



PAST PAPERS

Faculty	Department / Section/Division
Not Applicable	Learning Resource Centre

Past Papers

Faculty of health science

Bachelor of Science honours in cosmetic science

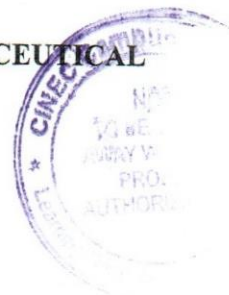
Year 1 – Semester II

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Faculty of Health Sciences
BSC. (HONS) BIOMEDICAL SCIENCE/ BSC. (HONS) INDUSTRIAL PHARMACEUTICAL
SCIENCE/ BSC. (HONS) COSMETIC SCIENCE

BSM 1233 – General Psychology
End Semester Examination SEQ
1st Year 2nd Semester
6th Batch



Date: 22nd September 2023

Time: 09.00 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.

Question 01

(100 Marks)

- 1.1 Define 'psychology'. (10 Marks)
- 1.2 What is the difference between Greek dualism and monism of the body and soul? (20 Marks)
- 1.3 Describe **three (03)** major types of psychologists and give at least **one (01)** example of each and describe briefly the type of work they did. (30 Marks)
- 1.4 Explain the **three (03) main** areas of Industrial-organization psychology. (40 Marks)

Question 02

(100 Marks)

- 2.1 Name **two (02)** neurotransmitters. (10 Marks)
- 2.2 Describe the **four (04) lobes** of the brain and their **two (02)** functions each. (20 Marks)
- 2.3 Describe the structure of a neuron using a **labelled diagram**. (30 Marks)
- 2.4 Another characteristic shown by animals is the ability to respond to their surroundings. For example, a person may withdraw their hand from a hot object. Describe the sequence of neuron events related to the that cause this response using a graph. (40 Marks)

Question 03

(100 Marks)

- 3.1 What is the difference between Growth and development? (15 Marks)
- 3.2 List **five (05)** 'reflexes of infants' related to the motor development of an infant. (20 Marks)
- 3.3 Describe Freud's Psychosexual Stages of Human Development with an example for each stage. (30 Marks)
- 3.4 "Teenagers often become angry, and stubborn and they are in constant anxiety". Explain the above sentence using the theories you have learned under Development Psychology. (35 Marks)

Question 04

(100 Marks)

- 4.1 Define 'intelligence'. (15 Marks)
- 4.2 What was the equation for calculating an IQ score? Clarify what IQ, MA and CA represent. (20 Marks)
- 4.3 Vanessa has a mental age of 13 and a chronological age of 10. Calculate her IQ. (30 Marks)
- 4.4 Name each of Gardner's multiple intelligences as they apply to the following examples. (35 Marks)
The first one is done for you.

<i>Linguistic</i>	Understanding Shakespeare
	Understanding the pattern of the tides and waves
	Understanding logical reasoning
	Knowing your strengths and weaknesses
	Fitting lots of luggage in the boot of the car
	Relating to and understanding others
	Singing a melody
	Playing netball

Question 05

(100 Marks)

- 5.1 List **three (03)** approaches to personality assessments. (15 Marks)
- 5.2 Outline Gordon Allport's **three (03)** kinds of personality traits. (30 Marks)
- 5.3 Briefly describe 'dreams.' (25 Marks)
- 5.4 Muscles tense and beads of sweat appear. This combination of reactions to stress is also known as the "fight-or-flight" response because it evolved as a survival mechanism, enabling people and other mammals to react quickly to life-threatening situations. (30 Marks)
Explain the body's main stress response pathway.

Question 06

(100 Marks)

- 6.1 What are the main functions of 'Attention'? (10 Marks)
- 6.2 Briefly describe the perceptual process with an example. (25 Marks)
- 6.3 Describe 'the multi-store model of memory'. (25 Marks)
- 6.4 Malithi who is going to face the G.C.E Ordinary Level exam this year is struggling to remember her lessons. (40 Marks)
Describe **four (04)** techniques that she can use to improve her memory.



Faculty of Health Sciences
Bachelor of Science (Honours) in Biomedical Sciences/ Bachelor of Science
(Honours) in Industrial Pharmaceutical Sciences/Bachelor of Science
(Honours) in cosmeceutical Sciences
BSM 1223 Professional English
Batch – 06
1st Year 2nd Semester
End Semester SEQ Examination

Date : 21.09.2023
Time : 9.00 am. – 11.00 am. (Two Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **FOUR** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

QUESTION 01

(100 Marks)

Read the following passage and answer the questions.

Changing our Understanding of Health

A

The concept of health holds different meanings for different people and groups. These meanings of health have also changed over time. This change is no more evident than in Western society today when notions of health and health promotion are being challenged and expanded in new ways.

B

For much of recent Western history, health has been viewed in the physical sense only. That is, good health has been connected to the smooth mechanical operation of the body, while ill health has been attributed to a breakdown in this machine. Health in this sense has been defined as the absence of disease or illness and is seen in medical terms. According to this view, creating health for people means providing medical care to treat or prevent disease and illness. During this period, there was an emphasis on providing clean water, improved sanitation and housing.

C

In the late 1940s the World Health Organization challenged this physically and medically oriented view of health. They stated that 'health is a complete state of physical, mental and social well-being and is not merely the absence of disease' (WHO, 1946). Health and the person were seen more holistically (mind/body/spirit) and not just in physical terms.

D

The 1970s was a time of focusing on the prevention of disease and illness by emphasizing the importance of the lifestyle and behavior of the individual. Specific behaviors which were seen to increase the risk of disease, such as smoking, lack of fitness and unhealthy eating habits, were targeted. Creating health meant providing not only medical health care, but health promotion programs and policies which would help people maintain healthy behaviors and lifestyles. While these individualistic healthy lifestyles approach to health worked for some (the wealthy members of society), people experiencing poverty, unemployment, underemployment, or little control over the conditions of their daily lives benefited little from this approach. This was largely because both the healthy lifestyles approach and the medical approach to health largely ignored the social and environmental conditions affecting the health of people.

E

During 1980s and 1990s there has been a growing swing away from seeing lifestyle risks as the root cause of poor health. While lifestyle factors still remain important, health is being viewed also in terms of the social, economic and environmental contexts in which people live. This broad approach to health is called the socio-ecological view of health. The broad socio-ecological view of health was endorsed at the first International Conference of Health Promotion held in 1986, Ottawa, Canada, where people from 38 countries agreed and declared that: The fundamental conditions and resources for health are peace, shelter, education, food, a viable income, a stable eco-system, sustainable resources, social justice and equity. Improvement in health requires a secure foundation in these basic requirements. (WHO, 1986) It is clear from this statement that the creation of health is about much more than encouraging healthy individual behaviors and lifestyles and providing appropriate medical care. Therefore, the creation of health must include addressing issues such as poverty, pollution, urbanization, natural resource depletion, social alienation, and poor working conditions. The social, economic, and environmental contexts which contribute to the creation of health do not operate separately or independently of each other. Rather, they are interacting and interdependent, and it is the complex interrelationships between them which determine the conditions that promote health. A broad socio-ecological view of health suggests that the promotion of health must include a strong social, economic and environmental focus.

F

At the Ottawa Conference in 1986, a charter was developed which outlined new directions for health promotion based on the socio-ecological view of health. This charter, known as the Ottawa Charter for Health Promotion, remains the backbone of health action today. In exploring the scope of health promotion, it states that: good health is a major resource for social, economic and personal development and an important dimension of quality of life. Political, economic, social, cultural, environmental, behavioral, and biological factors can all favor health or be harmful to it. (WHO, 1986) The Ottawa Charter brings practical meaning and action to this broad notion of health promotion. It presents fundamental strategies and approaches in achieving health for all. The overall philosophy of health promotion which guides these fundamental strategies and approaches is one of 'enabling people to increase control over and to improve their health' (WHO, 1986).

1.1 Using NO MORE THAN THREE WORDS from the passage, answer the following questions.

(50 marks)

- 1.1.1. In which year did the World Health Organization define health in terms of mental, physical and social well-being?
- 1.1.2. Which members of society benefited most from the healthy lifestyles approach to health?

- 1.1.3. Name the three broad areas which relate to people's health, according to the socio-ecological view of health.
- 1.1.4. During which decade were lifestyle risks seen as the major contributors to poor health?
- 1.1.5. Mention the official document that details the basic information to attain health for all.
- 1.2 Do the following statements agree with the information in the passage. Write YES if the statement agrees with the information NO if the statement contradicts the information NOT GIVEN if there is no information on this in the passage. (50 marks)
- 1.2.1 Doctors have been instrumental in improving living standards in Western society.
- 1.2.2 The approach to health during the 1970s included the introduction of health awareness programs.
- 1.2.3 The socio-ecological view of health recognizes that lifestyle habits and the provision of adequate health care are critical factors governing health.
- 1.2.4 The principles of the Ottawa Charter are considered to be out of date in the 1990s.
- 1.2.5 In recent years a number of additional countries have subscribed to the Ottawa Charter.

QUESTION 02**(100 Marks)**

- 2.1 Write the following in the passive voice. (100 marks)
- 2.1.1 When someone posts letters, someone sorts them out at the central post office and someone sends them to specified destinations and addresses.
- 2.1.2 The policemen arrested a mass murderer. They questioned him and took him to the courts. The judge sentenced him to life imprisonment.
- 2.1.3 When someone takes in food, the chemicals degrade the food. Next, the body absorbs the nutrients and removes the indigestible food.
- 2.1.4 When someone sends an application for a loan, the bank will verify the given information. He should also give his sources of income. After scrutiny, they will inform the applicant to come to the bank.
- 2.1.5 Someone has broken a glass and scattered small pieces of glass. If someone tramples them, they will cut their foot. Then someone must be taken to hospital immediately.

QUESTION 03**(100 Marks)**

- 3.1 Find the main idea of the following passages. (100 marks)
- 3.1.1 Microbes, most of them bacteria, have populated this planet since long before animal life developed, and they will outlive us. Invisible to the naked eye, they are ubiquitous. They inhabit the soil, air, rocks and water and are present within every form of life, from seaweed and coral to dogs and humans. And, as Yong explains in his utterly absorbing and hugely important book, we mess with them at our peril.
- 3.1.2 Every species has its own colony of microbes, called a 'microbiome', and these microbes vary not only between species but also between individuals and within different parts of each individual. What is amazing is that while the number of human cells in the average person is about 30 trillion, the number of microbial ones is higher – about 39 trillion. At best, Yong

informs us, we are only 50 per cent human. Indeed, some scientists even suggest we should think of each species and its microbes as a single unit, dubbed a 'holobiont'.

- 3.1.3 In each human there are microbes that live only in the stomach, the mouth or the armpit and by and large they do so peacefully. So 'bad' microbes are just microbes out of context. Microbes that sit contentedly in the human gut (where there are more microbes than there are stars in the galaxy) can become deadly if they find their way into the bloodstream. These communities are constantly changing too. The right-hand shares just one sixth of its microbes with the left hand. And, of course, we are surrounded by microbes. Every time we eat, we swallow a million microbes in each gram of food; we are continually swapping microbes with other humans, pets and the world at large.
- 3.1.4 For most of human history we had no idea that microbes existed. The first man to see these extraordinarily potent creatures was a Dutch lens-maker called Antony van Leeuwenhoek in the 1670s. Using microscopes of his own design that could magnify up to 270 times, he examined a drop of water from a nearby lake and found it teeming with tiny creatures he called 'animalcules'. It wasn't until nearly two hundred years later that the research of French biologist Louis Pasteur indicated that some microbes caused disease. It was Pasteur's 'germ theory' that gave bacteria the poor image that endures today.

QUESTION 04

(100 Marks)

4.1 Join the following sentences below using the linking verbs provided.

(100 marks)

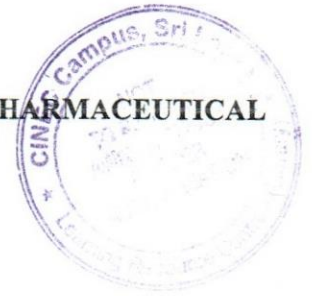
- 4.1.1 The negotiators hope to effect a smooth transition to an interim government. They expect to restore law and order in the country. [not only ...but also]
- 4.1.2 Smokers have a right to smoke. Non-smokers have a right to breathe smoke-free air. [on the one hand...on the other hand]
- 4.1.3 It is important that we make a concerted effort. There is little chance that we will succeed in changing the law. (nevertheless)
- 4.1.4 The president doesn't have any concern for the plight of the people. The authorities don't have any concern for the plight of the people. [neither..... nor]
- 4.1.5 He applied for hundreds of jobs. He is still out of work. [despite]



Faculty of Health Sciences

BSC. (HONS) BIOMEDICAL SCIENCE/ BSC. (HONS) INDUSTRIAL PHARMACEUTICAL
SCIENCE/ BSC. (HONS) COSMETIC SCIENCE

BSM 1213 Personality Development
1st Year 2nd Semester
END-SEMESTER Assignment
6th Batch

Date: 20th September 2023

Time: 13.30 pm – 14.30 pm – One Hour

INSTRUCTIONS TO CANDIDATES Page

- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01**(100 Marks)**

The following diagram denotes the Johari Window model prepared by Nimali to represent her own characteristics.

Known to all	Known to Self only
Known to Others only	Hidden

- 1.1 What is known as the Johari's Window model? (15 marks)
- 1.2. Do you think that Nimali has good interpersonal skills? Provide reasons for your answer. (35 marks)
- 1.3 Interpret your own interpersonal skills using a Johari Window model. (50 marks)

Question 02**(100 Marks)**

- 2.1 What is known as emotional intelligence? (25 marks)
- 2.2 How would you resolve a dispute between two colleagues using emotional intelligence? (75 marks)



Faculty of Health Sciences

**BSC. (HONS) BIOMEDICAL SCIENCE/ BSC. (HONS) INDUSTRIAL PHARMACEUTICAL
SCIENCE/ BSC. (HONS) COSMETIC SCIENCE**

BSM 1213 Personality Development

1st Year 2nd Semester

END-SEMESTER SEQ

6th Batch



Date: 20th September 2023

Time: 09.00 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.

Question 01

(100 Marks)

- 1.1 State **four (04)** factors that affect for personality development. (20 marks)
- 1.2 Mention **four (04)** ways in which you could convert your negative qualities so as to gain a good personality. (20 marks)
- 1.3 Differentiate between hard skills and soft skills. (30 marks)
- 1.4 Describe the effect of birth order on your personality. (30 marks)

Question 02

(100 Marks)

- 2.1 Outline the important soft skills to interact with your batchmates. (15 marks)
- 2.2 Write short notes on the following.
 - 2.2.1 Importance of Clarity for effective communication (30 marks)
 - 2.2.2 Importance of Completeness for effective communication (30 marks)
 - 2.2.3 Barriers of communication (25 marks)

Question 03

(100 Marks)

- 3.1 Discuss the importance of communication skills to understand clients. (30 marks)
- 3.2 Describe the benefits of developing skills to understand the clients well. (30 marks)
- 3.3 As, a project manager of an organization, discuss the different skills required to understand different types of clients. (40 marks)

Question 04

- 4.1 Define the word 'change' in the organizational context. (10 marks)
- 4.2 Briefly describe **four (04)** causes of change. (20 marks)
- 4.3 Explain 'Kurt Lewin's change model' using an example. (30 marks)
- 4.4 Resistance to change is the most common reason why many change initiatives fail.
"People resist change. It's important to recognize that managing change is about upsetting people only at a rate that they can tolerate".
 - 4.4.1 Briefly explain **three (04)** reasons that people resist change. (20 marks)
 - 4.4.2 Describe **two (02)** techniques in reducing resistance to change. (20 marks)

Question 05

(100 Marks)

- 5.1 What is 'leadership'? (15 marks)
- 5.2 Discuss different types of skills required by a leading business manager to provide a quality work environment for his/her employees. (20 marks)
- 5.3 Briefly describe **five (05)** challenges of being a leader in the corporate sector. (25 marks)
- 5.4 Explain **four (04)** Types of Leadership Styles with one example for each style. (40 marks)

Question 06

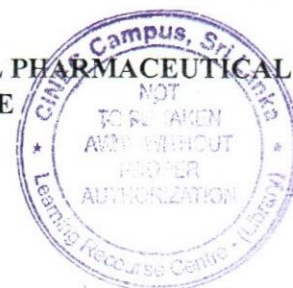
(100 Marks)

- 6.1 List **four (04)** techniques that can be used in building rapport with the audience when presenting a presentation. (20 marks)
- 6.2 What are the characteristics of a well-functioning, effective 'group'? (20 marks)
- 6.3 In 1965, Bruce Tuckman, an American psychological researcher, identified five stages of group formation. (25 marks)
Briefly describe each stage of group formation.
- 6.4 Explain effective communication using Johari's Window model of communication with examples. (35 marks)



Faculty of Health Sciences
BSC. (HONS) BIOMEDICAL SCIENCE/ BSC. (HONS) INDUSTRIAL PHARMACEUTICAL
SCIENCE/ BSC. (HONS) COSMETIC SCIENCE

BSM 1243 Foundation of Chemistry
End Semester Examination SEQ
1st Year 2nd Semester
6th Batch



Date: 19th of September 2023

Time: 09.00 am – 12.00 pm - Three Hours

INSTRUCTIONS TO CANDIDATES Page

- This question paper consists of **four** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01

(100 marks)

1.1 When the initial rate of this reaction was measured at various starting concentrations of the three reactants, the following results were obtained.

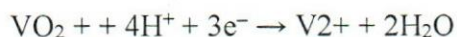
experiment number	[CH ₃ CHO] /mol dm ⁻³	[CH ₃ OH] /mol dm ⁻³	[H ⁺] /mol dm ⁻³	relative rate
1	0.20	0.10	0.05	1.00
2	0.25	0.10	0.05	1.25
3	0.25	0.16	0.05	2.00
4	0.20	0.16	0.10	3.20

- 1.1.1 Use the data from the table and write the rate equation for the reaction. (30 marks)
- 1.1.3 State the units of the rate constant in the rate equation. (10 marks)
- 1.1.4 Calculate the relative rate of reaction for a mixture in which the starting concentrations of all three reactants are 0.20 mol dm⁻³
- 1.1.5 Find the half-life of [CH₃CHO]. (10 marks)
- 1.1.6 Sketch graphs for each reactants of the reaction showing how the rate of the reaction changes with the concentration. (30 marks)
- 1.2 This question is about equilibrium systems. An equilibrium exists in aqueous solution between the chromate (VI) ions and the dichromate (VI) ions.
 Explain any change in the position of equilibrium if a few drops of sodium hydroxide solution are added to this equilibrium system. (20 marks)

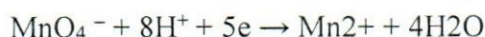
Question 02

(100 marks)

2.1 An impure sample of ammonium vanadate (V), NH_4VO_3 , with mass 0.150g, is dissolved in an excess of dilute acid. In this solution all vanadium is present as VO_2^+ ions. An excess of zinc powder is added to the solution and all the VO_2^+ ions are reduced to V^{2+} ions. The mixture is filtered to remove any remaining zinc powder.



When the resulting solution is titrated, 20.10cm³ of 0.0250mol dm⁻³ acidified MnO_4^- oxidizes all V^{2+} ions back to VO_2^+ ions.



Calculate the percentage by mass of NH_4VO_3 in the 0.150g impure sample of NH_4VO_3 .

Give your answer to three significant figures. [Mr : NH_4VO_3 , 116.9]

(20 marks)

2.2

2.2.1 The table below shows the elements in the third period of the Periodic Table, the number of electrons in their outer energy level, their oxidation state in their common compo and their melting points.

element	Na	Mg	Al	Si	P	S	Cl	Ar
number of outer electrons	1	2						
oxidation state	+1	+2	+3	+4/-4	-3	-2	-1	0
melting point/°C	98	650	660	1414	317	115	-101	-189

2.2.2.1 Explain why Na, Mg and Al are good conductors of electricity. (10 marks)

2.2.2.2 Which element exists as diatomic molecules of the type X_2 ? (10 marks)

2.2.2.3 Silicon has a similar structure to diamond. Explain why silicon has the highest melting point in the period. (10 marks)

2.2.2.4 Sodium chloride is a crystalline solid with a high melting point. It dissolves in water to give a neutral solution. Phosphorus trichloride is a liquid at room temperature. It reacts with water to form an acidic solution. Suggest an explanation for these differences in properties.

(10 marks)

2.2.2.5 Draw a dot-and-cross diagram showing the bonding in magnesium oxide. Show outer electrons only. (10 marks)

2.3 Draw the molecular orbital diagram of He^+ and figure out the bond order of the molecule. (30 marks)

Question 03

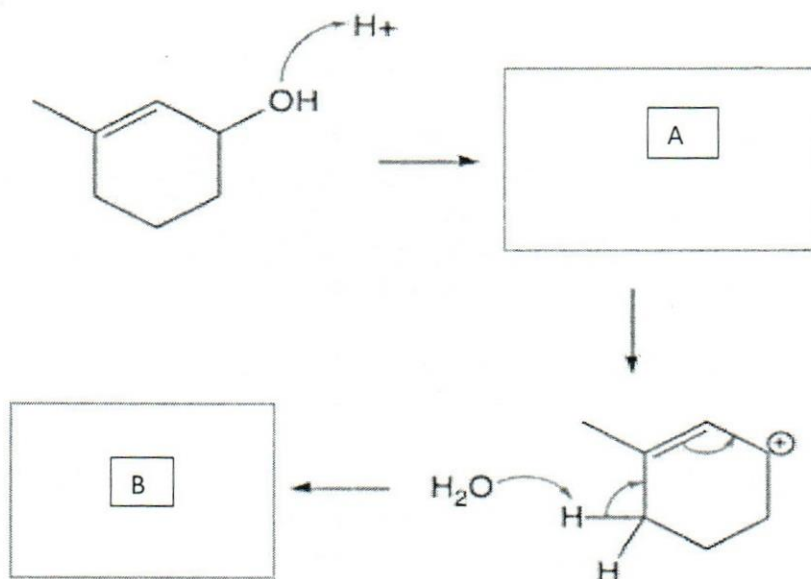
(100 marks)

3.1 Draw the structures for the following IUPAC names.

- 3.1.1 Propan -2-ol
 3.1.2 1,3- hexanediol
 3.1.3 2- propylcyclohexanol
 3.1.4 2-pentanone
 3.1.5 2,4,6-tribromophenol

(25 marks)

3.2 Complete the given A and B boxes based on the arrow- pushing mechanism given below. (20 marks)



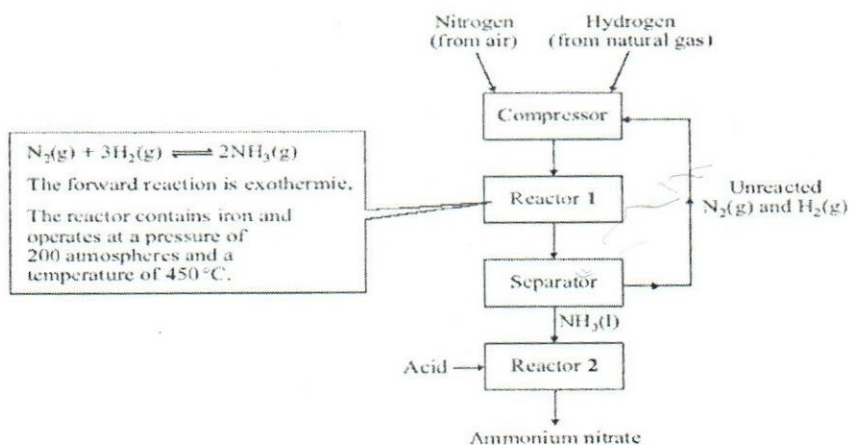
3.3 Calcium (Ca) is a S-block element and its physical and chemical properties are closely related to its electronic structure and size.

- 3.3.1 Write the electron configuration of Ca^{+2} according to the Hund's rule.
 (Mass number of Ca is 40 gmol^{-1} and the atomic number is 20) (15 marks)
- 3.3.2 Briefly explain why 3rd ionization energy is large compare to the 1st and 2nd ionization energy of Calcium (Ca) (20 marks)
- 3.3.3 Given that melting point of Ca is larger than the melting point of Ba. Explain the reason for the difference in the melting points. (20 marks)

Question 04

(100 marks)

4.1 The following questions are based on the Haber-Bosh process method.

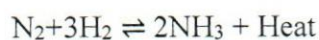


4.1.1 What is the purpose of the iron in reactor 1? (10 marks)

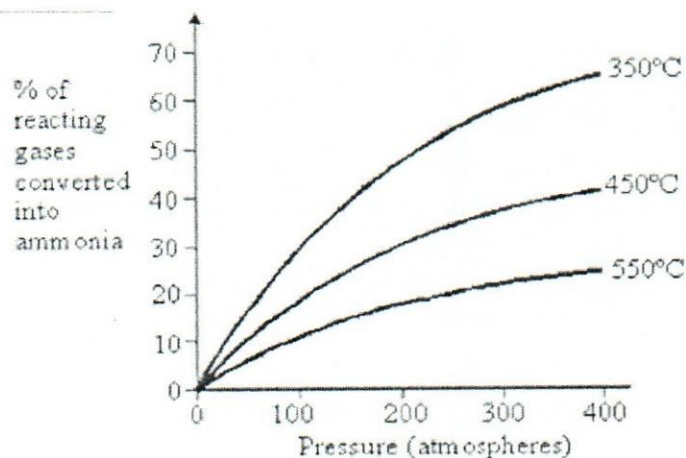
4.1.2 Write the balance reaction for hydrogen gas obtained from natural gas. Consider methane (CH₄) as the main component of natural gas. (20 marks)

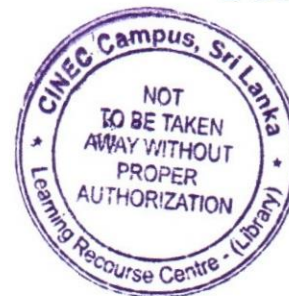
4.1.3 In the separator, it consists of a mixture of ammonia, hydrogen and nitrogen. Briefly explain how to separate the ammonia from the other gases? (30 marks)

4.2 The optimum industrial conditions employed for the process are a temperature in the range of 450-500 °C, and a pressure of 250-300 atm.



4.2.1 Following graph is for the yield of ammonia produced with changes made to temperature and pressure. Briefly describe the low yield of ammonia at 550°C (40 marks)



**Faculty of Health Sciences**

**BSc (Hons) Biomedical Sciences/ BSc (Hons) Industrial Pharmaceutical
Sciences/ BSc (Hons) Cosmetic Sciences
PROFESSIONAL ENGLISH – BSM 1223
1st YEAR 2ND SEMESTER -MID EXAMINATION SEQ -BATCH 06**

Date : 2023-05-25
Time : 9.00 A.M – 10.00 A.M (1 HOURS)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink

QUESTION 01**(100 Marks)**

1.1 Read the following passage and answer the questions based on it.

Quantum Computing and Stimulation

Simson L. Garfinkel and Chris J. Hoofnagle

Overview

Quantum computers have garnered enormous interest and media attention because of their predicted ability to one-day crack encryption algorithms that are widely used today. While such machines would have profound impacts within both the public and private sectors, they are not predicted to become a reality for at least a decade or, by some estimates, as many as forty years—if ever. By contrast, powerful quantum simulators are nearly a reality. Their practical applications could be just two years away.

In its 2019 report on quantum computing, the U.S. National Academy of Sciences identified quantum simulators as a potentially practical, near-term commercial application of today's computers. That same year, a National Science Foundation workshop found that, while reliable universal digital quantum computers are "likely decades away," special- purpose machines built to solve specific problems beyond the range of today's conventional computers "offer extraordinary opportunities for applications realizable on a 2-5 year time scale." Indeed, even if a "quantum winter" of decreased investment due to inadequate progress in large-scale general-purpose quantum computing occurs, quantum simulators might nonetheless rapidly move from the laboratory to practice.

What is a quantum computer?

Quantum computers take a different approach to computing from traditional digital machines, one based on calculating probabilities instead of discrete values. Rather than processing bits that can represent only a 0 or 1, they compute with qubits (quantum bits), which can initially represent many values.

Quantum computers then manipulate the qubits with mechanisms called quantum gates, causing the qubits to change over time. Finally, each qubit is measured by a conventional computer and converted to a 0 or 1 that the ordinary digital computer can record. This process may need to be repeated many times for a single quantum computation. These inherent differences in structure and methodology between standard digital and quantum computers make each best suited to very different kinds of calculations.

What is a quantum simulator?

Computer simulations produce insights into the behavior of real-world phenomena by using algorithms and data to create dynamic models of relevant processes. The term quantum simulator as used here refers to specialized quantum computers tailored to performing such simulations (rather than conventional computers simulating quantum phenomena). When Nobel laureate Richard Feynman proposed the idea of quantum computing back in 1981, he envisioned a new kind of computer that could directly simulate the quantum mechanical behaviors of atoms and subatomic particles using those same mechanisms. Feynman didn't know how such a computer could be built or how it would work, but he knew it would be the only way to simulate the physics of increasingly complex systems in a computer without requiring exponentially longer processing times.

Ordinary computers always generate the same output from the same input. Quantum computers, however, perform their computations using an ensemble of quantum particles that don't produce definite answers. Instead, they identify how probable particular answers are from multiple possibilities. As a result, the architecture of these computers simulates what physicists believe happens in a real mechanical system. That allows quantum computers to directly and efficiently model the quantum interactions of other such systems, thus enabling the simulation of extremely complex phenomena.

Quantum simulation poses promise and peril

Like any disruptive technology, quantum simulation has both enormous positive and negative potential for science, industry, and society:

- **Computing.** Just as early success in traditional digital computers was leveraged to design more powerful computers, quantum simulators may hold the key to hastening the development of a practical, general-purpose quantum computer. As simulators scale up in size, they may enable breakthrough discoveries in materials science that would make general-purpose quantum computers more feasible. Advances in traditional digital computers were produced and shared by many. Given their likely extraordinary monetary value, however, proprietary leaps in quantum computing technology might be held close by their early developer(s). If then used to produce yet more-robust quantum computers, a definable risk exists that such technology could be "captured" by a single actor

that would enjoy asymmetrical market advantages with potentially profound economic and social effects.

- **Critical Industry.** Less publicly familiar applications of quantum simulation technology may be equally profound and valuable. Nitrogen fixation, for example, is a key process in food and pharmaceutical production, as well as in many other industries. Currently, it occurs naturally with just air, water, sunlight, and microbes. Quantum simulation is ideally suited to advancing our understanding of the complex natural interactions that produce nitrogen fixation so that we can create more efficient industrial fixation processes.

(20 marks)

1.1.1 In a report in 2019 on quantum computing, it was identified that,

- i. Quantum computers have garnered enormous interest and media attention because of their predicted ability to one-day crack encryption algorithms.
- ii. Quantum simulators are potentially practical, near-term commercial applications of today's computers.
- iii. Quantum simulators are not predicted to become a reality for at least a decade.
- iv. Quantum computers' practical applications could be just two years away.

1.1.2 Quantum computers process with _____.

- i. Bits
- ii. Bytes
- iii. Gigabytes
- iv. Qubits

1.1.3 Underline the incorrect statement.

- i. Quantum computers take a different approach to computing from traditional digital machines.
- ii. Quantum computers manipulate the qubits with mechanisms called quantum gates.
- iii. Quantum simulator refers to specialized quantum computers tailored to perform digital algorithms.
- iv. Ordinary computers always generate the same output from the same input.

1.1.4 Less publicly familiar applications of _____ technology may be equally profound and valuable.

- i. Quantum particle
- ii. Quantum simulation
- iii. Quantum computer
- iv. Quantum mechanical

1.2 Find similar words for the following from the text. (20 marks)

- i. The process of converting information or data into a code, especially to prevent unauthorized access.
- ii. Lacking the quality or quantity required; insufficient for a purpose.
- iii. Existing in something as a permanent, essential, or characteristic attribute.
- iv. Having parts that fail to correspond to one another in shape, size, or arrangement; lacking symmetry.

1.3 Write a formal email to the Dean of your Faculty, requesting a medical camp organized within your university. Use 80-100 words. (60 Marks)

QUESTION 02

(100 Marks)

2.1 Write a letter selecting one situation from below, using approximately 150-200 words.

2.1.1 You recently took a holiday organized by a travel agent, but the standard of the accommodation was very poor. You feel misled by your travel agent because their advertisements made false or misleading claims about the hotel, the location, the city etc. Write a letter to the company outlining the problems you experienced with the accommodation and actions you want them to take.

2.1.2 Write a letter to Ms. Rochelle Ferdinand, HR Manager, Medihelp Hospital, Kandawala Road, Dehiwala-Mount Lavinia, enquiring about the possibility to pursue a career as an intern in Medical Laboratory Technologist for the internship requirement of your degree. You are Sonali/Sonal Wijerathna, No. 25, Richmond Road, Modara.

(100 marks)



00019

**Faculty of Health Sciences****BSC. (HONS) BIOMEDICAL SCIENCES/ BSC. (HONS) INDUSTRIAL PHARMACEUTICAL SCIENCES/ BSC. (HONS) COSMETIC SCIENCE****BSM 1233 – General Psychology****MID-SEMESTER EXAMINATION – 1st Year 2nd Semester****Date: 23rd of May 2023****Time: 09.00 am – 10.00 am – One Hour****INSTRUCTIONS TO CANDIDATES Page**

- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

Question 01**(100 Marks)**

- 1.1 Name **three (03)** behaviourist psychologists. (15 Marks)
- 1.2 Describe the **four (04)** main goals of Psychology with an example for each. (30 Marks)
- 1.3 Define '**Attribution Theory**'. (15 Marks)
- 1.4 Describe the **four (04)** key areas of '**Social Influence**'. (40 Marks)

Question 02**(100 Marks)**

- 1.1 Briefly explain the effect of **two (02)** neurotransmitters on human behaviour. (10 Marks)
- 1.2 Explain the '**limbic system**' and its functions. (35 Marks)
- 1.3 Define '**personality**'. (15 Marks)
- 1.4 Describes personality in terms of the '**Five-Factor Model of Personality**'. (40 Marks)



Faculty of Health Sciences
Bachelor of Science Honours in Cosmetic Science

BSM 1253 Academic Writing
1st Year 2nd Semester

End Semester SEQ Examination

5th Batch

INDEX NUMBER:

Date : 25th March 2022
Time : 1.30 p.m. – 4.30 p.m. (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.

01. (100 marks)

- 1.1 Briefly describe the difference between a full paper publication and an abstract. (35 marks)
- 1.2 Discuss the importance of an abstract. (30 marks)
- 1.3 Explain the importance of writing a research proposal as a beginning step of a research. (35 marks)

02. (100 marks)

- 2.1 What is a review article? (25 marks)
- 2.2 Compare and contrast a review article with an original research article. (25marks)
- 2.3 What is a questionnaire in a research? (25 marks)
- 2.4 You are supposed to do a research to evaluate a relationship between fat intake and prevalence of hypercholesterolemia. List the components that you need to mention under the methodology part of your research proposal. (25marks)

03. (100 marks)

- 3.1 Describe the general components of a graph that present the research findings by using an example. (30 marks)
- 3.2 Discuss the importance of using graphs in the result section of a research paper. (40 marks)

- 3.3 Suppose you are a final year student in the Faculty of Health Sciences, CINEC Campus. You have been asked by your supervisor to write a research proposal based on the screening of antioxidant activities of a selected plant leave using an animal study. List the major components you need to include under the materials and method section. (30 marks)

04. (100 marks)

- 4.1 State the difference between paraphrasing and summarizing. (20 marks)
- 4.2 Paraphrase the following paragraphs. (2 X 20 marks = 40 marks)

4.2.1 Women have traditionally been seen as mothers and home makers and it is only in recent years that they have been making significant inroads into the job market. There is still a long way to go before they achieve complete equality with men but the situation has definitely improved.

4.2.2 In the 1920s, an American academic, Elton Mayo, researched the effects of the physical environment on the productivity of workers. The result, known as the Hawthorne Studies, named after the electric company where it took place, showed that workers could be motivated to work harder by making small changes to the workplace, such as altering the lighting or the layout of a room.

- 4.3 Summarize the following paragraphs. (2 X 20 marks = 40 marks)

4.3.1 Research on children's advertising would not seem to support a ban. Psychology professor, Adrian Furnham, argues against any restrictions, noting "Peer influences and parenting styles are massively more influential in determining children's behaviour and achievements than advertising" (Stokes and Brown, 2011). Furthermore, a German study points out that, on average, children between three and thirteen years old spend only 1.4% of their waking time watching adverts. That said, in the UK, this translates into 18 000 adverts a year (Grissom, 2010). However until there has been definitive

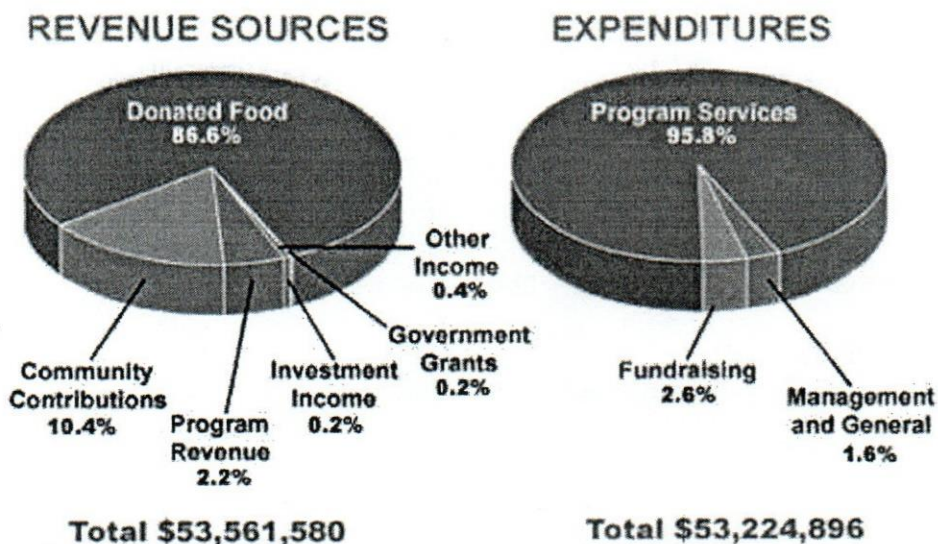
research linking behaviour to advertising, it would seem premature to argue for a ban, but perhaps some regulation is needed, especially given parents' concerns.

4.3.2. One restriction would arguably be on food advertising. 95% of these during children's television programmes were for products high in fat, salt or sugar (Grissom, 2010) and many, including the World Health Organisation, believe that there is a link between such foods and increasing levels of obesity and high blood pressure. Yet for every \$1 spent by the WHO to combat these effects of a poor diet, the global food industry spends \$500, part of an annual industry worth \$25 billion (WHO, 2009). It is obviously not a fair fight and as children's health is at stake, there is a strong case for a limitation on food advertising to the young.

05.

(100 marks)

5.1 The following pie chart shows the amount of money that a children's charity located in the USA spent and received in the year 2016. Describe the information by selecting and reporting the main features and make comparisons where relevant. Write at least 150 words. (35 marks)



5.2 The table below shows the results of a survey that asked 6800 Scottish adults (aged 16 years and over) whether they had taken part in different cultural activities in the past 12 months. Describe the information by selecting and reporting the main features and make comparisons where relevant. Write at least 150 words. (35 marks)

Participation in cultural activities, by age

	16-24	25-44	45-74	All aged 16 and over
	%	%	%	%
Any performance*	35	22	17	22
Undertaking any crafts	11	17	22	19
Cultural purchases	11	17	18	16
Any visual arts	30	16	11	15
Any writing	17	6	5	7
Computer based	10	9	5	6

* Dancing, singing, playing musical instruments and acting

5.3 Distinguish between a table and a figure in a research paper.

(30 marks)

06.

(100 marks)

6.1 Discuss the importance of referencing?

(40 marks)

6.2 Name two commonly used reference styles in scientific writing in addition to the Harvard Style.

(20 marks)

6.3 Define the term "plagiarism".

(20 marks)

6.4 Write the reference for the following article from the information given below. Use Harvard reference style.

(20 marks)

An article in the journal: Applied linguistics. It was written in 1985 by E Bialystock and M Sharwood-Smith. The title of the article is: Interlanguage is not a state of mind: An evaluation of the construct for second-language acquisition. It was published in volume 6 and it is from page 101 to page 117.



Faculty of Health Sciences

BSM 1243 Foundation of Chemistry

1st year 2nd semester

Batch - 02

End Semester Open Book Examination

INDEX NUMBER:

Date : 25th November 2020
Time : 09.00 am – 11.00 am (Two Hours)

INSTRUCTIONS TO CANDIDATES

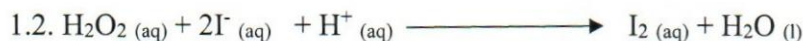
- This question paper consists of **TWO** questions.
- Answer **ALL** questions.
- You have to log in to the paper and can do inline writing.
- If you wish you can upload your file at the end.
- Please read the question carefully and plan your answer accordingly. Please be alert on the timing.

MATERIALS REQUIRED

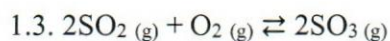
- You may use a scientific calculator. This must not be programmable and may be inspected during the examination. Programmable calculators, PDAs and mobile phones are not permitted in the examinations.

QUESTION 01**(100 marks)****Part A**

1.1. Differentiate between the molecular geometries of SnCl₂, CO₂ and H₃O⁺. (12 marks)



1.2.1. It is assumed that the order of the reaction shown above with respect to the concentration of iodide is 1. Describe the experimental procedure that you could carry out to justify your answer. (15 marks)



1.5 moles of SO₂ react with O₂ to form SO₃ at 27 °C inside a 5 dm³ vessel. At equilibrium 0.8 moles of SO₃ is present.

The Equilibrium Constant (K_c) for the reaction is 1.79 mol¹dm³.

1.3.1. Find the initial concentration of O₂ (g) if SO₃ (g) is not found in the vessel initially. (15 marks)

1.3.2. Find the value of Equilibrium Constant (K_p) with respect to the partial pressure.

(R = 8.314 Jmol⁻¹ K⁻¹). (08 marks)

Part B

1.4. Calculate the molecular weight in grams per mole of sucrose, C₁₂H₂₂O₁₁. (Atomic weights of C=12.0 amu, H=1.0 amu, O=16.0 amu) (10 marks)

1.5. Propane, C₃H₈ is a colorless, odorless gas often used as a heating and cooking fuel. Write a balanced equation for the combustion reaction of propane with oxygen to yield carbon dioxide and water. (10 marks)

1.6. The commercial production of iron from iron ore involves the reaction of Fe₂O₃ with CO to yield iron metal and carbon dioxide. Using balanced chemical equation, calculate number of moles of CO reacts with 0.50 mol of Fe₂O₃. (20 marks)

1.7. The concentration of an aqueous I₃⁻ solution can be determined by titration with aqueous sodium thiosulfate (Na₂S₂O₃) in the presence of starch indicator, which turns from deep blue to colourless when all the I₃⁻ has reacted. Calculate the number of moles of I₃⁻, if 24.55 mL of 0.102 M Na₂S₂O₃ is needed for complete reaction. (10 marks)



QUESTION 02**(100 marks)****Part A**

2.1. A student has conducted the qualitative flame test for the identification of the elements in chemical compounds. Below are the colours observed for the each flame test.

Red, Apple Green, Blue Green, Bright Yellow, Lilac

2.1.1. Name the Group 1_A metal that gives a lilac flame colour. (2.5 marks)

2.1.2. According to this flame test, the student has obtained red flame colour. Considering there were only Group I_A & Group II_A metals that gives red flame colour upon flame, how could you decide which metal was in the compound? (10 marks)

2.1.3. Considering metals from other parts of the Periodic Table, which metals form compounds giving a blue-green flame? (2.5 marks)

2.1.4. If you heat a compound containing Group 1_A metal ions strongly in a bunsen flame, some of the ions are converted back to atoms. Heat energy from the flame promotes electrons in the atoms to empty higher energy levels. Briefly describe how this results in a characteristic flame colour for the particular metal. (10 marks)

2.2. The equilibrium constant for the reaction of a metal with a ligand is called the “Stability Constant”.

2.2.1. Write down the balanced chemical equation for the reaction of Ferric ion with the ligand [Y₄⁻]. (05 marks)

2.2.2. Write down the equation to express the Stability Constant [K_{FeY}] for the reaction mentioned in the section 2.2.1. (05 marks)

2.3. In acidic solution with the present of KMnO₄, Iodine is liberated from potassium iodide. Comment on the chemical nature of KMnO₄. Your answer should provide necessary chemical reactions. (15 marks)

Part B

2.4. A solution of 0.100 M AgNO₃ is used to titrate a 100.00 mL solution of 0.100 M NaCl. The Solubility Product Constant (K_{sp}) of AgCl is 1.7×10^{-10} at 25°C.

2.4.1. Calculate the log value of Ag (pAg) if 50.00 mL of the titrant is added. (10 marks)

2.4.2. After the addition of excess (150 mL) AgNO₃ (aq) to the conical flask, the concentration of Ag⁺ ions in the resultant solution will be increased. Comment on the Cl⁻ ions concentration in the solution and calculate Cl⁻ ions concentration. (15 marks)

2.4.3. Calculate the Cl⁻ ions concentration required to remove 99% of Ag⁺ in a solution of AgNO₃. (05 marks)

2.5. Plaster of Paris and the Slaked Lime are industrially important Calcium compounds.

2.5.1. Comment on the physical nature of Plaster of Paris upon heating at 200°C. (05 marks)

2.5.2. Slaked lime is widely used in the bleaching industry. Justify your answer. (15 marks)



Faculty of Health Sciences
Bachelor of Science Honours in Cosmetic Science
BSM 1243– Foundation of Chemistry
Batch - 03
1st year 2nd Semester
End Semester SEQ Examination

INDEX NUMBER:

Date : 25th January 2021
Time : 09.00 am – 11.00 am (Two Hours)

INSTRUCTIONS TO CANDIDATES

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

01

(100 marks)

- 1.1. Briefly describe the hydrolysis process using SiCl_4 as the example. (15 marks)
- 1.2. 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.
 - 1.2.1. Define the term "Complex compound". (10 marks)
 - 1.2.2. State an example for a hexadentate ligand. (10 marks)
 - 1.2.3. Catalyst activity is another characteristic property of transition elements. Describe. (20 marks)
- 1.3. Concentrated nitric acid renders aluminium passive. Briefly describe this phenomena. (15 marks)
- 1.4. Alkali Metals are highly reacted with halides. Justify this statement. (30 marks)

02

(100 marks)

- 2.1. Aspirin has the formula $\text{C}_9\text{H}_8\text{O}_4$.
 - 2.1.1. Calculate the molar mass of aspirin. (C=12.01 g, H=1.008 g, O=16.00 g) (10 marks)
 - 2.1.2. Calculate how many moles of aspirin are in a tablet weighing 500 mg? (10 marks)
 - 2.1.3. Aspirin is prepared by reaction of salicylic acid ($\text{C}_7\text{H}_6\text{O}_3$) with acetic anhydride ($\text{C}_4\text{H}_6\text{O}_3$) according to the following equation. (20 marks)



Assuming molecular weights of salicylic acid and acetic anhydride are $138.121 \text{ gmol}^{-1}$ and 102.09 gmol^{-1} respectively, calculate how many grams of acetic anhydride are needed to react with 4.50 g of salicylic acid? How many grams of aspirin will result?

- 2.2.
 - 2.2.1. Potassium chlorate (KClO_3) reacts with table sugar (sucrose, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$) and forms potassium chloride, carbon dioxide and water. Write down the balanced chemical equation. (10 marks)
 - 2.2. 2. Potassium chlorate (KClO_3) decomposes when heated to yield potassium chloride and oxygen, a reaction used to provide oxygen for the emergency breathing masks in airlines. Write down the balanced chemical equation. (10 marks)
 - 2.2. 3. Aqueous solutions of sodium hypochlorite (NaOCl) are prepared by reaction of sodium hydroxide with chlorine. Calculate how many grams of sodium hydroxide are needed to react with 25.0 g of chlorine? (20 marks)

- 2.3. Which element is oxidized and which is reduced in each of the following reactions?
 - 2.3.1. $\text{Ca}_{(s)} + \text{Sn}^{2+}_{(aq)} \longrightarrow \text{Ca}^{2+}_{(aq)} + \text{Sn}_{(s)}$ (10 marks)
 - 2.3.2. Assign oxidation number to Mn element in MnO_4^{2-} . (10 marks)

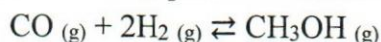
03

(100 marks)

3.1. What are London dispersion forces? (10 marks)

3.2. Differentiate between the molecular geometries of SnCl_2 , BeH_2 and H_3O^+ . (15 marks)

3.3. Methanol is produced according to the following equation:



In an experiment, 2.00 moles each of CO and H_2 could react in a sealed 20.0 dm^3 reaction vessel at 500 K . When the equilibrium was established, the mixture was found to contain 0.8 moles of CH_3OH . ($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$)

3.3.1. What are the equilibrium concentrations of CO , H_2 and CH_3OH ? (25 marks)

3.3.2. Calculate the equilibrium constant (K_c) for this reaction? (25 marks)

3.3.3. Calculate the equilibrium constant (K_p) for this reaction? (25 marks)

04

(100 marks)

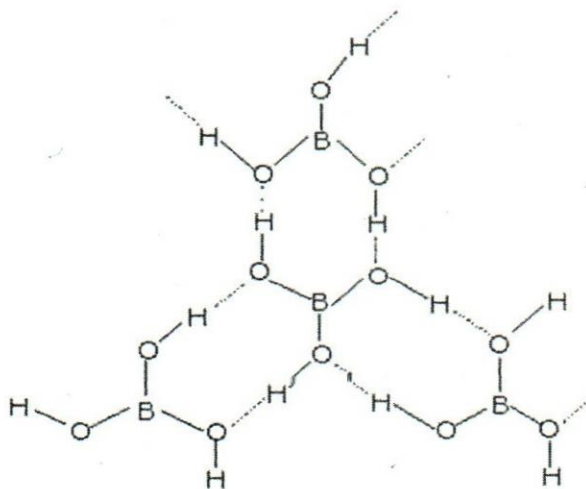
4.1. X is an element in the periodic table which has a 40.08 gmol^{-1} atomic mass.

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

4.1.2. Draw the quantum mechanical model for the atom X. (20 marks)

4.1.3. XCO_3 is one of the commercially important compounds which can be occurred in nature in several forms. State **02** (Two) methods of preparing XCO_3 in commercially by providing balanced chemical equations. (20 marks)

4.2. The compound shown below is a white crystalline solid, with soapy touch. It is highly soluble in hot water.



4.2.1. Identify the compound. (10 marks)

4.2.2. State the structural features of this compound. (10 marks)

4.3. Outline the production process of $\text{K}_2\text{Cr}_2\text{O}_7$ from chromite ore ($\text{Fe}_4\text{Cr}_2\text{O}_4$). (30 marks)



Faculty of Health Sciences

BSM 1243 Foundation of Chemistry

1st year 2nd semester

Batch - 04

End Semester Examination

INDEX NUMBER:

Date : 16th July 2021

Time : 09.00 a.m. – 12.00 p.m. (Three Hours) - To answer the questions
12.00 p.m. – 12.30 p.m. (30 minutes) - To upload & email the compiled
answer script

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** the questions.
- The paper will be for three hours (9.00 am – 12.00 pm). You will be given an extra 30 minutes for submission. Any submission after 12.30 pm will not be accepted.
- You should write the answers in **A4** sheets legibly in black or blue ink.
- You **MUST** write **examination name, module code and registration number** on each answer script.
- **Answer script** should be numbered (right bottom) clearly.
- Photograph of your answer scripts must be taken by keeping them on a clear platform (e.g. table).
- Arrange the photographs of your answer script in a word document in an orderly manner, then convert the word document to a **PDF**.
- **Label the PDF: Your Registration No – Foundation of Chemistry SEQ**
- **Upload** the labelled **PDF to LMS AND** also **email** the PDF to Fohs.exams@cinec.edu

MATERIALS REQUIRED

- 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

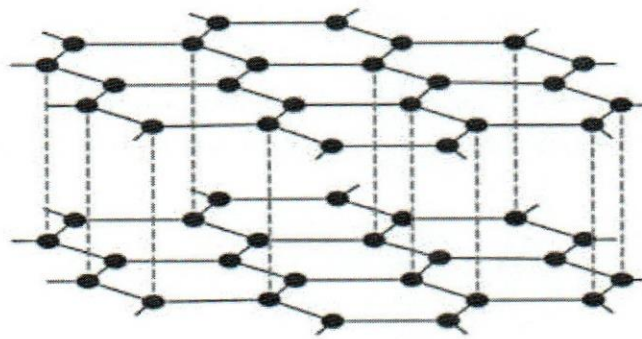
(100 marks)

- 1.1. Describe the "Law of multiple proportions" using an example. (15 marks)
- 1.2. Briefly describe the "Heisenberg Uncertainty Principle" in related to the electron. (15 marks)
- 1.3. State 05 (Five) important points of the Dalton's atomic theory of matter. (20 marks)
- 1.4. Describe the formation of a complex compound in volumetric analysis. (20 marks)
- 1.5. Alkali metals are highly reacted with halides. Justify this statement. (30 marks)

02

(100 marks)

- 2.1. Carbon family elements (M) can form halides of formula MX_2 and MX_4 (where X = F, Cl, Br, I). One of the elements in this family does not exists the form MI_4 . Mention the element and briefly describe why it does not exist in nature. (15 marks)
- 2.2. Briefly describe the alloy formation. (15 marks)
- 2.3. Transition elements act as catalysts. Comment on this statement. (20 marks)
- 2.4.



Describe the lattice structure and important properties of the above mentioned substance.

(20 marks)

- 2.5. Outline the reactivity of aluminum towards acids and bases.

(30 marks)

03

(100 marks)

3.1. Consider the following reactions.

(30 marks)



(a) Balance the chemical equation.

(b) What is the mass of O_2 will be needed to burn 60 g of C_2H_6 ?

(c) How many moles of water produced from the 19.2 g of C_2H_6 ?

3.2. State the 04 (**Four**) types of acid base reactions and give an example for each type.

(20 marks)

3.3. What are the pH testing methods for acid-base titrations?

(10 marks)

3.4. Balance the following reactions.

(20 marks)



3.5. Write short notes on following.

(20 marks)

(a) Energy

(b) First law of thermodynamics

04

(100 marks)

4.1. Acidified Potassium permanganate (KMnO_4) solution is widely used in the analytical chemistry as an oxidizing agent. In acid solutions with the presence of KMnO_4 , iodine is liberated from potassium iodide. Write down the balanced chemical reaction for this redox reaction including the oxidation and reduction half reactions. (10 marks)

4.2. Briefly describe the hydrolysis process using SiCl_4 as the example. (15 marks)

4.3. State 05 (**Five**) industrial importance of element hydrogen. (20 marks)

4.4. State the main chemical reactions involved in production of washing soda by Solvay process. (25 marks)

4.5. Outline the production of $\text{K}_2\text{Cr}_2\text{O}_7$ using $\text{Fe}_4\text{Cr}_2\text{O}_4$ as the primary source. (30 marks)

05 (100 marks)

5.1. What is the difference between "Thermodynamics" and "Kinetics"? (15 marks)

5.2. Consider the following reaction at 298 K. (20 marks)



(a) Write the rate law for the given reaction.

(b) What is the overall order of the given reaction?

5.3. Briefly describe the ionic bond formation. (20 marks)

5.4. Describe the molecular orbital theory and valence bond theory for covalent bond formation. (25 marks)

5.5. Draw the molecular orbital structures of the following organic compounds considering molecular hybridization. (20 marks)

(a) $\text{CH}_2 = \text{CH}_2$

(b) $\text{CH}_3 - \text{CH}_3$

(c) $\text{H}-\text{C} \equiv \text{C}-\text{CH}_3$

(d) $\text{CH}_3 - \text{CH}_2 = \text{CH}_2$

06 (100 marks)

6.1. State 04 (**Four**) properties of carbon monoxide. (10 marks)

6.2. Write down the reaction of borax with water. (10 marks)

6.3. X is an element in the periodic table which has a 40.08 g mol^{-1} atomic mass.

6.3.1. Identify the element X. (05 marks)

6.3.2. XCO_3 is one of the commercially important compounds which can be occurred in nature in several forms. State 02 (**Two**) methods of preparing XCO_3 in commercially by providing balanced chemical equations. (20 marks)

6.3.3. State 03 (**Three**) industrial uses of XCO_3 . (15 marks)

6.3.4. State 02 (**Two**) other industrially important compounds of the element X. (10 marks)

6.4. Outline the medical and industrial important uses of alkaline earth metals. (30 marks)