CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION 2023

111 GENERAL STUDIES

Time: 3:00 Hours **Monday 13, February 2023 am**

Instructions

1. **This paper consists of seven (7) questions.**
2. **Answer five (5) questions. Question number three (3) is compulsory.**
3. **Each question carries twenty (20) marks.**
4. **Write your index number on every page of your answer booklet(s)**
5. **Mobile phones and smart watches are not allowed in the examination room.**

1. What are the main principles, obstacles and failures of Education for Self-reliance as advocated by Mwalimu J. K Nyerere on Education in Tanzania? Six (6) points.

2. Many youth in Tanzania have positive development ideas but are still faced by poverty due to lack of empowerment. How can youth be empowered to overcome Poverty? Six (6) points.

3. Principles of Democracy can be used as a tool for managing conflicts in the society. With reference from African countries, show the validity of this statement. Six (6) points.

4. Examine six (6) challenges that weaken the efforts of the Government of Tanzania to control Corruption.

5. Technology transfer is a movement of scientific knowledge and methods of production from one country to another, where that knowledge or methods did not exist before. In six (6) points explain how this can be achieved in Tanzania.

6. Terrorism has become a serious problem world-wide. With reference from African countries show the factors leading to the growing of Terrorism. Six (6) points.

7. Globalization is a threat to the African cultural development. With six (6) points substantiate this statement.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES).

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

122/1 **ENGLISH LANGUAGE I**

Time: 3:00 Hours **Monday, 13th February 2023 p.m**

Instructions

1. This paper consists of two sections, A and B with a total number of **eight (8) questions.**
2. Answer all questions in section A and three questions from section B.
3. Questions **five (5) and (6) are compulsory.**
4. Section **A** carries 40 marks and section **B** carries 60 marks.
5. Cellular phones are prohibited in the examination room.
6. Write your **examination number on every page** of your answer booklet(s).

SECTION A (40 Marks).

Answer all questions from this section.

1. A mother tongue is not necessarily a mother tongue. Validate the statement using five (5) points.
2. (a) Human language has a lot of functions over and above communication. State the functions of language in the following statements.
   i. Hello, good afternoon!
   ii. I feel sorry for what she did to her mother.
   iii. Don't disturb me anymore.
   iv. I officially declare the meeting open.
   v. You are so expensive as tanzanite.

   (b). Define the following linguistic terms with concrete examples.
   i. Accent
   ii. Speech community
   iii. Lingua franca
   iv. Slang
   v. Mother tongue.
3. Language is said to be a system. Justify the statement by using five (5) points.
4. In contemporary society people move from one place to another to search for their basic needs through communication. Analyze the statement in line with the causes of multilingualism. Use five (5) points.

SECTION B (60 MAKS)

Answer any three questions from this section. Question 5&6 are compulsory.

5. (a) Using the following prefixes, form one word and make a sentence from the newly formed word.
   i. Dis-
   ii. Mis-
   iii. Mini-
   iv. Mal-
   v. Out-

(b). Explain the processes used in the formation of the following words;

i. NATO
ii. INTERNET
iii. Goody-goody
iv. TV
v. Motel

6. Listening and hearing co-exist in a way that they are both used in communication; however both skills differ in one way or another. Analyze the differences using eight points.
7. The president of our beloved nation is always making different speeches at different occasions by considering speech strategies before addressing her people. Discuss any eight speech making strategies that she may consider in her speech.

8. (a) Human beings as well as machines are good translator of different manuscripts. Considering the whole process, explain any three qualities of appropriate translation.
(b) Most interpreters have a view that any word to be interpreted should follow some principles. According to your knowledge, explain any five guidelines for interpretation.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES).

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

122/2 **ENGLISH LANGUAGE 2**

Time: 3:00 Hours **Thursday, 16th February 2023 a.m**

1nstructions

1. This paper consists of **two** sections, **A** and **B** with a total number of eight (8) questions.
2. Answer **all** questions in section **A** and three questions from section **B.**
3. Question five (5) and (6) are compulsory.
4. Section **A** carries **40** marks and section **B** carries **60** marks.
5. Cellular phones are prohibited in the examination room.

Section A (40 marks)

Answer **all** questions in this section.

1. With examples, define the following terms.
   i) Tragedy
   ii) Epic
   iii) Sonnet
   iv) Alliteration
   v) Refrain

2. Most of the people think that drama has got the same credential just like any other genres. With concrete examples, differentiate plays/drama from other genres of literature using five points.

3. Writing industry has totally distorted and eventually killed oral literature. Argue against the above statement with five reasons.

4. Language has been used in different positions according to its use. Validate the statement by discussing five variations of spoken and written language.

Section B (60 marks)

Answer three questions in this section. Question five (05) and six (06) are compulsory.

List of Readings in Plays:

Betrayal in the City – Francis Imbuga

I will Marry When I want – Ngugi Wa Thiong'o & Ngugi wa Mirii

The Bride – Austin Bukenya

Lwanda Magere – Okoiti Omtatah

An Enemy of the People – Henrik Ibsen

Black Mamba – John Ruganda

List of Readings in Novels and Short stories

Encounters from Africa – Macmillan Education limited

The beautiful ones are not yet born – Ayi Kwei Armah

A man of the People – Chinua Achebe

Divine Providence – Severin N. Ndunguru

The Rape of the Pearl – Magala Nyago

Vanishing Shadows – Namige Kayondo

His Excellency the Head of State – Danny Safo

A season of Waiting – David Omowale

List of Readings in Poetry.

Selected Poems – institute of Education

The Wonderful surgeon and other Poems – Charles Mloka

5. Most of the authors address the issues which are the enemies of development just like Mwl. Julius Kambarage Nyerere termed them; Poverty, ignorance injustice and corruption. Justify the statement using two novels you have read in this program.

6. Playwrights quite often use characters to send a positive impact to the society. Clarify the statement with eight points from two plays you have read. Use four points from each play.

7. "Poems are meant to teach and improve the social status of the society". Prove this argument by using any four poems you have studied in the class. Use two points from each poem

8. Read the following poem and answer questions that follow.

STOP
Stop
I ask you to think for a moment
To think of pain
Of hunger
To think of the people who are not free

To think of death
Stop
Now
Stop thinking of other things

Think only of this
Of people dying
Dying by the gun
The boot
The fist

Think of them
The people who are not free
Who will give their lives to be free

Stop
Now
Think
Now
Shout Africa
Three times
Africa
Africa
Africa.

Questions

i) Comment on the title of the poem
ii) In short, what is the poem about?
iii) Like other poems, this poem has themes. Analyze any five themes from the poem
iv) In what way do you think this poem is relevant to the modern society? Use three relevancies.

TUME YA KIKRISTO YA HUDUMA ZA JAMII

MTIHANI WA PAMOJA WA SHULE ZA MAKANISA KANDA YA KASKAZINI

MTIHANI WA UTAMIRIFU KIDATO CHA SITA 2023

121/1 **KISWAHILI 1**

Muda: Saa 3:00 **Jumatano, 15 Februari 2023 Asubuhi**

Maelekezo

1. Karatasi ina sehemu **A** na **B** zenye jumla ya maswali nane **(08)**
2. Jibu maswali yote sehemu **A** na maswali **(3)** kutoka sehemu **B,** swali la nane **(08)** ni la lazima.
3. Zingatia maagizo ya kila sehemu na ya kila swali.
4. Andika namba yako ya mtihani katika kila ukurasa wa karatasi zako za kujibia.

SEHEMU A (Alama 40)

Jibu maswali yote kutoka sehemu hii

1. Soma shairi lifuatalo kasha jibu maswali yanayofuata;

Leo makusudi yangu, nataka kusimulia
Kusimulia wenzangu, wote wote wanaosikia
Na ingawa wengi tangu, kura wanafurahia
Tusipuuze raia, haki ya kupiga kura.

Haki yakupiga kura, tusipuuze raia
Kwani kura ni ishara, kwamba sisi ni huria
Na uhuru ndiyo bora, wengi wanapigania
Tusipuuze raia, haki ya kupiga kura.

Na mimi nina himiza, wenzangu Tanzania
Wote tuliojiweza, kadi tumejipatia
Tusije tukapuuza, kupiga tukaachia
Tusipuuze raia, haki ya kupiga kura.

Tuchague viongozi, walio na njema tabia
Siyo kwa mema mavazi, nguo safi kuvalia
Twataka watekelezi, wenye bidii kutia
Tusipuuze raia, haki ya kupiga kura.

Viongozi domo kaya,wote wanaochukia
Wanaosema mbaya, ujamaa siyo sawia
Hao kwetu ni kaya ya,kura waachatumia
Tusipuuze raia, haki ya kupiga kura.

Maswali

(i) Andika kichwa cha shairi ulilosoma.

(ii) Toa maana ya maneno yaliyopigiwa mstari

(iii) Kwanini mwandishi anasema raia tusipuuze kupiga kura? Toa sababu **mbili**.

(iv) Mwandishi anasisitiza nini katika ubeti wa nne?

(v) Andika mawazo matano yanayopatikana kutoka katika shairi hili.

2. Watumiaji wengi wa lugha ya Kiswahili wanashindwa kutofautisha kati ya kivumishi na kiwakilishi. kwa kutumia mifano dhahiri ya lugha ya Kiswahili eleza tofauti kati ya kivumishi na kiwakilishi.

3.Kwa kutumia mifano toa fasili ya maneno yafuatayo kama yanavyotumika katika sarufi ya Kiswahili.

(i) Irabu

(ii) Unyambulishaji

(iii) Fonimu

(iv) Kishazi tegemezi

(v) Upatanisho wa kisarufi

4.Fafanua mambo matano (5) yanayomwongoza mtumiaji wa lugha ya Kiswahili katika uteuzi wa rejesta.

SEHEMU B (Alama 60)

Jibu maswali matatu (03) kutoka sehemu hii na swali la nane (08) ni la lazima

5.Jifanye wewe ni Afisa habari wa shirika la ndege Tanzania andika tangazo kwa abiria kuhusu kuahirishwa kwa safari ya ndege ya Precision aina ya Boeing 737 iliyokuwa ifanye safari yake toka Dar es Salaam kwenda Bukoba tarehe 11/11/2022 saa moja asubuhi, kuwa safari hiyo itafanyika tarehe 13/11 2022 saa saba mchana. Mabadiliko hayo yametokana na ajali ya ndege iliyoanguka Novemba 09 katika Ziwa Victoria kutokana na machafuko ya hali ya hewa katika uwanja wa ndege wa Bukoba.

Jina la mtoa tangazo liwe Venance Kurambate.

6.Kushamiri kwa Kiswahili sanifu baada ya usanifishaji hadi sasa kunasababisha lahaja nyingine kudumaa na nyingine kutoweka kabisa. Thibitisha kauli hii kwa hoja sita (06).

7."Utawala wa Mwingereza nchini Kenya ni chanzo cha mweneo mdogo na kudidimia kwa Kiswahili nchini humo". Fafanua dai hilo kwa hoja sita (6)

8.Nadharia za tafsiri zimeweza kufafanuliwa na wataalamu mbalimbali kama vile Cartford(1965), Nide(1964) na Taber(1969), ReisaBuhler na New Mark(1983/19830, Malangwa (2010). Kwa mifano elezea nadharia hizo zilivyoweza kufafanua dhana ya tafsiri kupitia wataalamu hao.(Toa hoja nne)

TUME YA KIKRISTO YA HUDUMA ZA JAMII

MTIHANI WA PAMOJA WA SHULE ZA MAKANISA KANDA YA KASKAZINI

MTIHANI WA UTAMIRIFU KIDATO CHA SITA 2023

121/2 **KISWAHILI 2**

Muda: Saa 3:00 **Jumatatu, 20 Februari 2023 Mchana**

Maelekezo

1.Mtihani huu una sehemu A na B zenye jumla ya maswali nane(8).

2.Jibu maswali yote sehemu A na sehemu B jibu maswali matatu (3) swali la tano (5) ni la lazima.

3.Simu za mkononi na vitu vyote visivyoruhusiwa havitakiwi katika chumba cha mtihani.

4.Andika namba yako ya mtihani katika kila ukurasa wa kijitabu chako cha kujibia.

SEHEMU A (Alama 40)

Jibu maswali yote katika sehemu hii

1. Majigambo na mashairi ni tanzu za fasihi simulizi zinazofanana na kutofautiana. Fafanua kwa ufupi kwa kutumia hoja mbili (02) za kufananana hoja tatu (03) za kutofautiana.

2. Toa maana ya dhana zifuatazo kisha toa mfano.
   i. Tamthilia
   ii. Mizungu
   iii. Misemo
   iv. Hekaya
   v. Utani

3. Wataalamu hugawa maendeleo ya ushairi wa Kiswahili katika mihula minne (04). Fafanua mihula hiyo kwa kutoa mifano.

4. Soma habari ifuatayo kwa makini, kisha onesha mbinu za kifani zilizotumika.

Siku moja Bwana Haji, jamaa mmoja kutoka Usheli aliketi juu ya kiti cha uvivu. Kiti kile alichokalia bwana huyu kilikuwa umbali wa mita tatu hivi kutoka Yusufu. Kama vile amelewa kwa ufahari wake, Bwana Haji, akivuta buruma huku akitingisha guu, alimkita jicho la dharau Yusufu, ambaye ingawa ni hirimu yake lakini ni maskini na yu mtumishi wake wa dukani wa miaka nenda rudi. Duka lilikuwa duka hasa, si kiduka mkoba. Lilisheheni kila aina ya bidhaa, kuanzia kanga za makenzi, vitambaa vya hariri na mali kadha wa kadha.

Wakati wote huo, Yusufu alikuwa akishughulika kwa mikogo kama aliyehodhi duka, huku akisikiliza watu wanaoomba aheri za bei za bidhaa na kujibishana nao, "Biashara haigombi, mteja ni mfalme." Yusufu alipoiba jicho kwa Bwana Haji, mboni za Yusufu zikakutana na zile za Bwana Haji sawia. Yusufu alitaharuki kwa jicho la Bwana Haji na bila ya kusita akauliza, "Kulikoni leo mahabubu? Mbona unanikazia macho hivyo mithili ya kungwi anayemfunda mwali kwa ishara?"

"Hakuna kitu ila tu fahari bila mali muhali." Haji alijibu huku akitoa tabasamu la dharau kama ilivyo kawaida yake, ya kuwayanyasa wanyonge na kuwaweka kwenye kiganja. "Naam muhali." Haji alijibu. "Lakini," aliendelea; "mali bila daftari hughibu bila ya habari." "Kumbe ndiyo maana faida, haramu, haipatikani kwa sababu fedha zote umepeleka kwenu," Haji alifoka huku kidazi kikimvuja jasho. Mzozo ukaanza papo hapo na Yusufu na Bwana Haji wakaanza mara moja kunyoosheana vidole.

"Umeniambia msungo," Haji akashutumu.

"La hasha," Yusufu akakana, "unaniibia kauli."

Alimradi pakawa na zogo mtindo moja. Ikazuka hekaheka, vitanda na mkeka. Bidhaa zikazagaa mchafukoge hapo dukani. Watu nao kama ujuavyo hawana dogo. Wakaanza kumiminika kama kumbikumbi wa masika. Wakati huo huo Haji ambaye alikwishaanza kugonga bati kichwani kutokana na umri wake, akawa anapumua kama mtu aliyefukuzwa na nyati aliyejeruhiwa. Huku akipiga chafya; kwa hasira, maneno yakawa yanamtoka kama cherehani. Usingalijua kama ni yule Yusufu mwenye kigugumizi kwa jinsi alivyokuwa anasema kama chiriku. "Mungu hawezi kumjalia mimi kumbi." Yusufu alitanabahi huku akipepesa macho yake huku na huko. Hakuonesha uso wa soni.

Kwa kuwa nazi haiwezi kushindana na jiwe, haukupita muda, kwa kuchelea kumwaga unga, japokuwa kazi yenyewe mshahara tonge, Yusufu akaanza kupiga magoti akaomba msamaha kwani ulimi hauna mfupa.

"Lo, masalale!" Haji akavimba kichwa na kuzidi kutamba kwa kusema, "Nitakushitaki hadi bati kuoza" Haji alizidi kumimina kashfa mpaka Yusufu akawa anaomba kimoyomoyo asije akafukuzwa kazi. Ingawa mali si yake, Yusufu ameota kitambi, kama ujuavyo mtegemea nundu haachi kunona na aliyekaa karibu na waridi haachi kunukia.

SEHEMU B (Alama 60)

Jibu maswali matatu kwenye sehemu hii, swali la tano (5) ni lazima

ORODHA YA VITABU

(A) USHAIRI

Kimbunga - Haji G. Haji

Mapenzi Bora - Shaban Robert

Chungu tamu - Theobald Mvungi

Fungate ya Uhuru - Mohamed S. Khatibu

(B) RIWAYA

Usiku utakapokwisha - Mbunda Msokile

Kufikirika - Shaban Robert

Mfadhili - Hussein Tuwa

Vuta N'kuvute - Shafi Adam Shafi

(C) TAMTHILIYA

Kwenye Ukingo wa Thim - Ibrahim Hussein

Morani - Emmanuel Mbogo

Kivuli kinaishi - Said Mohamed

Nguzo Mama – PeninaMuhando

5. "Ushairi wa fasihi simulizi huwa na aina fulani ya madoido ambayo hukamilisha ushairi huu kwa kufanya ushairi huo upendeze na uweze kuchezeka " chagua vipengele vitano na eleza umuhimu wa kila kipengele katika ushairi wa fasihi simulizi kinavyojitokeza.

6. Mwandishi wa riwaya si mbinafsi ila ni mtumishi wa Umma, bila yeye kujua. Thibitisha kauli hii kwa kutumia riwaya mbili (02) ulizosoma.

7. Tamthiliya zimepitwa na wakati katika jamii ya sasa. Jadili kauli hiyo ukitoa hoja nne (04) kwa kila tamthiliya mbili (02) kati ya ulizosoma.

8. Wasanii huweza kutofautiana katika utunzi wa kazi zao kwa lengo la kujenga upekee wenye mvuto mahiri. Jadili ukweli wa hoja hii kwa kutumia tamthiliya mbili (02).

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION 2023

112/1 **HISTORY 1**

Time: 3:00 Hours **Tuesday, 14th February 2023 a.m**

Instructions

1. **This paper consists of seven (7) Questions.**
2. **Answer a total of five (5) questions, question number one (1) is compulsory.**
3. **Each question carries twenty (20) marks.**
4. **Cellular phone(s) and any other unauthorized materials are not allowed in the examination room.**
5. **Write your index number in every page of your answer booklet(s)**

1. The demand for a new constitution in Tanzania is like the demand of a thirsty man in the desert of which he is in need of quenching his thirsty, but unable to reach the water source. Discuss by giving six (6) points.

2. Analyze how trade and exchange systems between African and Western European societies formed a platform for African underdevelopment.

3. Columbus' journeys to Asia through westward route were historical phenomena. Discuss six changes in the New World from 1502.

4. ''The interest of the colonizer was to serve their mother countries and never the colonized people". How did colonial state facilitated that? Six (6) points

5. Explain three grounds that thriven the African Trade Unions and three features of their peculiarities.

6. Africans had nothing to proud prior their contact with external world. In six (6) points show the fallacy of this statement.

7. "All African people conference was iconic during nationalism in Africa" With six (6) points validate this statement.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION 2023

112/2 **HISTORY 2**

Time: 3:00 Hours **Friday, 17th February 2023 p.m**

Instructions

1. This paper consists of seven (7) Questions.
2. Answer a total of five (5) questions. Question number one (1) is compulsory.
3. Each question carries twenty (20) marks.
4. Cellular phone(s) and any other unauthorized materials are not allowed in the examination room.

Questions

1. COVID – 19 has been declared by W.H.O as world pandemic infections viral disease. Taking Third World Countries as your reference give eight (08) points on how the pandemic affects the economy of African countries.

2. The rise of militarism and arms race in Europe in the 19th C was very hot. Evaluate the circumstances which accelerated it.

3. "The global fighting among the Imperialist powers in 1914 to 1918 had impacts to the rise of anti- democratic regimes in Italy, Germany and Japan" How far is this statement true? Six points.

4. The idea brought by the American president in 1920s to 1930s was redemption to America economic trouble. Justify by using six (6) points.

5. To what extent is true that the Tudor monarchy played a very important role in the development of mercantile trade in England? (6 points).

6. Analyze the outcomes of the disintegration of the Communist Bloc on East – West relations. Six (6) points.

7. "The America had surrounded our country with military bases, now they would learn what it feels like to have enemy missile pointing at you" one leader of the rival side remarked; with reference to the statement discuss why that leader used Cuba to terrify U.S.A in 1962 (Give six points).

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

113/1 **GEOGRAPHY 1**

Time: 3:00 Hours **Tuesday, 14th February 2023 p.m**

Instructions:

1. **This paper consists of seven (7) questions**
2. **This paper has two sections Section A (40 marks) and Section B (60 marks)**
3. **Answer two questions from section A and three questions from section B. Question number one (1) is compulsory with a total of 20marks.**
4. **The work done in each question should be shown clearly in the answer space(s) provided.**
5. **Non programmable calculators may be used.**

SECTION A

(Answer two questions from this section, question one is compulsory)

1. Carefully study the table below and then answer the following questions

YEAR / CROP	1976	1977	1978	1979	1980
TEA	30	10	36	60	50
SUGARCANE	42	30	12	20	42
TOBACCO	27	40	55	42	15

a). Calculate the percentage of each crop in each year.

b). Represent the data above by using divided percentage bar graph.

c). Describe two (2) merits and two demerits of the method used above.

2 (a) Vertical air photographic interpretation is a science which cannot be taught, the skills are acquired through constant practice. However, the beginner should note several aids in interpretation and work to a recognized procedure. With the aid of examples explain any 4 techniques that can be used to interpret vertical air photograph

b) Describe four factors affecting clarity of the ground photograph

3. Tape survey is one of the methods in land surveying in which sides of various triangles are measured directly in field. Explain its applicability in our daily life.

SECTION B

Answer three (3) questions from this section

4. There is a great role of water in transforming the chemical nature of the rock from its original mineral compounds into secondary mineral compounds which are susceptible to decomposition. Support this statement by providing five (5) points

5. "Soil is made up of interacting substances existing in three states of solid, liquid and gaseous" Justify

6. There was a layman in a certain village which experienced water shortage that led to deaths of living organisms in the area. This man was asked to explain the reasons for the deaths of organisms, and then he said '*it is just a curse from God due to human immoral practices*', critically explain to the layman and villagers the major roles of water to living organisms

7. Areas near Gibs, large plantation farms and Mount Kilimanjaro are found in the same latitudes, but Mount Kilimanjaro shows its unique climatic characteristics compared to that of Gibs large plantation farm. In six points explain the reasons behind this situation.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION 2023

113/2 **GEOGRAPHY 2**

Time: 3:00 Hours **Thursday, 16th February 2023 p.m**

Instructions:

1. This paper consists of seven (7) questions
2. Answer a total of five (5) questions
3. Question number one (1) is compulsory
4. Each question carries 20 marks
5. The work done in each question should be shown clearly in the booklets provided.

Questions

1, "Africa is stepping ahead in infant mortality reduction" Explain why? (Give six (6) points)

2. "The exodus of people from the rural areas to urban centers is like to cause problems in both places". Discuss with three (3) points per each place.

3, The world's today campaign much rely on the form of Agriculture which the production of crops and Animals take place with less or without the use of synthetic inputs such as manufactured pesticide and artificial or industrial fertilizers. On the light of this statement explain with examples.

(a) The principals of organic farming according to international federation of organic agriculture movement (4points)

(b) The importance of organic farming in Tanzania and world at large (4points)

4. Tanzania is endowed with physical and non-physical factors that facilitate the development of tourism industry, but still the industry is not well developed justify the statement using six points.

5. Assume you are appointed to be a Minister of Industry and trade by Honorable Dr. Samia Suluhu. How would you do so as to modernize manufacturing industry in your country? Explain scenario with eight (8) points.

6 .Explain six ways to contain the effects of unsustainable fishing on the environment.

7. OPEC and major supranational companies are the main determinants of global economic standard; explain eight repercussions of Russians against Ukraine war to the world economy in relation to the major energy resources found in these two countries.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

133/1 BIOLOGY 1

Time: 3:00 Hours **Wednesday, 15th February 2023 pm**

Instructions

1. This paper consists of sections A and B with a total of ten (10) questions.
2. Answer **all** questions in section A and two (2) questions from section B.
3. Section A carries seventy (70) marks and section B carries thirty (30) marks.
4. Cellular phones and any unauthorised materials are not allowed in the examination room.
5. Write your Examination Number on every page of your answer booklet(s).

SECTION A (70 marks)

Answer all questions from this section.

1. (a) Chloroplasts, mitochondria and bacteria have features in common. Enumerate the features to reveal the truth of this statement. Give four (4) points.

   (b) Apart from providing medium for chemical reactions. What are the other four functions of cytoplasm?

   (c) In what way are the cells of plants and animals structurally different from single-celled eukaryotes?

2. (a) Classifying enzymes based on the type of reactions they catalyse.

   (b) Give basis of the following test.

   (i) Non-reducing sugar.

   (ii) Protein.

3. A student was provided with the following organisms Tortoise, Butterfly, Crab, Bird, Snake, Snail and Earth worm then required to classify them. In his classification, he placed he placed the organisms in three distinct groups as shown in the table below:-

Group	Organisms
A	Tortoise, Snail, Crab
B	Earthworm, Snake
C	Bird, Butterfly

   (a) (i) What type of classification scheme was used by the student

   (ii) What are the shortfalls of this classification scheme

   (iii) What criteria were used by the student to place together the organisms in group: (i) A (ii) B (iii) C

4. Explain the mechanism of conduction of nerve impulse along the axon
5. The secretion of gastric juices is under both hormonal and nervous control. Justify this statement.
6. (a) Briefly explain any five (5) changes that occur to a flower after fertilization.

   (b) State five (5) advantages of reproduction by seeds.

7. (a) By giving four points, explain the importance of phosphorylation of glucoseto form glucose-6-phosphate during glycolysis.

(b) Explain the adaptations to oxygen uptake for divers.

SECTION B (30 Marks)

Answer any **two** questions from this section. Each question carries fifteen (15) marks.

8. a. In the table below shows relative amounts of the DNA in a cell of organism X measured during mitosis and meiosis. Study the Table then answer questions that follows.

Cell division	Phase of nuclear cycle	DNA content
	Early interphase	2
Mitosis	Metaphase	4
	Late telophase	2
Meiosis 1	zygotene	4
Meiosis 2	Late telophase	1

i. Account for the differences in DNA content among the different phases.

ii. What would be the probable amount of DNA content in late Telophase I and prophase II of meiosis? Explain

b. The long-term survival of a species depends on its ability to adapt to a constantly changing environment. To achieve this, it is necessary for offspring to be different from their parents as well as different from each other. Explain three ways in which this variety is brought about with the aid of meiosis.

9. (a) Describe the mechanism of transporting manufactured food material in a phloem tissue as demonstrated by Munch's hypothesis.

(b) How the model described in (a) above applied in real life situation of plants.

10. Explain the main events of the citric acid cycle indicating the formation of ATP, carbon dioxide, reduced NAD and FAD.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

133/2 **BIOLOGY 2**

Time: 3:00 Hours **Thursday, 16th February 2023 am**

Instructions

1. This paper consists of six (6) questions.
2. Answer five (5) questions.
3. Each question carries twenty (20) marks.
4. Except for diagrams that must be drawn in pencil, all writing should be in blue or black ink.
5. Cellular phones and any unauthorised materials are not allowed in the examination room.
6. Write your Examination Number on every page of your answer booklet(s).

1. (a). In what ways is fungi important to man?

   (b) What are distinctive features of different classes of phyla arthropod?

2. (a) What do you understand by the term organic evolution

   (b) Explain how the following processes lead to organic evolution.

   i) Gene flow

   ii) Mutation

   iii) Natural selection

   iv) Genetic drift

   (c) State two weaknesses of the special creation theory of origin of life.

3. a) Briefly explain the evidence to support the idea of hereditary material being located in the nucleus.

   b) i. Explain the process of DNA replication.

   ii. Why is the process of DNA replication interrupted on the lagging strand?

4. (a) Briefly explain four features associated with secondary growth in dicot plants.

   (b) With the aid of illustration, explain why insects exhibit a unique growth curve.

5. (a) The renal corpuscle is highly modified for the process of ultra-filtration. In five points, potentiate this statement.

   (b) Human beings have developed mechanisms of regulating their body fluids in hot or cold climatic conditions. Explain why in cold weather, humans produce more dilute urine than in hot weather.

   (c) Urea is one of the nitrogenous waste products excreted by mammals. What advantages do mammals have in using urea as a nitrogenous waste product? Give four, points.

6. (a) Population of any place is dynamic and not static. Explain four (4) factors that cause this phenomenon in any area.

   (b) Explain the advantages and limitations of simple, systematic and random sampling techniques. Give two points in each case.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

133/3A

BIOLOGY 3

Time: 3:00 Hours **Friday, 17th February 2023 am**

INSTRUCTIONS:

1. This paper consists of **three (3)** questions.
2. Answer **ALL** questions.
3. Question **one (1)** carries **20 marks** and the other **two (2)**, carries **15 marks** each.
4. Except for diagrams that must be drawn in pencil, all writing should be in blue or black ink.
5. Cellular phones are **not allowed** in the examination room
6. Write your Examination Number on every page of your answer booklet(s)

1. You have been provided with specimen K. Dissect the specimen in a usual way to fully display the digestive system. Pin the ileum to the left side of the animal.

   LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT.

   a. Draw a large, neat, well labelled diagram of your dissection.
   b. Name five parts which are found in the fore gut of specimen K.
   c. Explain how the central location of a gizzard helps the specimen in digestion.
   d. Differentiate the crop from the digestive caeca.

2. You have been provided with three test tubes, a large beaker, thermometer, starch suspension, pure drinking water and the reagents. Carry out experiments using procedures(i)-(vii) and then answer the questions that follows

   Procedures

   i. Take 3 test tubes and label them as test tube 1, 2and 3 respectively.
   ii. Rinse your mouth with pure drinking water and then collect your saliva by spiting 2ml into each of test tube 1 and 3.
   iii. Put the 2ml of water into test tube 2.
   iv. To test tube 3, boil the content to a temperature of about 60^0C.
   v. Add 2ml of starch suspension to each test tube. Shake the test tubes.
   vi. Put the test tubes in a beaker of water at 40^0C. Leave them for 10 minutes.
   vii. Put 2 drops from each test tube into separate dimples of the white tile, then add a drop of iodine solution. Note the results.
   viii. Add 3ml of Benedict's solution to each test tube, and then boil the test tubes for 3minutes. Note the results.

   Questions

   a) Based on the observations in the procedure performed above, write what happened to the iodine and Benedict's test respectively. Record your experimental results as shown in Table 1

Table 1

Test Tube	Result of Iodine test	Result of Benedict's test
1		
2		
3		

b) Which test tube contained starch at the end of experiment? Give a reason to support your answer.

c) What is the effect of saliva on starch?

d) What is the effect of procedure (vii) in the human body if it is maintained for 15 minutes?

e) Why warmth in procedure (v) of the experiment is important to our body?

f) In what ways is the knowledge used in the experiment useful in your daily life?

3. You are provided with specimens S1, S2 and S3.

a) i) Name the kingdom and phyla to which specimen S1, S2 and S3 belong.

ii) State two economic importance of specimen S2.

iii) Suggest possible habitat for specimen S3

iv) State 3 structural adaptation for the specimen in habitat you mentioned.

b) By using sharp razor blade, cut specimen S1 longitudinally to obtain two halves

i) Draw half flower diagram

ii) Write the floral formular of the specimen S1.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

132/1 **CHEMISTRY 1**

Time: 3:00 Hours **Monday, 13th February 2023 p.m**

Instructions:

1. This paper consists of ten (10) questions
2. Answer all questions in section A and two questions in section B
3. Each question carries 10 marks in section A and 15 marks for each question in section B
4. The work done in each question should be shown clearly in the answer space(s) provided.
5. Use the following constant where necessary: -

   Gas constant R= $0.0821 atm dm^3 mol^{-1} K^{-1}$ or R= $8.314 JK^{-1} Mol^{-1}$

   Rydberg constant Rh= $1.0971 \times 10^7 M^{-1}$

   GMV = $22.4 dm^3$

   Velocity of light C = $3.0 \times 10^8 Ms^{-1}$

   Plank's constant h = 6.626×10^{-34} JS

   Avogadro's constant = 6.02×10^{23}

   Atomic masses H=1, O= 16, Ca= 40, K = 39, I = 27, Na= 23, C= 12.

SECTION A

Answer **all** questions in this section

1. (a) How can you distinguish the following items:-

   (i) Emission spectra and absorption spectra

   (ii) Line spectra and continuous spectra

   (iii) Atomic orbital and degenerate orbital **(03 marks)**

   (b) What is the wavelength of a photon (in nanometers) emitted during a transition from the fifth to second energy levels in hydrogen atom? To what region of the spectrum does this wavelength correspond? **(04 marks)**

   (c) Suppose that the uncertainty in determining the position of an electron circling an atom in an orbit is 0.4A°. What is the uncertainty in the velocity? **(03 marks)**

2. (a) Write short notes on the following
   i. Hydrogen bonding
   ii. Van der Waal forces
   iii. Dative bond
   iv. Polar covalent bond
   v. Intramolecular hydrogen bonding (2.5marks)

   (b) Give the name of a geometrical structure and one example of the molecules formed from the following hybridized atomic orbital.

   i. SP^3 hybridized orbital

   ii. SP^2 hybridized orbital

   iii. d^2SP^3 hybridized orbital **(03 marks)**

   (c) Explain why CO2 is a non-polar molecule while SO2 is a polar despite the fact that both have the same empirical formula. (01.5 marks)

   (d) Briefly describe three conditions necessary for the formation of hydrogen bond **(03 marks)**

3. a) State the following gas laws and provide their mathematical expression.
   i. Charles law
   ii. Avogadro's Law

iii. Dalton's law of partial pressure (03 *marks*)

b) i) Why bakery products(bread) becomes fluffy
ii) Why a basketball shrinks when left in a cold surface overnight.*(04Marks)*

c) Automobile air bags respond to a collision of a present strength by electrically triggering the explosive decomposition of sodium azide (NaN_3) to its elements. In an industrial lab simulation,15.3cm^3 of nitrogen gas collected over water at 25°C and 755mmHg.How many grams of azide decomposed.(03 *marks*)

4. (a) Describe the meaning of colligative properties

(b) Describe four colligative properties

(c) Explain any five importances of colligative properties

(d) Describe the Rault's Law as it is used in chemistry

(e) Show how can you achieve the Rault's equation (10marks)

5. (a) With the aid of chemical equation explain how soluble and insoluble metal sulphate can be prepared? (04marks)

(b) In one laboratory test experiment dilute nitric acid was added to green solid V. A blue solution W and gas X that forms a white precipitate with lime water were formed. This was followed by evaporating a blue solution to dryness and then heating strongly in a crucible. The following product were observed to be formed, a black solid Y, brown fumes of gas Z and a gas that relight a glowing splint.

i. Identify solid V and Y

ii. Identify gas X and Z

iii. Write a chemical equation for the reaction between solid V and dilute nitric acid

iv.Write the chemical equation for the formation of solid Y (06marks)

6. a) Explain the meaning of the following terms

i. Enthalpy of formation (01 *mark*)

ii. Enthalpy of reaction (01 *mark*)

iii. Enthalpy of combustion (01 *mark*)

iv. Enthalpy of transition (01 *mark*)

b) In an experiment, 2g of methanol was burned completely in air the enthalpy changes of formation are as follows:-

$\Delta fH/KJmol^{-1}$

$CH_3OH_{(l)}$	-234
$CO_{2(g)}$	-394
$H_2O_{(l)}$	-286

i. Write an equation for the combustion of methanol $(01\ mark)$

ii. Using your equation and data given above calculate ΔCH(Standard enthalpy change of combustion) for methanol. $(00\frac{1}{2}\ mark)$

iii. Comment on whether this reaction is endothermic or exothermic?

c) Given $CH_8 + 5O_2 \rightarrow 3CO_2 + H_2O$

Bond	C - H	C - C	O = O	C = 0	O - H
Mean bond enthalpy $KJmol^{-1}$	+413	+347	+498	+743	+464

i) Using the bond enthalpies and equations shown above, calculateΔH for the combustion of pentane $(01\frac{1}{2}\ marks)$

ii) Draw on energy diagram for the forward reaction labeling the reactants, products, ΔH and stating whether it is an exothermic or endothermic reaction. $(03\ marks)$

7. (a) Explain the meaning of the following terms: -

(i) Homogeneous catalyst

(ii) Heterogeneous equilibrium

(iii) Dynamic equilibrium **(03 marks)**

(b) Consider the following gas phase reaction equilibrium involving N_2O_4.

Reaction 1: $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$ $k_1 = 0.115$

Reaction 2: $2N_2O_{4(g)} \rightleftharpoons 2N_2O_{(g)} + 3O_2$ $k_2 = 1.37\times10^{-1}$

Determine the equilibrium constant of the reaction. $4NO_{2(g)} \rightleftharpoons 2N_2O_{(g)}+3O_{2(g)}$ $k_3 = ?$

(03 marks)

(c) Initially, there are 0.249 mol N_2, 3.21×10^{-2}mol H_2, and 6.42×10^{-4}mol NH_3 in a 3.50L reaction vessel at 375◦C.

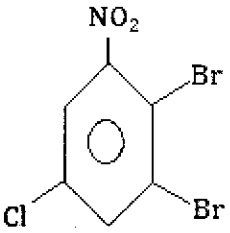
If the equilibrium constant (Kc) for the reaction $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ is 1.2 at this temperature, decide whether the system is at equilibrium. If it is not, predict which way the net reaction will proceed to achieve equilibrium. **(04 marks)**

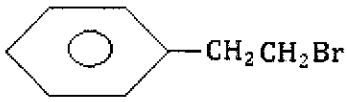
8. (a)Draw the structural formula for the following molecules
   i. $3-ethyl-2-methyl\ heptate$
   ii. $3-ethyl-2,2-dineethyl\ hexane$
   iii. $2,3,4,5,6,7-hexamethyl\ octane$
   iv. $2-ethyl-2-methyl\ butane$(02marks)

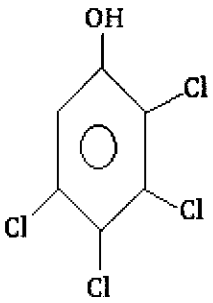
   (b) The following names are incorrect, draw their structure and rename them according to the IUPAC system
   i. 2,2-diethyl-1-methylhexane
   ii. 2-chloro-2-bromo-3-propylpentane
   iii. Pent-3-ene-1-yne
   iv. 1-methyl-1-bromo-3-ethylheptane
   v. Hex-2,4-ene (10marks)

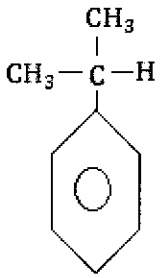
   c) Show how to prepare
   i. Acetylene from ethylene
   ii. $1-butyne\ from\ acetylene.$ $(03\ marks)$

9. (a)Give *IUPAC* names of the following aromatic compounds

i) 

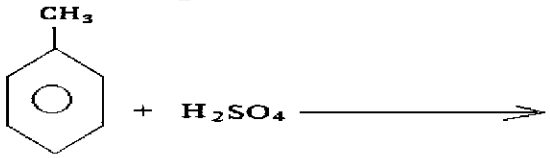
iii) 

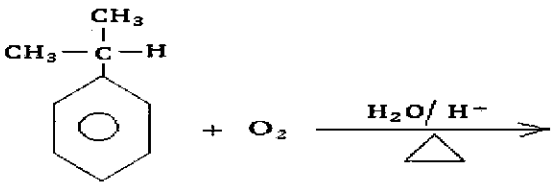
ii) 

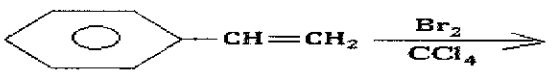
iv) 

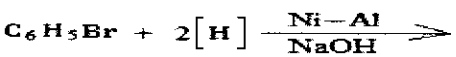
(02marks)

b) Complete the following reactions

i) 

ii) 

iii) 

iv) 

(02marks)

(c) The hydrocarbon compound A(C_5H_{12}) on heating at high temperature in the presence of V_2O_5 gives two products which are compound B(C_2H_4) and compound C. Treatment of compound B with acidified potassium permanganate at low temperature (0°C) it gives

compound D.When compound D is passed through conc.H_2SO_4 at high temperature it gives compound E. When compound E is passed through red hot iron tube compound F(C_6H_6) is formed.

i. Identify compound A to F (06marks)

ii. Show all the possible chemical reactions taking place in the process above (04marks)

iii. What will happen when compound B is reacted with conc.H_2SO_4 (01mark)

10. (a) Describe the meaning of the following terms

i. Active soil acidity

ii. Potential soil acidity

iii. Liming material

iv. Cation exchange capacity

v. Percentage of base saturation

(b) A soil test shows the following: -

Nutrients	meq/100g soil
Ca^{2+}	9.9
Mg^{2+}	2.1
K^{+}	2.0
Al^{3+}	7.6
$NH4^{+}$	0.6
Na^{+}	0.1

i. Calculate the cation exchange of the soil

ii. Calculate the percentage of base saturation of the soil

iii. Calculate the percentage of aluminium saturation of the soil

(c) Explain any four (4) factors which influence the soil acidity. **(02 marks)**

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

132/2 **CHEMISTRY 2**

Time: 3:00 Hours **Monday, 20th February 2023 p.m**

Instructions:

1. This paper consists of six (06) questions
2. Answer **any five** questions
3. Each question carries a total of 20 marks
4. The work done in each question should be shown clearly in the answer space(s) provided.
5. Use the following constant where necessary: -

Gas constant R= 0.0821atmdm^{3}mol^{-1}K^{-1}or R= 8.314JK^{-1}Mol^{-1}

Rydberg constant Rh= 1.0971 x 10^{7}M^{-1}

GMV = 22.4dm^3

Velocity of light C = 3.0 x 10^{8}Ms^{-1}

Plank's constant h = 6.626 x 10^{34} JS

Avogadro's constant = 6.02 x 10^{23}

Atomic masses H=1, O= 16, Ca= 40, K = 39, I = 27, Na= 23, C= 12.

1. (a) (i) Describe the meaning of ideal solution.(02 mark)

(ii) Ideal solution differ from non-ideal solution by four areas, by using four points give factors contributes to ideal solution formation. (04 marks)

(iii) By using well labelled diagram show that Acetone and Ethanol mixture form a non-ideal solutions. (06 marks)

(b) When 0.7dm3 of an aqueous solution containing 6g of a solute B per litre was shaken with 200cm3 of heptanol, 3.21g of the solute B was extracted. Assuming the molecular state of the solute remained the same in both solvents, Calculate:

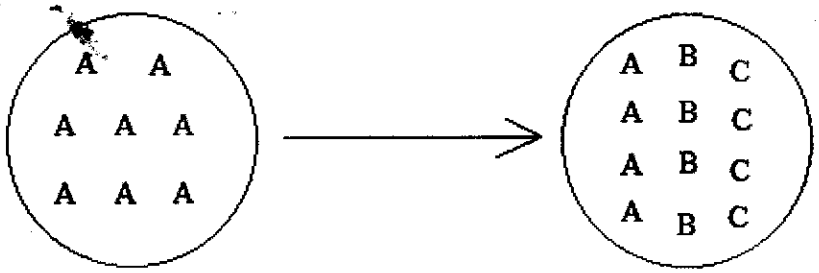
(i) Value of distribution coefficient. (04 mark)

(ii) Mass of the solute B which remained in the aqueous solution after a further shaking with 200cm3 of heptanol. (04 marks)

2. (a).i) What is the half-life $\left(t_{\frac{1}{2}}\right)$ for a reaction?

ii) Sketch a reaction energy diagram for catalyzed and unanalyzed reaction

b) Substance A (8 particles) decomposed to two other substance B (4 particles) and C (4 particles) in the first order gases reaction. The molecular scenes below show a portion of the reaction mixture at two different times (0 sec and 30 sec)



i. How many particles A, B and C are there at $t = 60\ sec$?

ii. Find the rat constant of the reaction.

iii. If the total pressure of the mixture is 5.0 atm at 90 sec.What is the partial pressure of substance B(P_B)?

c) The overall reaction $2NO_{(g)} + O_{2(g)} \rightarrow 2NO_{(g)}$ has an experimental rate law $R = K[NO]^2[O]$. A proposed mechanism is;

I. $NO_{(g)} + O_{2(g)} \underset{R_{-1}}{\overset{R_1}{\rightleftharpoons}} NO_{3(g)}$ (fast)

II. $NO_{3(g)} + NO_{(g)} \xrightarrow{R_2} 2NO_{2\,(g)}$ (slow)

i. What is the intermediate species?

ii. Is the rate law consistent with proposed mechanism?

3. a) i) Calculate the P^H of a buffer solution prepared by dissolving $0.10\,moles$ of cynic acid($H - CNO$) and 0.5 moles of sodium cyanide ($NaCN$) in enough water to make 0.50 $litre$ of solution

$$(K_a\ for\ H - CNO = 2.0 \times 10^{-4}\ at\ 25°C)$$

ii) Calculate the P^H of the buffer solution in above after adding 0.03moles of HCl.

b) 6.60g of MnF_2 will be dissolve in one litre of solution at$25°C$.Calculate the value of K_{sp} for MnF_2 at $25°C$

c) Write the balanced equations to explain whether addition of $H_3O^+$from a strong acid affects the solubility of each of the following ionic compounds.

i. Lead (II) bromide

ii. Copper (II) hydroxide

iii.Iron (II) sulphide

4.(a) Describe how polarizing power differ from polarizability (02marks)

(b) study the following chemical species and then answer the questions bellow

Ca^{2+}, K^+ , S^{2-}, Ar, Cl^-, and P^{3-}

Arrange them in the order of decreases in their :-

i. Polarizing power
ii. Polarizability
iii. Ionic size
iv. Electronegativity
v. Electropositivity

(c) Comment on the following statements: -

i. Mg is large compared to Mg^{2+}

ii. K^+ has low polarizing power compared to Li^+

iii .Al is smaller than Na though they are found in the same period

iv. Hydrogen is located in group I but not in group VII

(d) Describe the usefulness of Modern periodic table over the Mendeleev's periodic table

5. a) i) Describe any four characteristics of transition elements

ii) By using crystal field theory, explain the color formation in Transition elements.

b) i) For each of the two octahedral complex ions $[Fe(H_2O)_6]^{2+}$and $[Fe(CN)_6]^{4-}$draw orbital splitting diagram and predict the number of unpaired electrons.

ii) What are the charge and coordination number of the central ions in each of the following complex compounds; $[Ni(H_2O)_6]Cl_2$ and $[Cr(en)_3](ClO_4)_3$

c) Name the following coordination compounds;

i. $[Pt(H_2NCH_2CH_2NH_2)_2Cl_2]Cl_2$

ii. $[Ag(NH_3)_2][Ag(CN)_2]$

d) Give the molecular formula of the following coordination compounds;

i. Ammonium tetrachlorocuprate (II)

ii. Pentaamine chroloplatinum (IV) bromide

iii. Ammonium diaqualbisOxalato nickelate (II)

iv. Sodium tetrachrolonickelate (II)

v. Tris-ethylenediamine cobalt (III) sulphate

6. (a) Describe the meaning of iodoform test. (03marks)

(b) Using the concept of iodoform test show how can you distinguish between propanal and propan-2-one. (07marks)

(c). Show how can you obtain:-

i. propanal from propanone (one step)

ii. ethanal from ethyne (any steps)

iii. Propane from propanone (one step)

iv.propan-2-one from propane (any two steps)

v. Methanal from pentane.(2steps) 2@=10marks

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATIONS 2023

132/3A **CHEMISTRY 3A**

Time: 3:20 Hours **Tuesday, 21st February 2023 a.m**

Instructions:

1. This paper consists of three questions
2. Answer all questions
3. question 1 carries 20 marks while question number 2 and 3 each carries 15marks
4. The work done in each question should be shown clearly in the answer space(s) provided.
5. Use the following constant where necessary: -

Gas constant R= $0.0821 atm dm^3 mol^{-1} K^{-1}$ or R= $8.314 JK^{-1} Mol^{-1}$

Rydberg constant Rh= $1.0971 \times 10^7 M^{-1}$

GMV = $22.4 dm^3$

Velocity of light C = $3.0 \times 10^8 Ms^{-1}$

Plank's constant h = 6.626×10^{34} JS

Avogadro's constant = 6.02×10^{23}

Atomic masses H=1, O= 16, Ca= 40, K = 39, I = 27, Na= 23, C= 12.

Q1. You are provided with the following:

X: A solution made by dissolving 0.79g of KMnO4 in 250cm^3 of solution

Y: A solution made by dissolving 13.90g of FeSO4.XH2O in 500cm^3 of aqueous solution acidified with Sulphuric acid.

Z: A dilute Sulphuric acid

Procedures:

(i) Put X in the burette.

(ii) Pipette 20 or 25cm^3 of Y into conical flask. Add equal amount of Z to the same conical flask.

(iii) Titrate the solution in conical flask against X in the burette until permanent pink colours just appear. Record the burette reading.

(iv) Repeat procedure (i) to (iii) three times and tabulate your results as shown below.

Results:

The volume of the pipette used was..... cm^3

The volume of the burette used was .....cm^3

Burette readings

Titration Number	Pilot	1	2	3
Initial volume (cm^3)				
Final volume (cm^3)				
Volume used (cm^3)				

Summary:

.....cm^3 of Y required..... cm^3 of X for complete reaction.

Questions:

(a) (i) Write the redox half reactions for this titration.

(ii) Write the overall balanced ionic redox reaction.

(iii) Indicate the species which is oxidant and the one which is reductant.

(b) Explain why an indicator is not used in this kind of experiment.

(c) Explain why sulphuric acid and not hydrochloric acid is used in a particular experiment.

(d) Calculate,

i. Concentration of $FeSO_4.XH_2O$ in g/dm^3
ii. Concentration of $KMnO_4$ in g/dm^3
iii. Molarity of $KMnO_4$
iv. Molarity of $FeSO_4$
v. Molar mass of $FeSO_4.XH_2O$
vi. Value of x in the formula $FeSO_4.XH_2O$

Q.2 . You are provided with the following

A1: 4.0g of anhydrous copper(ii) sulphate, CuSO4

A2: 6.0g of hydrated copper (ii) sulphate, CuSO4.5H2O

Distilled water

Thermometer

Procedures

i. Take 100ml beaker put in it a thermometer. Put this beaker into 250ml beaker and in between the beakers fill the space with insulating materials that is cotton wool or saw dust
ii. Pour $50cm^3$ of distilled water into a beaker containing thermometer.
iii. Stir the water well by using thermometer and record temperature T_1

iv. Accurately weight about 2.0g of anhydrous $CuSO_4$ on a watch glass and put salt into water. Stir gently until dissolution is complete. Observe what happens to temperature during dissolution

v. Record the highest or lowest temperature of the solution, T_2.Clean and dry the beaker and thermometer, then repeat the experiment using 4.0g of $CuSO_4.5H_2O$ in place of anhydrous salt.

Record your result as follow

Salt	Volume of water $V(cm^3)$	Mass of salt(g)	Initial temperature of water $T_1(^0C)$	Final temperature of the solution $T_2(^0C)$	Temperature change $T=T_2-T_1$	Molar weight of salt (Mr)
$CuSO_4$						
$CuSO_4.5H_2O$						

Questions

a) Copy and complete the table above

b) Calculate the enthalpy of solution **in each salt**

c) Accepted values for these two **experiments are,**

ΔH^{θ} Solution CuSO4= -66.10Kj/mol

ΔH^{θ} Solution CuSO4.5H2O= +11.30Kj/mol

How do your values compares? Explain

Use the equation: heat produced when (g) of salt dissolved in water =mass of water x specific heat capacity x temperature change of the solution

$\Delta H=-(pVc\Delta T)$

Specific heat capacity **of water is** $4.18Jg^{-1}K^{-1}$ **and density of solution** is $1.0g/cm^3$

3. You are provided with sample P **containing two** anions and two cation. Carry out the experiment described below. Record carefully your **observations**, make appropriate inference and finally identify the cations and anions present in sample P.

Table of result

S/N	Experiment	Observation	Inference
1	Take a spatulaful of sample P into boiling test tube and add about $3cm^3$ of distilled water. Heat gently the mixture for about one minute while swirling the test tube. Filter to obtain a clear solution and divide a resulting solution into three portions.		
	(a) To a first portion add NaOH solution till excess		
	(b) To a second portion add NH_4OH solution till excess		
	(c) To a third portion add dil. HNO_3 followed by $AgNO_3$ solution then NH_3 solution		
2.	(a) Dissolve the residue in a little quantity of Conc. HCL and identify the gas evolved		
	(b)Dilute the resulting solution in (a) above with water and divide it into two portions.		
	i. To a first portion add dilute magnesium sulphate solution		
	ii To the second portion add KI solution and heated		

Conclusion

i. The cations in sample P are _____ and _____

ii. The anions in sample P are _____ and _____

iii. Write the formula of the two salts identified in sample P.

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION 2023

PHYSICS 1

Code No 131/1 **Tuesday 14th February 2023 am**

INSTRUCTIONS:

1. **This paper consists of ten questions**
2. **Answer all questions in section A and two (2) questions from section B.**
3. **Each question carries 10 marks in section A and 15 marks in section B.**
4. **The work done in each question should be shown clearly in the answer space(s) provided.**
5. **Mathematical tables may be used and non-programmable calculator maybe used.**
6. **Cellular phones and any unauthorized material are not allowed in the examination room.**
7. **Write your examination number on every page of your answer booklet(s)**
8. **The following information may be used**
   (a)Acceleration due to gravity g =9.8m/s^2

   (b)Gravitational constant G=6.67x10^{-11}Nm^{2}kg^{-2}

   (c)Mass of the earth M_E=6.0x10^{24}kg

   (d) Radius of the earth R_E=6.4X10^{6}m.

   (e) Specific heat capacity of water is 4.2KJkg^{-1}K^{-1}

   (f) Charge of electron=1.6x10^{-19}C

SECTION A (70 MARKS)

Answer all questions in this section.

1.(a) (i) Prove dimensionally if it is true or not that pressure is defined as momentum per unit volume. (3marks)

(ii) Explain the principle of homogeneity of dimensions. (2 marks)

(b) The heat generated in the circuit depends upon the current, resistance and time for which current flows. If the errors in measuring the above are 2%, 1%, and 1%, respectively, find the maximum error in measuring heat. (5 marks)

2.(a) (i) You can shield a charge from electrical forces by putting it inside a hollow conductor. Can you shield a body from the gravitational influence of near by matter by putting it inside a hollow sphere or by some other mean@ (2.5 marks)

(ii)A body weighs 63N on the surface of the earth, what is the gravitational force on it due to the earth at the height equal to half the radius of the earth? (Given that the radius of the earth is 6400Km (2.5 marks)

(b) A rocket is fired vertically upward with the speed of 5km/s from the earth surface. How far from the earth does the rocket go before returning to the earth? (Mass of the earth is $6x10^{24}$kg.Mean radius of the earth =$6.4x10^{6}$m; G=$6.67X10^{-11}Nm^2kg^{-2}$. (5 marks)

3.(a)(i) Why are wheels made circular? (2 marks)

(ii) At what angle must a truck with a bend of radius 200m be banked for a safe running of a trains at a speed of 36km/h? (3 marks)

(b) Show that the variation of "g" with depth is given as g" =g $(1-\frac{d}{R})$, where by g" is the acceleration due to gravity below the earth surface; g is the acceleration due gravity on the surface of the earth; d is the depth; R is the radius of the earth. (5 marks)

4.(a)(i) A body is projected with the speed Vo at an angle to the horizontal to have maximum horizontal range. What is its velocity at the highest point? (2 marks)

(ii) Prove that the maximum horizontal range is 4 times the maximum height attained by the projectile. (3 marks)

(b) A rocket moving in free space has a speed of $3x10^{3}$m/s relative to the earth. Its engines are turned on, and fuel is ejected in direction opposite the rocket's motion at speed of $5x10^{3}$m/s relative to the rocket. What is the speed of the rocket relative to the earth once the rocket's mass is reduced to one half its mass before ignition? And what is the thrust on the rocket if it burns fuel at 0.77kg/s? (5 marks)

5.(a) (i) Why is specific heat of a gas at constant pressure greater than its specific heat at constant volume? (2 marks)

(ii) A brass boiler has a base area of $0.15m^2$and thickness of 1cm. it boils water at the rate of 6Kg/min, when placed on a gas stove. What is the temperature of the part of the flame in contact with the boiler? ($K_{brass}=109js^{-1}m^{-1}°C^{-1}$). Heat of vaporization of water is $2256x10^3Jkg^{-1}$) (3 marks)

(b)A particular resistance thermometer has a resistance of 30Ω at the ice point , 41.580Ω at the steam point and 34.59Ω when immersed in a boiling liquid. A constant volume gas thermometer gives a reading of $1.333x10^5$Pa,$1.821x10^5$Pa and $1.528x10^5$Pa at the respective three temperatures. Determine the temperature at which the liquid is boiling:

(i)On the scale of the gas thermometer and (2.5 marks)

(ii)On the scale of the resistance thermometer (2.5 marks)

6.(a) (i) explain the concept of calorimetry (1 marks)

(ii) 2000g of water is contained in a 2.5KW electric kettle assuming that the heat capacity of the kettle is negligible. Calculate the time taken for the temperature of water to rise from 25°C to its boiling point (100 °C) and the mass of water evaporated per second from the boiling water. Specific capacity of water 4.2J/g°C and latent heat of vaporization of water =2250J/g. (4 marks)

(b) The specific heat capacity of an ideal gas at constant pressure is C_P =5R/2. The gas is contained in a closed vessel of volume $0.0083m^3$ at a temperature of 300K and a pressure of $1.6x10^6N/m$ it is given $2.49x10^4$J of energy. Compute the final temperature and pressure of the gas. Gas constant R =8.3J/mole.K (5 marks)

7.(a) The power P in wind contained in a cylindrical column (that is intercepted by the horizontal blades) of free un obstructed wind moving horizontally at a constant speed V is equivalent to the rate of change of its kinetic energy E. show that $P=\frac{1}{2}\rho AV^3$ (5marks)

(b)Explain the disadvantages of wind energy (at least 5points) (5marks)

SECTION B (30MARKS)

Answer two (2) questions from this section

8(a)(i)A wire is connected across a source of constant potential difference. After sometime the wire becomes hot. If cold water is poured on half of its portion, what will happen?
(1mark)

(ii) Upon which principle Kirchhoff's voltage law (loop rule) is based? (1marks)

(b)Give reasons for the following.
(i)The area of cross- section of wire of Meter Bridge should be uniform. (2marks)
(ii)The length of wire of the metre bridge need not be necessarily 1m. (2marks)

(c)A sinusoidal voltage of peak value 283V and frequency 50HZ is applied to a series LCR
Circuit in which R=3Ω, L=25.48mH, and C= 796μF. Find
a) The impedance of the circuit (2marks)
b) The phase difference between the voltage across the source and the current (2marks)
c) The power dissipated in the circuit and (3marks)
d) The power factor (2marks).

9 (a) (i) differentiate between modulation and demodulation (2marks)
(ii) Explain the advantages of negative feedback in operational amplifier as inverting amplifier (3marks)
(b) A sinusoidal carrier voltage of frequency 2MHz and amplitude 70V is amplitude modulated with sinusoidal voltage of frequency 4kHz producing modulation factor of 55%. Determine
(i) The frequency of the lower sideband (1marks)
(ii) The frequency of the upper side band (1marks)
(iii) The band width of resultant; modulated signal; and (2marks)
(iv) The amplitude of the upper and lower sideband.1marks)

(c) (i) Explain the effect of thermal runaway (2marks)
(ii) Give three causes of thermal runaway (3marks)

10 (a) (i) Why is collector of a transistor made wider than emitter and base? (2 marks)
(ii) Why are rectifier diodes not operated in the breakdown region? (2 marks)
(b) (i) A full wave rectifier uses two diodes, the internal resistance of each diode maybe assumed constant at 20Ω.The transformer r.m.s. secondary voltage from centre tap to each end of secondary is 50V and load resistance is 980Ω.Find the mean load current and the r.m.s value of load current (3 marks)

(ii) In Zener diode regulated power supply, a Zener diode with VZ=6V is used for regulation. The load current is to be 4.0mA and unregulated input is 10V.What should be the value of series resistor Rs?
(3 marks)

(c) (i) How is a sample of an n-type semiconductor electrically neutral through it has an excess of electrons?

(2 marks)

(ii) Calculate the current produced in a small germanium plate of area $1cm^2$and thickness 0.3mm when a potential of 2V is supplied across its faces. Given concentration of free electrons in Ge is $2x10^{19}/m^3$and mobilities of free electrons and holes are $0.36m^2/Vs$ and $0.17m^2/Vs$ respectively. (3 marks)

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION 2023

131/2 **PHYSICS 2**

Time: 3:00 Hours **Monday, 20 February 2023 a.m**

Instructions:

1. This paper consists of 6 questions
2. Answer 5 questions
3. Each question carries 20 marks
4. The work done in each question should be shown clearly in the answer space(s) provided.
5. Mathematical tables may be used and non-programmable calculators maybe used.

6. Cellular phones and any un authorized materials are not allowed in the examination room.

7. Write your examination number on every page of your answer booklet

8. The following information's maybe useful

(a)Acceleration due gravity $g=9.8m/s^2$

(b) Speed of sound in air=340m/s

(c) Permeability of free space $=4\pi x10^{-7}H/m$

1(a) (i). Why compressibility of fluid is said to be an important characteristics ***(2marks)***

ii. Water flows steadily at the rate of $1000cm^3/s$ through a horizontal pipe of non-uniform cross- section. Find the velocity of water at a section, where the radius of pipe is 10cm (5marks).

a) The Bernoullis equation can be written in form of

$P + \frac{1}{2}P V^2 = \text{constant}$

i. Explain the meaning of each term in the equation. (3marks)

ii. State two conditions which must apply for this equation to be true **(4 marks)**

b) A cylindrical tank with a radius of 1m rests on a platform 5m high. Initially the tank is filled with water to a height of 6m. A plug whose area is 10^{-5} m^2 is removed an orifice on the side of the tank at the bottom. Calculate

i. Initial speed with which the water will strike the ground (1 mark)

ii. Initial distance from the tank to the point where water strikes the ground **(2 Marks)**

iii. Time taken to empty the tank **(3 marks)**

2 (a) Explain the following terms as applied to polarization

(i) Polaroid **(1 mark)**

(ii) Polarizing angle **(1 mark)**

(iii) Distinguish between unpolarized light and a plane polarized light **(2 marks)**

(b) (i)What are the three main difference between the sound waves and light waves **(3 marks)**

(ii)When a source moves towards you, is there any change in wave speed?

(iii)We cannot hear echo in a room. Explain. **(2 marks)**

(c) (i)The planet Jupiter has an atmosphere composed mainly of methane at a temperature of 143 K . Find the velocity of sound on the planet. Given that $\gamma_{gas} = 1.3$ and $R = 8.36 Jmol^{-1}K^{-1}$. **(2 marks)**

(ii) One steel pipe of length 660 m is struck a blow which produces loud sound. A listener at the other end hears two sounds at an interval of $1.89s$; one from the wave that has travelled along the metal portion of the pipe and the other from the wave that has travelled through air. If the density of steel is $8 \times 10^3 kgm^{-3}$, what is the bulk modulus of elasticity of steel? **(3 marks)**

(d) A simple harmonic wave train is travelling in gas in the positive direction of the $x-$axis. Its amplitude is 2 cm, velocity $45m/s$ and frequency $75s^{-1}$.

(i) Write down the equation of the wave. **(1.5 marks)**

(ii) Find out the displacement of the particle of the medium at a distance of 135 cm from the origin in the direction of wave at the instant $t = 3s$ **.(2.5 marks)**

3(i) State Hooke's law of elasticity. **(02 marks)**

ii) A uniform steel wire of length 4m and area of cross section $3 \times 10^{-6}m^2$ is extended 1mm. Calculate the energy stored in the wire, if the elastic limit is not exceeded.

(03 *marks*)

b) A rubber cord of a catapult has a cross-sectional area of $2mm^2$ and an initial length of 0.2m is stretched to 0.24m to fire a small object of mass 10g. Assuming that the elastic limit is not exceeded, calculate the initial velocity of the object when it is released.

(04 *marks*)

c) i) Mention three evidences that proves that there is surface tension in water surfaces.

(03 *marks*)

ii) Calculate the work done against surface tension forces in blowing a soap bubble of 1cm in diameter. **(04 *marks*)**

c) Estimate the radius of a single droplet when the rain drop of radius 0.5 mm strikes the surface and breaks to 125 droplets of equal size. **(04 *marks*)**

4(a) i) What is time constant of a capacitor? (02 *marks*)

ii) Find the force of attraction between plates of a parallel plate capacitor of effective area $2.5 \times 10^{-4}m^2$ when stores a charge of $3\mu C$. **(04 *marks*)**

b) i) What is dielectric material? **(02 *marks*)**

ii) A parallel air plate capacitor is charged to a p.d of 300V and then connected in parallel with another capacitor of equal dimension but with ebonite as a dielectric. The p.d is found to be 75V, calculate the dielectric constant of the ebonite. **(04 *marks*)**

c) The belt of a Vann De Graff generator is of width $10^{-2}m$ and travels at a speed of $12m/sec$. The charge delivery on the belt is$3 \times 10^{-5}Cm^{-1}$. The generator is connected to a resistor of$4 \times 10^{10}\Omega$. Determine;

i. The maximum steady current that can be drawn from the generator. (02 Marks)

ii. The maximum potential difference across the resistor. **(02 *marks*)**

iii. Power of the motor to drive the belt. **(02 *marks*)**

a) 5 (i) What does the area of hysteresis loop indicate?

(ii) What is the use of hysteresis loop?

b) A beam of alpha particles and of proton of the same velocity v, enter a uniform magnetic field at right angles to the field lines. The particles describe circular paths. What is the ratio of radii of the two paths?

c) Describe what happens when a charged particle is projected perpendicular to a uniform magnetic field.

d) A circular coil of wire of 50 turns and radius 0.05 carries current of $1A$. The wire is suspended vertically in a uniform magnetic field of $1.5T$. The direction of magnetic field is parallel to the plane of a coil.

(i) Calculate the torque of the coil.

(ii) Would your answer change if the circular coil is replaced by a plane coil, other particulars unaltered?

6(a) What are the main two differences between Rutherford's and Bohr's model of an atom.**(03 *marks*)**

b) Hydrogen atom in its ground state is excited by means of monochromatic radiation of wavelength $975\mathring{A}$. How many different lines are possible in the resulting spectrum? Calculate the longest wavelength amongst them, assuming the ionization energy of hydrogen atom is 13.6eV. **(07 *marks*)**

c) What is the power output of a $_{92}U^{235}$ reactor if it takes 30days to fuse up 2kg of fuel and if each fission gives 185MeV of usable energy? $N_A = 6.02 \times 10^{26}$per kilomole.

(06 *marks*)

d) i) Why is a neutron most effective as a bullet in nuclear reaction? **(02 *marks*)**

ii) What is nuclear reactor? **(02 *marks*)**

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM SIX PRE-NATIONAL EXAMINATION- 2023

131/3A **PHYSICS 3A**

Time: 3:00 Hours **Wednesday, 22nd February 2023 am**

INSTRUCTIONS:

1. **This paper consists of three questions**
2. **Answer all questions**
3. **Question 1 carries 20 marks while question number 2 and 3 each carries 15marks**
4. **The work done in each question should be shown clearly in the answer space(s) provided.**
5. **Mathematical tables may be used.**

1. You are provided with retort stand and its accessories, a bob, cotton thread of about 120cm. and stop watch.

Tie a thread to the given pendulum bob. Make at Knot a short distance from the bob. This distance should be of the order 10cm. The distance between the Knot and bob is denoted by "b" and distance between Knot and point of suspension is X. Adjust X to be 20cm displace the pendulum by small angle and the release it so that is swing to and from with small amplitude of vibration. Find time for 30 Oscillations and hence determine the time period (T) for one oscillation.

i. Draw the diagram to represent the information above
ii. Repeat the procedure for the value of X= 30cm, 50cm, 70cm and 90cm.
iii. Tabulate the values of X, t(s)T $(s)^2$. If the periodic time T is related to X by T $=2\pi\sqrt{\frac{x+b}{g}}$

(b) Plot the graph of T^2 against X

i. Find the slope of your graph
ii. Calculate the value of "g"

(c) Read and record a value of X- intercept

i. Read and record T^2 Intercept T_0
ii. Show that To is related to "b" by

$T = \frac{4\pi^2 b}{g}$

iii. State the aim of this experiment

2. You are required to determine the specific heat capacity of liquid A provided.

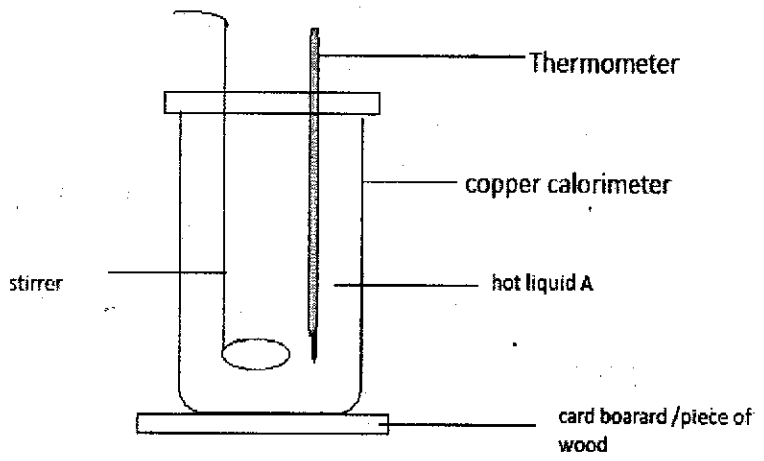
Proceed as follows;

(a) (i) Weigh the empty calorimeter with lid and stirrer.

(ii) Fill the calorimeter to about 2/3 full of liquid A that has been heated to a temperature of 90°C

(iii) Set up the apparatus as shown in the figure below.

2



(b) Read and record the temperature θ of the liquid as it cools at the interval of 2 minutes over the temperature range from 80°C to 56°C while gently stirring the calorimeter.

(c) Tabulate the values of θ°C and the corresponding values of time t starting at t=0.

Also read and record the room temperature θ_R.

(d) Remove the thermometer and weigh the calorimeter with its contents

(e) (i) Plot a cooling curve for liquid A

(ii) Draw the gradient at 65°C to obtain the rate of cooling of the liquid

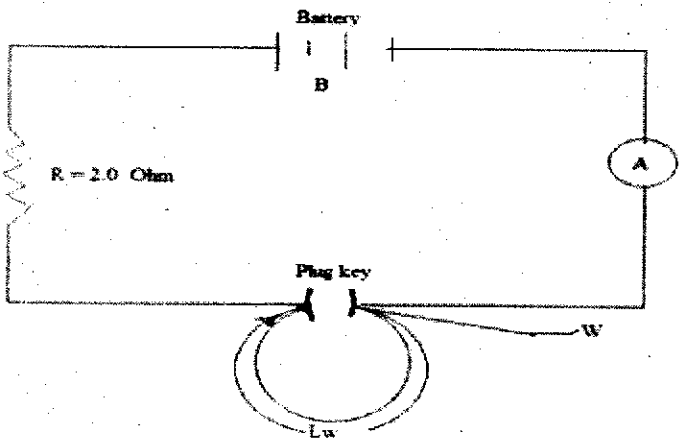
(iii) Using the relation $(M_A C_A + M_C C_C)\frac{d\theta}{dt} = -430$.

Calculate the specific heat capacity of liquid A, where M_A is the mass of liquid A and M_C is the mass of calorimeter with lid and stirrer. Given that Cc =390J/Kg/°C is specific heat capacity of calorimeter

(f) State two factors upon which the rate of loss of heat depends.

3. The aim of this experiment is to determine the resistivity ρ, of the wire labeled W and the internal resistance of the battery provided.

Proceeds as follows



Connect the circuit as shown in Figure above

With the plug key open adjust the length of wire W to a value of 20 cm. Note the ammeter reading .

NB: Plug key should be open throughout the experiment.

(a) Repeat the procedure above for L_W = 40 cm, 60 cm, 80 cm and 100 cm each

time recording the ammeter reading.

(b) Tabulate your results including Length L_W of wire (cm), Current I (A), and $1/I(A^{-1})$

(c) (i) Plot a graph of 1/I against L_W

(ii) Determine the slope G.

(iii) Determine the Intercept Y on the vertical axis

(d) Measure and record the diameter at four different places on the wire. Hence

Find the mean value of diameter d.

(c) Given that $E=\frac{4\rho}{\Pi E d^2}$ and $Y=\frac{R+r}{E}$ Where E is the emf of the battery, and R=2Ω

Find the (i) The resistivity, ρ of the wire.

(ii) Internal resistance, r of the battery