks)

QUESTION 02 (100 marks)

2.1. Describe the negative impacts that could arise due to disunity among your batchmates. (50 marks)
2.2. Relate the important intrapersonal and interpersonal skills for good teamwork. (50 marks)

QUESTION 03 (100 marks)

3.1. Describe the methods that could be carried out by a person to become more self-aware about himself.
(50 marks)
3.2. Discuss the importance of reflective learning using Bloom's taxonomy. (50 marks)

QUESTION 04 (100 marks)

4.1. Discuss the different types of skills that is needed as a project manager in a business company to understand the different types of clients. (50 marks)
4.2. Relate the importance of personal change to your organization by providing an example. (50 marks)

QUESTION 05 (100 marks)

5.1. Apply and discuss the leadership skills of a leader for the development of our country. (40 marks)
5.2. Discuss the different challenges faced by a religious leader and mention the ways that could be carried out to overcome those challenges. (30 marks)
5.3. Write a short note on a leader who has inspired you. (30 marks)

QUESTION 06 (100 marks)

6.1. List four methods that could be carried out by a person who is anxious to present in public. (20 marks)
6.2. Discuss the importance of visual aids when presenting in public. (30 marks)
6.3. Justify the presentation skills that you need to acquire to deliver an effective presentation to a general audience. (50 marks)

CINEC
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Beyond A Graduate

Faculty of Health Sciences

BSc. (Hons) Industrial Pharmaceutical Science

BSM 1243 Foundation of Chemistry
1st year 2nd semester
Batch - 05
End Semester SEQ Examination

INDEX NUMBER: ....

Date : **22nd of March 2022**
Time : **09.00 a.m. – 11.00 a.m. (Two Hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **FOUR** questions.
- Answer **ALL** the questions.
- You should write the answers in provided sheets legibly in black or blue ink.
- You are not allowed to take out the examination papers.

MATERIALS REQURIED

- You may use a scientific calculator. This must not be programmable and may be inspected during the examination. Programmable calculators, PDAs and mobile phones are not permitted in the examinations.

01. (100 marks)

1.1. State the "Law of constant composition". (10 marks)

1.2. State **02** structural features of an atom proposed by Rutherford in his atomic model.

(10 marks)

1.3. State **05** important points of the Dalton's atomic theory of matter. (20 marks)

1.4. Following is the setup for the argentometric titration. The burette holds 0.100 $molL^{-1}$ $AgNO_3$ (aq) and conical flask holds 0.0500 $molL^{-1}$ 10 mL of NaCl (aq). At the equivalence point $AgCl$ (s) formed in the conical flask. The reaction reached to the equivalence point after the addition of 5 mL of $AgNO_3$ (aq).

0.100 $molL^{-1}$
$AgNO_3$ (aq)

0.0500 $molL^{-1}$
NaCl (aq)
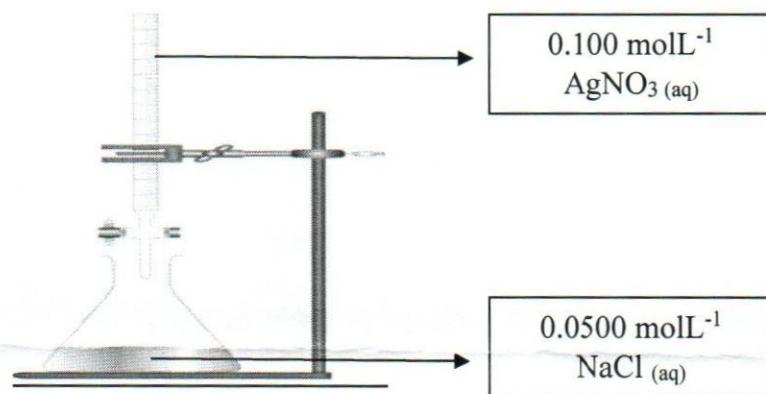
1.4.1. Write the equilibrium for the precipitate with its ions in the solution and calculate the concentration of Cl^- ions in the titration flask (Ksp = 1.7 x 10^{-10} at 25°C). (20 marks)

1.4.2. After the equivalence point, another 1.0 mL of $AgNO_3$ (aq) was added to the conical flask. Calculate the excess Ag^+ ions concentration in the conical flask. (20 marks)

1.4.3. After the addition of excess (1.0 mL) $AgNO_3$ (aq) to the conical flask, the concentration of Ag^+ ions in the resultant solution will be increased and the equilibrium position is shifted for the dissociation of $AgCl$ (s) to the left. Comment on the Cl^- ions concentration in the solution and calculate Cl^- ions concentration in the solution (Ksp = 1.7 x 10^{-10} at 25°C). (20 marks)

02. (100 marks)

2.1. Complex formation is a common characteristic feature of d block elements. Most d block metal ions are bind with six ligand atoms to form complex compounds.

2.1.1. State **02** other characteristic features of d bock elements. (10 marks)

2.1.2. Briefly describe the formation of a complex compound in volumetric analysis.

(20 marks)

2.1.3. State an example for a hexadentate ligand. (10 marks)

2.1.4. The stability constant **(K_{MY})** for the reaction of metal ion with a ligand is given below.

$$M^{n+} + Y^{4-} \rightleftharpoons MY^{(n-4)+}$$

2.1.4.1. Based on the equation given above, write down the balanced chemical equation for the reaction of silver ion $[Ag^+]$ with the ligand $[Y^{4-}]$.

(10 marks)

2.1.4.2. Write the equation to express the stability constant $[K_{AgY}]$ for the reaction mentioned in the section 2.1.4.1. (10 marks)

2.2. Carbon family elements form halides of formula MX_2 and MX_4 (where X = F, Cl, Br, I). One of the elements in this family does not exits the form MI_4. Mention the element and briefly describe why it does not exist in nature. (20 marks)

2.3. The reaction of Al with concentrated nitric acid renders aluminium passive. Briefly describe this statement by providing necessary chemical equations. (20 marks)

03 (100 marks)

3.1. Consider the following balanced reaction.

$$4NH_3 + 5O_2 \rightarrow 6H_2O + 4NO$$

3.1.1. How many moles of NO can be made using 1.3 moL of NH_3? (10 marks)

3.1.2. How many grams of H_2O can be made from 47g of NH_3? (10 marks)

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3.2. Write the electron configuration of following elements. (15 marks)

3.2.1. Cd (atomic number: 48)

3.2.2. Sr (atomic number: 38)

3.2.3. Mn (atomic number: 25)

3.3. Briefly describe the formation of ionic bonds and covalent bonds. (15 marks)

3.4. X" is an element found in the periodic table and the molecular weight of this element is 23.00 gmoL^{-1}.

3.4.1. State **04** industrially important compounds of element "X". (20 marks)

3.4.2. One of the compounds of element "X" is produced by using Castner-Kellner cell. A brine solution is electrolyzed using a mercury cathode and a carbon anode. State the name of the compound and write down the anode and cathode reaction.

(20 marks)

3.4.3. State **02** characteristic features of element "X". (10 marks)

04 **(100 marks)**

4.1. State **02** models have been developed to describe the covalent bonding. (05 marks)

4.2. Draw the molecular orbital arrangement of following organic molecules. (20 marks)

4.2.1. $CH_2=CH_2$

4.2.2. $CH\equiv CH$

4.3. Name the following organic molecules according to the IUPAC nomenclature. (25 marks)

a)

b)

c)

$H_3C-\overset{\overset{\displaystyle O}{\|}}{C}-NH_2$

d)

$\overset{\displaystyle CH_3}{\underset{\displaystyle }{|}}$
$CH_3C=CH_2$

e)

$C\equiv N$

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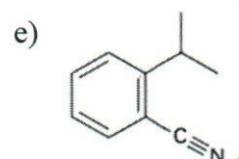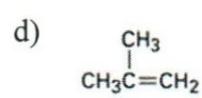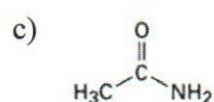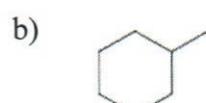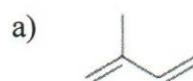
4.4. Draw the following organic molecules.   (25 marks)

    a) 2,4-Dimethylheptane

    b) cis-1,4-Dichlorocyclohexane

    c) 3-Methyl-2-nitrobenzoic acid

    d) p-Iodonitrobenzene

    e) Hex-2-en-4-ynoic acid

4.5. Write a short note on stereoisomers by giving examples.   (15 marks)

4.6. Briefly describe the open, closed, and isolate systems in thermodynamics.   (10 marks)

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Approved for Quality Management System

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Sciences

BSM 1243 Foundation of Chemistry
1st year 2nd semester

End Semester SEQ Examination

INDEX NUMBER: ....

Date	:	13th January 2020
Time	:	1.30 pm – 4.30 pm - Three Hours

INSTRUCTIONS TO CANDIDATES
- This question paper consists of **Six** questions.
- Answer **ALL** questions
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers

MATERIALS REQURIED
- You may use a scientific calculator. This must not be programmable and may be inspected during the examination. Programmable calculators, PDAs and mobile phones are not permitted in the examinations.

QUESTION 01 (100 marks)

1.1. Define the term **"The Law of Constant Composition"**. (10 marks)

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1.2. The atomic theory of matter explains the nature of matter of the materials formed.

1.2.1. State 05 **(Five)** important points of the atomic theory of matter. (20 marks)

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1.2.2. State the **Heisenberg Uncertainty Principle** in related to the electron. (10 marks)

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1.3. **HA** is a weak acid which is not completely dissociated in the aqueous solution. The acid **HA** and its corresponding base **A⁻** are said to be a conjugated acid-base pair due to gain or loss of a proton. The dissociation of this weak acid is given below.

$$HA_{(aq)} \rightleftharpoons H^+_{(aq)} + A^-_{(aq)}$$

1.3.1. Define the term "**Ka**".   (10 marks)

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1.3.2. Write down the equation for **Ka** of this weak acid.   (10 marks)

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1.3.3. Write down the **Henderson Hasselbalch** equation for the weak acid HA.   (10 marks)

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1.3.4. Sodium hypochlorite [NaOCl] was dissolved in a solution, buffered to pH 6.20. Find the

ratio of [OCl⁻ / HOCl] in this solution. PKa for Hypochlorous acid is **7.53**.   (15 marks)

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1.4. Formic acid (HCOOH) and Benzoic acid (C_6H_5COOH) are weak acids. The dissociation of these two acids can be expressed as follows.

$$HCOOH_{(aq)} \rightleftharpoons HCOO^-_{(aq)} + H^+_{(aq)} \qquad\qquad K_a = 1.80 \times 10^{-4}\text{ ; } PK_a = 3.744$$

$$C_6H_5COOH_{(aq)} \rightleftharpoons C_6H_5COO^-_{(aq)} + H^+_{(aq)} \qquad K_a = 6.28 \times 10^{-5}\text{ ; } PK_a = 4.202$$
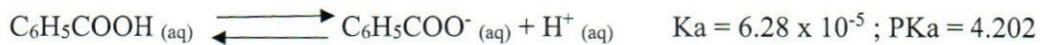
1.4.1. Which acid is the strongest? (05 marks)

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1.4.2. Briefly explain the reason for the answer in section **1.4.1.** (10 marks)

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QUESTION 02 (100 marks)

2.1.

2.1.1. What is an **ion-dipole force**? (10 marks)

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2.1.2. State the type of molecular geometry and draw the molecular structures of the following
compounds. (15 marks)

1. PO_4^{3-}

2. CO_3^{2-}

3. ICl_4^-

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2.2.

2.2.1. Write 04 (**Four**) factors which affects the rate of a reaction. (05 marks)

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2.2.2. What are the methods to determine the rate of a reaction? (10 marks)

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2.3. HI dissociates to form I_2 and H_2 as follows.

$2HI_{(g)} \rightarrow H_{2(g)} + I_{2(g)}$
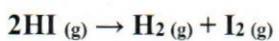
If the concentration of HI changes at a rate **of −0.345 M/s,** what is the rate of appearance of $I_{2(g)}$?

(15 marks)

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2.4. $N_2{}_{(g)} + 3H_2{}_{(g)} \rightleftarrows 2NH_3{}_{(g)}$
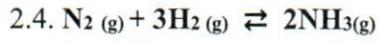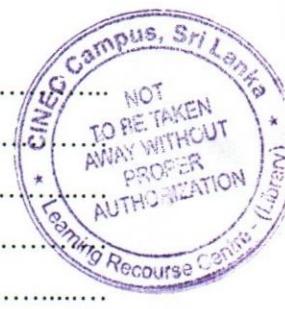
According to the chemical reaction mentioned above, 2.5 moles of H_2 react with N_2 to form NH_3 at 50^0C inside a $5dm^3$ vessel. At equilibrium, **0.298 moles** of NH_3 is present. The **Kc** for the reaction is **0.079mol^{-2}dm^6**.

2.4.1. Calculate the value of **Kp** (R= 8.314 Jmol^{-1} K^{-1}).   (15 marks)

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2.4.2. Calculate the initial concentration of $N_2{}_{(g)}$.   (30 marks)

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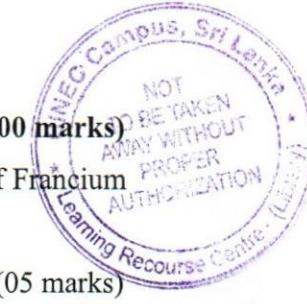
QUESTION 03 (100 marks)

3.1. Francium is a metallic element found in the periodic table. The atomic number of Francium is 87.

3.1.1. Define the term **"Atomic number"**. (05 marks)

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3.1.2. State 04 **(Four)** metallic properties of Francium. (10 marks)

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3.1.3. Mention 02 **(Two)** distinct characteristics of the family in which Francium belongs to.

(10 marks)

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3.2. Briefly describe the **"passivation"** process (Answer should include necessary chemical reactions). (10 marks)

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3.3. Some elements in the periodic table are reactive, bond easily with other elements to make compounds and are only found in nature bonded with other elements. Based on this statement, briefly explain the reasons for makes an element reactive.

(15 marks)

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3.4. Complex formation is a common feature of d block elements. Most of the d block elements are known as transition metals. Most transition metal ions are bind with six ligand atoms to form complex compounds.

3.4.1. State 04 **(Four)** characteristics of d bock elements. (10 marks)

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3.4.2. Briefly explain one of the characteristics stated in the section **3.4.1.** (10 marks)

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3.4.3. Define the term "**Complex compound**". (05 marks)

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3.4.4. State an example for a **hexadentate** ligand. (05 marks)

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3.4.5. Briefly explain the chelating effect of the ligands. (10 marks)

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3.5. The stability constant (K_{MY}) for the reaction of metal ion with a ligand is given below.

$$M^{n+} + Y^{4-} \rightleftharpoons MY^{(n-4)+}$$

3.5.1. Based on the equation given above, write down the balanced chemical equation for the reaction of Silver ion $[Ag^+]$ with the ligand $[Y^{4-}]$. (05 marks)

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3.5.2. Write down the equation to express the stability constant $[K_{AgY}]$ for the reaction mentioned in the section **3.5.1.** (05 marks)

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QUESTION 04 (100 marks)

4.1. **"X"** is an element in the periodic table which has a 40.08 gmol^{-1} atomic mass.

4.1.1. State 04 **(Four)** industrially important compounds of the element "X". (10 marks)

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4.1.2. **XCO₃** is one of the commercially important compounds which can be occurred in nature in several forms. State 02 **(Two)** methods of preparing **XCO₃** in commercially by providing balanced chemical equations. (20 marks)

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4.1.3. Briefly explain the properties of **XCO₃**. (10 marks)

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4.1.4. State 04 **(Four)** industrial uses of **XCO₃**.   (10 marks)

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4.2. Carbon monoxide **(CO)** and Carbon dioxide **(CO₂)** are important compounds of carbon. Both of these compounds have many uses in field of Chemistry.

4.2.1. **CO** is widely used in the extraction of many metals from the respective oxides ores. Comment on this statement in related to the properties of **CO**.   (05 marks)

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4.2.2. **Water gas** and **producer gas** are very important industrial fuels. State the balanced chemical equations and necessary conditions for the production of **water gas** and **producer gas.**   (10 marks)

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4.2.3. **CO₂** is dissolved in water and forms carbonic acid which is a weak dibasic acid. Write down the balanced chemical equations for the dissociation of carbonic acid in water.

(10 marks)

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4.3. Acidified Potassium permanganate **(KMnO₄)** solution is widely used in the analytical chemistry as an oxidizing agent. In acid solutions with the present of **KMnO₄**, Iodine is liberated from potassium iodide. Write down the balanced oxidation half reaction for iodide.

(05 marks)

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4.4. Briefly explain the preparation procedure of **Potassium dichromate** from chromite ore. (Answer should include all the necessary chemical reactions involved in this process).

(20 marks)

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QUESTION 05 **(100 marks)**

5.1. Briefly describe any 02 (**Two**) different types of polysaccharides, two examples per each type and relevant function. (25 marks)

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5.2. State the structural difference between triacylglycerols and phosphoacylglycerols.

(10 marks)

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5.3. Write short account on any 05 (**Five**) different types of proteins, their functions and one example per each function you mentioned. (40 marks)

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5.4.

5.4.1. Giving all examples per each type, name different types of nitrogenous bases found in nucleic acids. (15 marks)

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5.4.2. DNA is a polymer of deoxyribose nucleotide. Draw the schematic diagram of **deoxyribose nucleotide**. (10 marks)

QUESTION 06 (100 marks)

6.1. Humulone, $C_{21}H_{30}O_5$ is one of the flavor components that gives a bitter taste to the hops used in making beer.

6.1.1. Calculate the molar mass of Humulone. (C=12.01 g, H=1 .008 g, O=16.00 g)   (10 marks)

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6.1.2. How many moles of $C_{21}H_{30}O_5$ molecules are in 275 mg of humulone?   (10 marks)

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6.1.3. Calculate the mass of 0.60 mol of humulone.   (10 marks)

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6.2.

6.2.1. What is meant by stoichiometry? (10 marks)

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6.2.2. Balance the following chemical equations. (10 marks)

i. $AgNO_3\ _{(aq)} + H_2SO_4\ _{(aq)} \longrightarrow Ag_2SO_4\ _{(S)} + HNO_3\ _{(aq)}$

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ii. $NaHCO_3\ _{(s)} + HCl\ _{(aq)} \longrightarrow NaCl\ _{(aq)} + H_2O\ _{(l)} + CO_2\ _{(aq)}$

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6.3. Define metabolism. (20 marks)

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6.4. Describe the method of energy (ATP) generation from carbohydrate catabolism.   (30 marks)