PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISIONER'S OFFICE

FORM SIX MOCK EXAMINATION

ENGLISH LANGUAGE 1

CODE: 122/1

TIME: 3 HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of section **A** and **B** with a total of eight **(8)** questions.
2. Answer **all** questions in section **A** and three **(3)** questions from section **B.** Question **five (5)** and **seven (7)** are **compulsory**.
3. Section **A** carries **forty (40)** marks and section **B** carries **sixty (60)** marks.
4. Cellular phones and any unauthorized materials are **NOT** allowed in the examination room.
5. Write your Examination number on every page of your answer booklet.

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SECTION A: (40 MARKS)

Answer ALL questions from this section

1. (a) Linguistics say, the major function of any language in the society is to fulfill communicative needs. Identify the function fulfilled by the following sentences
   - (i) Thank you for coming
   - (ii) Away with you!
   - (iii) What does this word mean?
   - (iv) Have one thing in common
   - (v) In the beginning God created heaven and earth (Genesis 1:1)

   (b) Explain five characteristics of human language.

2. Briefly explain the similarity and difference in pronunciation for each of the pairs of the words below;
   - i. Ten and den
   - ii. Bark and back
   - iii. Word and wed
   - iv. Bands and bonds
   - v. Knife and knight

3. (a) What is suffixation

   (b) Explain four (4) characteristics of suffixes

4. Explain the following terms
   - (i) Skimming
   - (ii) Scanning
   - (iii) Intensive reading
   - (iv) Extensive reading
   - (v) Critical reading

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SECTION B (60MARKS)

Answer three questions in this section. Question number 5 and 7 are compulsory

5. Most of contemporary Tanzanian societies can communicate in two or three languages effectively; ethnic language, Kiswahili language and English language. However, the contact between the two or all three languages give rise to different linguistic situations in the societies. Explain the eight possible outcomes when two or three languages come into contact.

6. In order to achieve well in reading critically and intensively there are a number of hints to follow. Explain (give 8 points)

7. "Thankyou Mr.Chairperson for this wonderful and glorious opportunity to support the idea put before by our fellow Mr. Hassan. My name is Mr. Johansen, I stand before you to be counted among the pioneers of women education as opposed to men for the sake of liberating our communities socially and economically" assume you have antagonistic ideas to Johansen, write eight(8) points to verify your antagonism.

8. An interpreter needs to consider some factors before and during the interpretation session. Discuss (8) eight points, 4 before and 4 during the interpretation session.

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KILIMANJARO REGIONAL COMMISIONER'S OFFICE

FORM SIX MOCK EXAMINATION

ENGLISH LANGUAGE 2

CODE:122/2

TIME: 3HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of section **A** and **B** with a total of eight **(8)** questions.
2. Answer **all** questions in section **A** and three **(3)** questions from section **B.** Question **six (6)** and **seven (7)** are **compulsory**.
3. Section **A** carries **forty (40)** marks and section **B** carries **sixty (60)** marks.
4. Cellular phones and any unauthorized materials are **NOT** allowed in the examination room.
5. Write your Examination number on every page of your answer booklet

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SECTION A (40 MARKS)

1. A). Study the picture below and then answer the questions that follow:

i) Outline three stylistics features of the text above.

ii) Give three reasons for using the above public advertisement.

B).To which province does the following expressions belong?

i. Don't say soap, say Revola.

ii. She was bailed out at high price.

iii. A mixture of dilute *NAOH* and aluminum piece is used in open drain.

iv. Ronaldo with the ball.....Ronaldo dribbles the ball, Ronaldo..... Gooool.....

2. Briefly explain what is meant by the following literary terms.

a) Dramatic Irony

b) Verbal Irony

c) Foot

d) Refrain

e) Rhythm

3. A) i.)What is a scientific language?

ii.)What are the characteristics of a scientific language, give out three points.

B) Some elements differentiate Novels from other works of literature, briefly explain five elements which make a Novel unique.

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4. Read the following poem carefully and then answer the questions that follow.

His headstone said

FREE ATLAST FREE ATLAST

But death is on a slave's freedom

We seek the freedom of free men

And the construction of a world

Where Martin Luther King could have lived

And preached non-violence

Questions;

i. What is a title of the poem

ii. Briefly identify three strong themes from the poem above.

iii. Identify two poetic devices with evidence from the poem.

iv. What is the type of the poem according to form and according to content

v. Briefly show how this poem is relevant to the society today.

SECTION B (60 Marks)

Answer three (3) questions from this section. Question six (6) and seven (7) are compulsory.

List of readings in Plays:

- Betrayal in the City – Francis Imbuga
- I Will Marry When I Want – Ngugi wa Thiong'o
- The Bride - Austin Bukenya
- LwandaMagere - Okoiti Omtatah
- An Enemy of the People – Henrik Ibsen
- Black Mamba – John Ruganda

List of readings in Novels:

- Encounters from Africa – Macmillan Education Publishers Limited
- The Beautyful Ones Are Not Yet Born – AyiKwei Armah
- A Man of the People – Chinua Achebe
- Divine Province – Severin Ndunguru
- The Rape of the Pearl – Magala Nyago
- Vanishing Shadows – Namige Kayondo
- His Excellency Head of the State – Danny Safo
- A Season of Waiting – David Omuwale.

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List of Readings in Poetry:

- Selected Poems – Tanzania Institute of Education
- The Wonderful Surgeon and other Poems – Charles Mloka

5. Most of the writers use techniques and styles to add beauty to their work; from the two plays you have read show how playwrights use techniques and styles to color their work. Give eight(8) points, four(4) from each play

6. Citing relevant examples from four poems you have read, discuss two musical features as shown from each poem.

7. Characters constantly encounter numerous challenges in their efforts to correct the wrong done in their societies. It can happen to them when trying to avoid any direct involvement in the wrong done. Use four points from each of the two novels you have read to justify this statement.

8. Betrayal and hypocrisy is among the most common themes written by many playwrights. Justify the statement with reference to the two plays you have read. Give 8 points, 4 points from each play.

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

CODE:113/1 **GEOGRAPHY 1**

TIME: 3 HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of Seven (7) questions in section A and B.
2. Answer a total of **five (5)** question, **two (2)** questions from section **A** and **three (3)** questions from section B. Question number **one (1)** is Compulsory.
3. In section **A** question number **one (1)** carries **25** marks and the rest **15** marks while in section **B** each question carries **20** marks.
4. Cellular phones and any unauthorized materials are not allowed in the examination room.
5. Non programmable calculators may be used.
6. Write your examination number on every page of your answer booklet (s)

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SECTION A

Answer **two (2)** questions. Question number **One (1)** is compulsory.

1. A. Carefully study the following hypothetical data showing land use by percentages of total area in a selected East – Africa countries by 2005 then answer the following questions.

Country	Area in "000" Km²	LANDUSE (Percentages of total area by 2005)			
		Agricultural	Recreations	Forest	Industrial
Tanzania	435	60	20	15	05
Kenya	290	35	-	25	40
Uganda	236	25	12	28	35
Rwanda	159	26	09	42	23
Burundi	115	45	20	-	35

i. Present the data by compound divided rectangle.
ii. Describe three (03) merits and Demerits of the method used to present the data.
iii. Name other alternative ways of presenting the data above.

B. The following is the distribution of scores for two sets in Geography Paper One and Geography Paper Two.

Geography Paper One	80	70	20	90	50	10	30	28
Geography Paper Two	30	35	42	50	32	49	39	33

i. Calculate the Standard Deviation of Geography Paper Two.
ii. Calculate the coefficient of range.
iii. As a geography student identify any five roles of statistics in geography.

2. Tanzania conducted census in 2022. Use the data collected in Research strategies;
   i. What methodologies were used in collecting data?(3 points)
   ii. Why did we opt to use such methodologies? (2 points each)
   iii. What challenges do you think the data collection process in research faced? (3 points)
   iv. What formats can be applied in presentation of data?(3 points)
   v. What are the likely significances we would get from data collection? (3 points)

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3. **A.** Peter and Jane took Vertical Aerial photograph and Ground photograph respectively. During interpretation, Peter's photograph faced some difficulties. Describe why Peter faced such difficulties in interpretation? (Five points)

   B. The side of the building measures 20CM on the photograph taken by 160MM, Focal Length Camera. If the same side measures 4.25CM on the 1:50,000 map. Calculate the flying height of the aircraft above the ground.

SECTION B (60 Marks)

Answer three (3) questions from this section

4. The Dynamic state of the earth is due to number of geological phenomena some of which operate in or on the earth surface. Justify by six points.

5. You as a form six student visited Tanga coast, arriving there you experienced that bash wash waves were much stronger than the swash waves along the coastal area. Assist on the likely (6) six features caused by that scenario you saw at the Tanga Coast.

6. Soil moisture in Soil A is greater than Soil B
   b. What are the likely causes of Soil A having more moisture than soil B? (Four points)
   c. How important is Soil moisture to the soil (four points)

7. Denis is living in Dar es salaam one day he decided to visit his grandmother who is living in Kilimanjaro. After arriving in Kilimanjaro, he started to experience different climatic conditions from what he is used to experience in Dar es salaam. With six points, account for the reasons to why Denis experienced such climatic condition in Kilimanjaro.

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

GEOGRAPHY 2

CODE: 113/2

TIME: 3 HOURS **NOVEMBER 2022**

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 phones are **not allowed** in the examination room.

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1. Tanzania has conducted her census this year 2022 but the census has still brought irrelevant and inaccurate population data. Why? (Eight points)

2. At present the average population growth for developing countries is 2.07% per annum while that of the world is 1.7% per annum. Account for the high rate in developing countries.(Eight points)

3. Farming is considered as a system because it has inputs, Processes and Outputs. Justify

4. You are appointed to be the Minister of Power and Energy by President Samia Suluhu Hassan. How would you improve if not eradicate the ongoing power shortage? (Eight points)

5. Resources should be conserved for future purpose. By using this statement, explain on how we can conserve forest and still exploit resources from it. (Eight points)

6. President Samia Suluhu Hassan filmed a documentary on Tanzania tourism honey pots called Royal Tour. Since then, there is a great improvement in tourism sector. How has the Royal Tour documentary led to the development in tourism sector? (Eight points)

7. China is more advanced than Tanzania in Information Communication Technology (ICT) sector. What is Tanzania missing from Information Technology Communication (ICT) that China is acquiring?

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OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

OFISI YA MKUU WA MKOA KILIMANJARO

MTIHANI WA UTAMIRIFU KIDATO CHA SITA

MSIMBO:121/1 **KISWAHILI 1**

MUDA: SAA 3:00 **NOVEMBA 2022**

MAELEKEZO

1. Karatasi hii ina sehemu mbili A na B zenye jumla ya maswali nane (8)
2. Jibu maswali yote sehemu A na maswali matatu (3) sehemu B
3. Zingatia maelekezo ya kila sehemu na kila swali
4. Simu za mkononi na vitu vyote visivyoruhusiwa havitakiwi katika chumba cha mtihani.
5. Andika namba yako ya mtihani katika kila kurasa ya karatasi utakayojibia.

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SEHEMU A (ALAMA 40)

Jibu maswali yote katika sehemu hii.

1.Soma kifungu cha habari kifuatacho kwa makini kisha jibu kwa usahihi maswali yanayofuata.

Nilianza katika dimbwi la mawazo kiasi cha kuhama nilipokua ooh! Maskini kwanini hakusikiliza ushauri? Ama kweli asiyesikia la mkuu huvunjika guu, "mkataa pema pabaya panamwita". **Dimbwi** hili la mawazo liliwahusu Gobosi na Simosa, vijana walikuwa maarufu katika kijiji chetu. Gobosi alikuwa mvulana rijali jamali wa miaka 19 na Simosa alikuwa msichana mrembo wa miaka 20. Vijana hao walikuwa viongozi wa wanafunzi katika shule ya Sekondari Jitambueni.

Baada ya kuhitimu kidato cha sita. Simosa alifaulu na hivyo alijiungaa katika chuo kikuu cha Kilimo Sokoine kilichopo Morogoro, yeye alipenda kilimo na ufugaji. Gobosi alichaguliwa kujiunga katika chuo kikuu cha Mzumbe kusomea shahada ya uongozi. Wanakijiji tulifurahi sana tulikuwa na matarajio makubwa kwa wasomi hawa.

Siku moja majira ya asubuhi nilipata **fununu** iliokuwa ikisambaa kijijini kumhusu Gobosi. Moyo ulienda mbio na macho ya wengi yalibaki yakitiririka machozi na kuondolewa. Ooh! Maskini Gobosi! mzee mmoja alisikika. Kumbe alipofika Mzumbe alijiunga na makundi ya vijana wa mtaani wanaotumia dawa za kulevya. Ni mwaka mmoja sasa umepita tangu alipojiunga na chuo kikuu. Saa akili zimeruka na amekuwa **teja**! Hawezi tena kusoma wazazi wake walimpeleka Hospitali ya Taifa ya Muhimbili kupatiwa matibabu lakini bado hali haikuwa nzuri. Baada ya kuanza dawa za kulevya alianza kuwa mgomvi.

Siku moja alipigana na mwenzake ambaye alimpiga jiwe kichwani na kuharibu sehemu ya ubongo wake. Ndoto zake zote zimepotea. Wazazi na jamii tumepoteza nguvu kazi ya Taifa. Alishauriwa sana aachane na vikundi hivyo. lakini hakusikia, hakika mkaidi hafaidi mpaka siku ya Idd. Ghafla nilianza kusinzia kwa huzuni ya moyo na kutokomea katika **ulimwengu wa njozi.**

Maswali

a. Andika kichwa cha habari uliyosoma kisichozidi maneno (5)
b. Eleza maana ya maneno au vifungu vya maneno kama ilivyotumika katika habari uliyosoma
   i. Dimbwi la mawazo
   ii. Ulimwengu wa njozi
   iii. Fununu
   iv. Tokomea
   v. Teja
c. Methali "Asiyesikia la mkuu huvunjika guu"inasadifu vipi katika habari uliyosoma? Toa hoja tatu.
d. Kutokana na habari uliyosoma, mada ya ufahamu ina manufaa gani kwako? Eleza manufaa matatu.

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2. Katika kila tungo zifuatazo taja kielezi na fafanua aina ya kielezi hicho.

a) Amekaa juu ya nyumba.
b) Anapigana kishujaa.
c) Hospitali imefungwa kwa mara ya tatu.
d) Nitaondoka asubuhi na mapema.
e) Ameelekea upande wa kulia.

3.Umbo la O-rejeshi lina majukumu mbalimbali katika tungo.Bainisha majukumu matano(05) ya umbo hilo kwa mifano.

4.Wewe kama mtu unayemudu vizuri lugha ya Kiswahili,unafikiri ni mambo gani yanaweza kupoteza uwezo wako wa kuimudu lugha hiyo? toa hoja tano (05).

SEHEMU B (ALAMA 60)

Jibu maswali matatu (03) katika sehemu hii. Swali la nane (08) ni la lazima.

5. Wewe ni Afisa Habari wa shirika la ndege Tanzania,andika tangazo kwa abiria kuhusu katizo la usafiri wa ndege NAMBA JET 343 Iliyokuwa ifanye safari yake toka Songea kwenda Zanzibar siku ya Ijumaa tarehe 25/12/2022.saa 12 asubuhi,kuwa safari hiyo itafanyika siku ya Jumapili ya tarehe 27/12/2022 saa 8 mchana.Mabadiliko haya yanatokana na kuchafuka kwa hali ya hewa angani. Jina la mtoa tangazo ni Kudura Riziki.

6. "Kushuka kwa hadhi ya kiswahili toka uhuru hadi leo kunasababishwa na watanzania wenyewe". Thibitisha dai hili kwa hoja tano (5) na mifano dhahiri.

7. Kamati ya usanifishaji wa lugha ya Kiswahili, The Inter-territorial Language Swahili Committee ilipoundwa mwaka 1930 ilikabidhiwa majukumu mbalimbali. Eleza majukumu sita (6) ya kamati hiyo.

8. a) Fafanua dhima na udhaifu wa;Tafsiri ya kisemantiki na Tafsiri ya kimawasiliano.
b) 'kutokana na maendeleo ya sayansi na teknolojia, dhana ya Ukalimani inahitajika katika shughuli mbalimbali za kila siku'.Thibitisha kauli hii kwa kutoa hoja nne(04)

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OFISI YA RAIS

TAWALA ZA MIKOA NA SERIKALI ZA MITAA

OFISI YA MKUU WA MKOA WA KILIMANJARO

MTIHANI WA UTAMIRIFU KIDATO CHA SITA

KISWAHILI 2

MSIMBO: 121/2

MUDA: MASAA 3 **NOVEMBA, 2022**

MAELEKEZO

1. Karatasi hii ina **sehemu A na B** zenye jumla ya maswali **nane (8)**
2. Jibu maswali yote katika **sehemu A** na **maswali matatu (3)** kutoka **sehemu B.**
3. Zingatia maelekezo ya kila sehemu na kila swali
4. Simu za mkononi na vitu visivyoruhusiwa havitakiwi katika chumba cha mtihani
5. Andika namba yako ya mtihani katika kila ukurasa wa kijitabu chako cha kujibia

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SEHEMU A (Alama 40)

Jibu maswali yote katika sehemu hii.

1. Mhakiki wa kazi za fasihi simulizi ni mnyonyaji wa kazi asilia.Jadili kauli hii kwa kutoa hoja **tano(05)** zenye mashiko.

2. Fasihi ya kiswahili ni ya muda mrefu tofauti na fasihi ya waswahili pamoja na fasihi kwa kiswahili.Jadili changamoto mbalimbali zinazoifanya fasihi ya kiswahili kukua .toa hoja **tano(05)**

3. Eleza sababu **tano(05)**za ufaraguzi wa fanani katika uwasilishaji wa kazi za fasihi simulizi.

4. Fafanua kwa kutoa mifano dhahiri vipengele vya kisanaa vilivyo tumika katika shairi lifuatalo.

Hao miungu waliosimama,
wambie wakae chini warefu,
kaeni chini wengi nyuma hatuoni
hatutaki venu vichafu, visogo kuona,
ndugu kaeni chini kaeni chini ndiyo amri,
acheni kelele! Kelele zajaza tumbo,
kaeni chini tulio nyuma yatuchoma moyo,
twataka chagua watu !watu! watu hasa!
Ulipewa uongozi ukawapaka rangi nyingi,
Na madaraka madaraka yakawalevya,
Sasa yavueni wapisheni wenye nia.
Au hamjaona hasira ikifura ya wengi watu?
Ulizeni saidi aliyechomewa sokoni ,
Na Abdala aliye mgonga maskini ,
Miungu nanyi ndugu chini bwetekene
Tukanyage mpite mbele tujisukume
Sisi twauza bidhaa ninyi mwauza maneno,
Tuko sawa haikai mdomoni.

Kateni yote misitu, fimbo tuenee,
Na vinyago tuwachongee Watoto wachezee,
Kausheni yote maziwa, maji tuwalowanishe,
Kukipambazuka wasiweze ruka angani,
Kokeni moto, mashujaa wa uonevu tuwabanike,
Kamwe hapata kuwa kilio, wala matanga,
Bali hoi za ushindi na madaraka kwa umma.

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SEHEMU B (Alama 60)

Jibu maswali matatu (03) katika sehemu hii,swali la tano ni lazima .

ORODHA YA VITABU

USHAIRI:

KIMBUNGA	-	**HAJI G HAJI**
FUNGATE YA UHURU	–	**M. S. KHATIBU**
MAPENZI BORA	–	**SHAABAN ROBERT**
CHUNGU TAMU	-	**T. A MVUNGI**

RIWAYA:

KUFIKIRIKA	-	**SHABANI ROBART**
USIKU UTAKAPO KWISHA	–	**MBUNDA MSOKILE**
VUTA" NKUVUTE	–	**SHAFI A. SHAFI**
MFADHILI	-	**HUSSEINI TUWA**

TAMTHILIYA:

NGUZO MAMA	-	**PENINA MHANDO**
KIVULI KINAISHI	-	**SAID A. MOHAMED**
KWENYE UKINGO WA THIM	-	**E. HUSSEIN**
MORANI	-	**EMANUEL MBOGO**

5. Fasihi Andishi ya kiswahili ni kapu kubwa lililosheheni semi mbalimbali" Thibitisha usemi huu kwa kutumia Hoja **tatu(03)**kutoka katika kila Diwani mbili ulizosoma.

6. Ushairi ni dawa ya kutibu majeraha mbalimbali katika jamii." Tumia Diwani mbili kati ya ulizosoma darasani kuthibitisha usemi huu.Toa hoja tatu kwa kila Diwani.

7. Vijana si watu wazuri'Thibitisha kauli hii kwa kutoa hoja **tatu (03)** kwa kila Riwaya kutoka katika riwaya mbili ulizosoma.

8. ''Wahusika huweza kuainishwa kwa kutumia vigezo viwili,yaani majukumu yao na tabia zao.kwa kutumia tamthiliya mbili ulizosoma fafanua aina ya wahusika kwa kigezo cha tabia.Toa hoja **tatu(03)**kwa kila tamthiliya.

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

GENERAL STUDIES

CODE:111

TIME: 3 Hours **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of **seven (7)** questions.
2. Answer **five (5)** questions. Question **one (1)** is compulsory.
3. Each question carries **twenty (20)** marks.
4. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

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Answer **five (5)** questions. Question one **(1)** is compulsory.

1. Discuss changes that were proposed in the philosophy of education for Self-reliance. (Six points)
2. By giving six points, show how different life skills can enable an individual person to solve his/ her social and economic challenges in the society.
3. Evaluate six functions of political parties.
4. Suggest six measures that can be adopted for the revival and development of local technology in Tanzania.
5. Explain any six obstacles for democratization process in Africa.
6. Describe six challenges facing the United Nations in maintaining peace and security in the World.
7. Demonstrate six precautionary measures that Tanzania can adopt to overcome drought.

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

CODE: 112/1 **HISTORY 1**

TIME: 3 HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of **seven (07)** questions.
2. Answer **five(5)** questions. Question number **one (01)** is compulsory.
3. Each question carries **twenty(20 marks).**
4. Cellular phones and any unauthorized materials are **not allowed** in the Examination room
5. Write your **Examination Number** on every page of your answer booklet(s).

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Answer **five (05)** questions. Question number **(01)** is compulsory

1. The formation and expansion of states in the interior of East and Central Africa by the 19th century was a direct product of long-distance Trade. Discuss with relevant examples. (Six points)
2. Marxist scholars notably, Walter Rodney and V. I Lenin specify that, a conspicuous disparity in development between Africa and Europe consequently underdevelopment of Africa is accredited to the development of capitalism in Europe since the 19th Century. By using six points, give credit to the above statement.
3. We are striking homewards Africa to make her big Black Republic. Remarked one activist. Identify six (6) challenges of the referred movement.
4. Assess the ways in which the expansion of colonial transportation systems after the Second World War facilitated the exploitation of African natural and human resources. (Six points).
5. Examine three (03) reasons behind and three (03) strategies employed to affect changes in colonial education after 1945.
6. Relate the decline of European capitalist economy after the Second World War with the increasing liberation movement in Africa. Give six points
7. It cannot be denied that Education for self-reliance registered some achievements in Tanzania. In light of the above statement elaborate six achievements.

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

CODE: 112/2 **HISTORY 2**

TIME: 3 Hours **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of **seven (07)** questions.
2. Answer **five(5)** questions. Question number **one (01)** is compulsory.
3. Each question carries **twenty(20 marks).**
4. Cellular phones and any unauthorized materials are **not allowed** in the Examination room
5. Write your **Examination Number** on every page of your answer booklet(s).

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Answer **five (05)** questions. Question number **one (01)** is compulsory

1. Mercantilism was very prosperous in America to Europe and America. With six points show how it contributed to the underdevelopment of African continent.
2. Although short lived the French revolution was very inspirational in promoting democracy in the World. With six points substantiate this statement.
3. Analyze the major reasons which accelerated the colonial rivalry in Africa up to 19th century. (Six points).
4. Appraise with six points the effects of USA relation with Japan in the period after 1945.
5. Describe the lesson African countries like Tanzania got from Russia and Chinese Marxist revolution. (Six points).
6. With six points, explain Khrushchev's motives of installing nuclear missiles in Cuba in 1962.
7. The Brandt report was an instrument solution for the Third World Poverty. In light of this statement analyze six outcomes of the report on Third World Countries.

cheap labour

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

ECONOMICS 1

CODE: 151/1

TIME:3HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of sections **A**, **B** and **C** with total of **eight (8)** questions.
2. Answer all questions in section A and **two (2)** questions in section **B** and **C**.
3. Section A carries **Twenty (20)** marks; section B and C carries forty **(40)** marks each.
4. **Non programmable calculators** may be used.
5. All communication devices and any unauthorized materials are not allowed in the examination room.
6. Write your **examination number** on every page of your answer booklet(s) provided.

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SECTION A (20 Marks)
(Answer all questions in this section)

1. Briefly describe why it is necessary to reduce the high unemployment rate in Tanzania? Provide five (05) points.
2. Outline five (05) probable cause of Capital Consumption.

SECTION B (40 Marks)
(Answer two (02) questions in this section)

3. (a). With vivid examples, describe **three (3)** tools of Economic Analysis.

   (b). Given the following information

Label in PPL	Paddy	Maize
K1	180	1060
K2	280	800
K3	350	540

Required:

i. Suggest three production possibilities which can be decided by the firm.

ii. Giving explanations, provide relevant ratios in moving from KI to K2

4. (a). A firm faces demand curve given by $Q = 100 - 2P$

   Marginal cost(MC) and Average Cost (AC) for the firm are constant at 10/= per unit.

   Required:

   i. What output levels should the firm produce to maximize profit?

   ii. What output levels should the firm produce to maximize sales revenue

   iii. What is the respective profit at output level which maximizes profit?

   iv. What is the profit at maximum sales revenue?

   v. A market structure in which the firm operating?

   (b). Identify three (03) types of price discrimination.

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5. (a). Study carefully the following table and answer the questions that follow

YEAR 1			YEAR 2			
Goods	Price	Index	Weight	Price	Index	Weight
A	2.00	100	4	2.5	125	4
B	5.00	100	2	6.00	200	2
C	1.00	100	1	0.80	80	1
D	3.00	100	3	6.00	200	3

Determine:

i. The weighted price index for the year 1 and 2.

ii. The percentage change in the weighted index over the period.

iii. The change in the value of money on goods over the period.

(b). Define price index. Explain problems encountered when compiling price index number. Give **six (6)** points.

SECTION C (40 Marks)

(Answer two (2) questions in this section)

6. A research shows that most of people prefer **SAMSUNG** than **TECNO.** If this is true, why do more people buy **TECNO** than **SAMSUNG**? Discuss by giving **six (6)** points

7. Increase in population lead to increase in labor force, despite this economic importance of population growth, describe why do we take measures to control population growth?

8. Despite the defects of price mechanism, many people still have faith in its operation because it can be corrected to work better. Justify this statement by giving **six (6)** points.

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FORM SIX MOCK EXAMINATION

CODE: 151/2 **ECONOMICS 2**

TIME: 3HOURS **NOVEMBER, 2022.**

INSTRUCTIONS

1. This paper consists of sections **A, B** and **C** with a total of **eight (8)** questions.
2. Answer **all** questions in section **A** and **two (2)** questions from section **B** and **C** respectively.
3. Section **A** carries **twenty (20)** marks, section **B** and **C** carries **forty (40)** marks each.
4. **Non -programmable calculators** may be used.
5. All communication devices and any unauthorized materials are **not** allowed in the examination room.
6. Write your **examination number** on every page of your answer **booklet(s)** Provided.

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SECTION A (20 Marks)

Answer all questions in this section

1. Most of developed countries have achieved to attain their goal in advanced industrialization through employing the modern technology which has encouraged innovations and prosperity in the sector. With **five (5)** points explain how the economy of Tanzania will revive and boom through investing successfully in the Import -Substitution Industrialization Strategy(ISIS).

2. The developing countries especially sub-Saharan countries, including Tanzania, have not realized the full benefits from foreign commercial banks. Discuss **five (5)** main reasons why these countries have not realized the benefits.

SECTION B (40Marks)

Answer two (2) questions in this section

3. (a)An economy of a certain country is given by

   C=150+0.8y

   I=400

   G=700

   X=130

   M=0.08y

   (The figures are in million shillings)

   Calculate

   (i) Equilibrium national income

   (ii) Consumption expenditure

   (iii) Investment multiplier

   (iv)Marginal propensity to save

   (v) When equilibrium income changes to 500, what is the new government expenditure?

   (b) Give at least **five (5)** immense significances for studying the circular flow in the economy.

4. Suppose an initial deposit of 1000 is made into the banking system and the cash ratio is fixed at 20%.Assuming there are many banks in the economy say A, B, C and D.

   i. Show how the process of credit creation can take place

   ii. Find final deposit

   iii. Credit multiplier

   iv. Total loan created

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v. Total cash reserve created

5. Table below shows income distribution in a society. You are required to:

i. Plot the Lorenz curve

ii. Determine:

(a)The percentage of wealth which is owned by the lowest 50% of the population

(b)The percentage of wealth which is owned by the top 20% of the population.

iii. Comment on the shape of the Lorenz curve.

Household groups	Value of Household assets In %	Cumulative % of households	Cumulative % 0f wealth
1st	0.0	10	0.0
2nd	0.3	20	0.3
3rd	0.9	30	1.2
4th	1.9	40	3.1
5th	4.0	50	7.1
6th	6.7	60	13.8
7th	9.6	70	23.4
8th	13.0	80	36.4
9th	20.4	90	56.8
TOP	43.2	100	100.0
TOTAL	**100.00**		

SECTION C (40 Marks)

Answer two (2) questions from this section

6. (a) Suppose you are a form six student of economics and you have been given a task to present about economic planning. Critically analyse the steps in which a project planning must follow (**5 points**).

(b) Why the government need for a proper economic planning? (**5 points**).

7. The government of Tanzania is trying to widen the tax base and taxable capacity through introducing and imposing fee charges in various necessity goods and services offered and provided to its people aiming at perpetuating and increasing the revenue collected for financing various important projects in the country. Explain **six (6)** main reasons why some of the citizens have perceived the idea contrary and not realized the benefits.

8. Discuss the collisions and difficulties that impending the Sustainable Economic Development in the East Africa Great Lakes Countries, Tanzania inclusive (**6 points**).

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FORM SIX MOCK EXAMINATION

CODE: 133/1 **BIOLOGY 1**

TIME: 3 HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of section 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. Except for diagrams which must be drawn in pencil, all writing should be in blue or black ink.
5. Cellular phones and any unauthorized materials **arenot** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s)

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SECTION A (70 marks)

Answer **all** questions in this section. Each question carries **ten (10)** marks.

1. (a) During cell differentiation various organelles are modified to suit their functions. One method through which cell is modified is by having organelles which help it to function effectively. Give reasons why the following cells are equipped with large number of lysosomes.
   (i) Salivary gland
   (ii) Cells lining digestive system
   (iii) Leucocytes
   (iv) Cells lining uterus.

   (b) Give reasons for the following biological observations:
   (i) Meat deteriorate unless refrigerated
   (ii) Plant cells would still produce ATP even if all mitochondria were removed.

   (c) Name the part of cell membrane which acts as:
   (i) Receptor site for chemical messengers such as hormones and neurotransmitters.
   (ii) Controller of passage of polar molecules and ions to

2. (a) A certain organic compound X contain elements C.H.O. Substance X gives negative test with Iodine and Benedict's solution. When treated with enzyme A from small intestine, substance X gave Y and Z. Y is aldose and Z is Ketose. Both Y and Z gave positive test with Benedict's solution.
   (i) Identify substance A, X, Y and Z.
   (ii) Write the word equation to show conversion of X by A to Y and Z.

   (b) State the roles of ATP in living things.

3. (a) The fixation of carbon dioxide in photosynthesis can be summarized by the Equation below;

   $$3CO_2 + 9ATP + 6NADP \Longrightarrow \text{Triose phosphate} + 8Pi + 9ADP + 6NADP + 3H_2O.$$

   With reference to this equation:
   (i) Explain the origin of the ATP and NADP.
   (ii) Explain why Pi, ADP and NADP do not accumulate in the chloroplasts during carbon dioxide fixation.

   (b) Giving reasons explain the following biological facts:
   (i) Ribulose biphosphate (RuBP) is constantly found in the Calvin cycle despite the continuous photosynthesis process.
   (ii) Maize plants are more efficient in photosynthesis than bean plants.

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(c) Next to stomach, there is a large gland which has a group of cells that produce a variety of digestive enzyme. Name the gland and three (3) digestive enzymes it produces with their functions.

4. (a) Describe the interaction between hormonal and nervous system.

(b) Explain the commercial application of the following phytohormones. Give two points in each.

(i) Auxin
(ii) Gibberellin

5. (a) What will happen if double fertilization does not occur in angiosperms. Give four points.

(b) With illustration, explain the formation of female gametes in flowering plants.

6. (a) What information do you get from RQ? Give three points.

(b) State features of respiratory surfaces which help to;

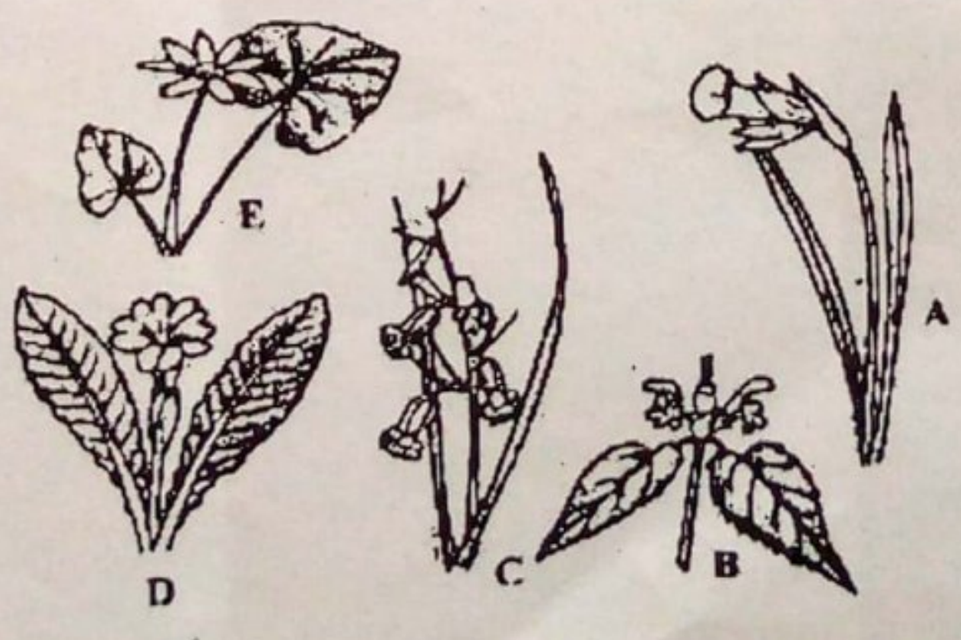
(i) Dissolve respiratory gases
(ii) Maintain diffusion gradient
(iii) Allow passage of gases.
(iv) Ensure rapid rate of diffusion of gases.

(c) State the significance of haemoglobin to have low affinity to oxygen at low partial pressure of oxygen.

7. (a) What is taxonomic hierarchy?

(b) Using a human being as an example, list the seven ranks of taxonomy and write the correct scientific name.

(c) Study the diagram of the five flowering plants given below



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Using the key provided identify plants A, B, C, D and E by their common names indicated in the key

1 (a) Leaves narrow go to 2
  (b) Leaves broadgo to 3
2 (a)Flowers like bells Bluebell
  (b)Flowers like trumpetswild daffodil
3 (a)Top petal overhangs lower petal deadnettle
  (b)Top petal does not overhang lower petalgo to 4
4 (a)Leaf heart shaped lesser celandine
  (b)Leaf club shaped primrose

SECTION B (30 marks)

Answer any **two (2)** questions from this section. Each question carries **fifteen (15)** marks

8. (a) (i) Enumerate any three features that make root hairs cells to be efficient in absorption of water and mineral salts from the soil.
   (ii)What are the consequences of the Casparian strip for water and ions movement in plants
   (b) Explain three forces which are involved in the upward movement of water from the xylem to the leaf.
9. (a) Explain the extra - embryonic membranes and their roles.
   (b) Illustrate stages of spermatogenesis.
10. (a) Explain how electron transport chain occurs in aerobic respiration.
    (b) Describe three (3) factors which cause variation of the BMR of an individual.

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FORM SIX MOCK EXAMINATION

BIOLOGY 2

CODE: 133/2

TIME: 3HOURS **NOVEMBER 2022**

INSTRUCTIONS:

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

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1. (a) Briefly in five (5) points, explain how plants with undifferentiated bodies have managed to overcome various challenges in terrestrial habitats.

   (b) With aid of illustrations, describe the life cycle of malaria causing parasite.

2. (a) How does the type of nitrogenous waste excreted by an animal relate to water availability in its habitat?

   (b) Explain how endotherms and ectotherms maintain constant body temperature in cold climates.

3. (a) Describe the events which take place during mitotic stages.

   (b) Describe the cell division in both animal and plant cells.

4. With reference to first and second Mendel's laws, describe how the ratios 3:1 and 1:1 in monohybrid cross and 9:3:3:1 and 1:1:1:1 in a dihybrid cross are obtained.

5. (a) Explain how comparative morphology and anatomy support the theory of descent with modification. Give example in each point.

   (b) Explain three types of speciation that can occur in a population based on geographic isolation, reproductive isolation and environmental factors.

6. Briefly explain the meaning, six causes and eight consequences of population explosion in animals.

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FORM SIX MOCK EXAMINATION

CHEMISTRY 1

CODE: 132/1

TIME: 3 HOURS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of **ten (10)** questions in sections **A**, and **B**.
2. Answer **all** questions in **section A** and choose any **two (2)** questions from **section B.**
3. Each question carries **ten (10)** marks in section A and **fifteen (15)** marks in section **B**.
4. Cellular phones and any other unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s)
6. The following constant may be used
   - Gas constant, **R = 0.0821 atmLmol^{-1}K^{-1} or 8.314JMol^{-1}K^{-1},**
   - Rydberg's constant, **RH = 1.09678 x 10^{7}m^{-1}**
   - Velocity of light, **c = 3 x 10^{8}m/s**
   - Planck's constant, **h = 6.63 x 10^{-34}Js**
   - Atomic masses: **H = 1,C = 12, N = 14. O = 16, P= 31, Br = 80**

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SECTION A (70 marks)

Answer all questions in this section

1.(a) Earlier we met the idea that the probability of finding the electron at any particular point is zero. We also spoke about the probability of finding the electron at a given distance from the nucleus. Try to explain why these two ideas are not contradictions of one another. **(02 marks)**

(b) Werner Heisenberg derived a remarkable result using a different (but compatible) theory to that of Schrodinger. He said that it was impossible to measure with complete accuracy both the position and momentum of an electron. This statement has come to be known as Heisenberg's uncertainty principle. We can write the uncertainty in position as Δx and in momentum as Δp. Heisenberg's equation is; $\Delta p.\Delta x \geq h/4\pi$

(i) If the position of an electron is known to within 10^{-12}m, what is the uncertainty in its momentum?

(ii) In our large-scale world, is there a limit (in principle) on the accuracy with which we can measure the momentum and position of a particle, e.g. a golf ball?

(iii) Guess the effective value of Planck's constant in the large-scale world. **(03marks)**

(c) Why do the spacing between lines in hydrogen spectrum decreases as one goes away from the nucleus?**(02 marks)**

(d) An electron moves from n = 5 to a lower energy level in visible part of electromagnetic spectrum. Calculate:

(i) Energy possessed by electron in the new energy level(shell)

(ii) Energy emitted during transition from n = 5 to a lower energy level.

(iii) Frequency of radiation emitted.**(03 marks)**

2. (a) Write short notes on the following;

(i) Hydrogen bonding.

(ii) Van der Waal forces**(02 marks)**

(b) Explain the following observations:

(i) $AlCl_3$ is covalent while AlF_3 is ionic.

(ii) CO_2 is non- polar molecule while SO_2 is polar.**(04 marks)**

(c) Using VSEPR theory, predict the molecular geometry and the type of hybridization in which the following molecules undergo;

(i) H_2O (ii) SO_3 (iii) CS_2 (iv) SO_4^{2-}**(04 marks)**

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3.(a) Describe the two assumptions of kinetic theory of gases that are not obeyed by real gases. **(02 marks)**

(b)Briefly explain in short why beyond a certain temperature gases can not be liquefied. **(02 marks)**

(c) A bromide of phosphorus is found to diffuse in the gaseous state more slowly by a factor of 3.923 than nitrogen gas under the same conditions.

(i) Calculate the relative molecular mass of the bromide.

(ii) Given that bromide molecule contains one atom of phosphorus, write down its formulae. **(06 marks)**

4. (a) Explain the following:

(i) Why is the osmotic pressure measurement preferred for determining molecular mass of protein?

(ii) Why the equimolar solutions of sodium chloride and glucose are not isotonic? **(04 marks)**

(b) Arrange the following solutions in order of increasing of their boiling points;
0.1M KCl, 0.01M glucose, 0.01M $MgCl_2$, 0.01M KCl. **(02 marks)**

(c) A 0.004 kg of acetic acid (CH_3COOH) is added to 500cm^3 of water.If 25% of the acid is dissociated, what will be the depression in freezing point?
(K_f for water =1.86 °Ckg/mol,density of water =0.997g/cm^3). **(04marks)**

5. (a) With examples state the following;

(i) Basic oxides

(ii) Acidic oxides

(iii) Amphoteric oxides **(03 marks)**

(b) You are given a list of metal carbonates in the table below. Tabulate your results by using(V) to indicate soluble carbonate and (X) for insoluble carbonate in the space provided.

Metal carbonate	$MgCO_3$	$(NH_4)_2CO_3$	Na_2CO_3	$CuCO_3$	$PbCO_3$	$ZnCO_3$
Solubility						

(03 marks)

(c) Using a balanced chemical equation, describe the decomposition of the following compounds when heated.

(i) Sodium carbonate (Na_2CO_3)

(ii) Hydrated crystals of aluminium chloride ($AlCl_3.6H_2O_{(s)}$)

(iii) Anhydrous copper (II) sulphate ($CuSO_{4(s)}$)

(iv) Sodium hydrogen carbonate($NaHCO_{3(s)}$) **(04 marks)**

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6. (a) State and give examples for each of the following terms;

(i) physical equilibrium

(ii) chemical equilibrium **(02marks)**

(b) 1dm^3 of dinitrogen tetraoxide, N_2O_4 weighs 2.5g at 60°C and 1atm pressure. Find;

(i) the degree of dissociation of N_2O_4 into NO_2.

(ii) the value of Kp **(05marks)**

(c) When a yellow solution of iron (III) chloride, $FeCl_3$ and a colourless solution of potassium thiocyanate, KSCN were mixed in a test tube, a red colour appeared and the following equilibrium was established;

$$\underset{\text{Yellow}}{Fe^{3+}_{(aq)}} + SCN^-_{(aq)} \rightleftharpoons \underset{\text{Red}}{[Fe(SCN)]^{2+}_{(aq)}}$$

(i) What is the effect on the Fe^{3+} ion concentration upon adding KSCN to the equilibrium mixture

(ii) Why has a change in pressure no effect on equilibrium?

(iii) The red colour faded when the test tube containing the equilibrium mixture was placed in an ice-water bath. State whether the value of Kc for this reaction is high or low at the lower temperature. Is the forward reaction exothermic or endothermic? Justify your answer. **(03marks)**

7.(a) (i) State Hess's law of constant heat summation.

(ii)Use Hess's law to calculate the enthalpy change in the hypothetical reaction $2MgCl_{(s)} \longrightarrow Mg_{(s)} + MgCl_{2(s)}$. If the standard enthalpy of formation of MgCl is -130 kJ/mol and the standard enthalpy of formation of $MgCl_2$ is -640 kJ/mol. **(03marks)**

(b) The table below lists a number of some mean bond enthalpies,

Bond	Mean bond enthalpy(kJj/mol)
C-C	348
C=C	612
C-H	412
O-H	463

(i) Given that the enthalpy of combustion to form carbon dioxide and steam is -2102kJ/mol for propane and -1977 kJ/mol for propene. Determine the enthalpy for the oxidation of 1mole of propane to propene and steam.

$$C_3H_{8(g)} + \tfrac{1}{2}O_{2(g)} \longrightarrow C_3H_{6(g)} + H_2O_{(g)}$$

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(ii) Use the mean bond enthalpies in the table above together with your answer in (i) above to calculate the bond enthalpy of the O=O bond in the oxygen molecule.

(04marks)

(c) Calculate the heat of formation of anhydrous sodium chloride from;

$2Na_{(s)} + 2H_2O_{(l)} + aq. \longrightarrow 2NaOHaq. + H_{2(g)}$ $\Delta H = -87.0$ kcals.

$H_{2(g)} + Cl_{2(g)} + aq.\ 2HClaq. \longrightarrow \Delta H = -78.60$ kcals

$NaOHaq. + HClaq. \longrightarrow NaClaq. + H_2O_{(l)} \Delta H = -13.70$ kcals

$NaCl_{(s)} + aq.NaClaq. \longrightarrow \Delta H = +1.20$ kcals

$2H_{2(g)} + O_{2(g)} 2H_2O_{(l)} \longrightarrow \Delta H = -136.0$ kcals

(03marks)

SECTION B (30 marks)

Answer any **two(2)** questions from this section

8.(a) Give the IUPAC names of the following compounds:

(i)
```
CH3 - CH - CH - CH2 - CH2 - CH3
      |     |
CH3 - CH2CH2   CH2CH2CH3
```

(ii)
```
CH3 - CH2 - CH2CH2CH2CH2 CH3
      |
CH3 - C - C - CH3
      |   |
      CH3 CH2 - CH2 - CH2 - CH3
```

(iii)
```
CH3 - CH2 - CH - CH2 - CH3
              |
CH3 - CH2 - C - CH2 - CH3
              |
CH3 CH2CH2 - C - CH2 - CH3
              |
CH3 CH2 CH2CH2 CH CH2CH2 CH3
```

(iv)
```
CH3CH2CH2CH2 CHCH2CH2CH2 CH3
             |
             CH-CH3
             |
CH2 - C - CH2CH3
      |
      CH3
```

(04marks)

(b) When $20cm^3$ of a gaseous hydrocarbon A, are exploded with $150cm^3$ of oxygen,the residual gases occupied $110cm^3$. After shaking the residual gases with aqueous sodium hydroxide,thefinal volume was $30cm^3$ (all volumes were measured at the same temperature and pressure.What is the molecular formula of A. **(04marks)**

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(c) Outline how the following conversions can be achieved in not more than three steps.

(i) $CH_3CH_2Cl \longrightarrow CH_3CH_2\text{-}\underset{Cl}{\underset{|}{C}}H\text{-}\underset{Cl}{\underset{|}{C}}H_2$

(ii) $CH_3CH_2CH_3 \longrightarrow CH_3\underset{Br}{\underset{|}{C}}HCH_3$ **(04 marks)**

(d) What mass of propene is obtained from 34.0 g of 1-iodopropane on heating with ethanolic KOH , if the yield is 36% . **(03marks)**

9. (a) How does straight fertilizer differs from complete fertilizer. Give one example in each case. **(02marks)**

(b) Give the name of the fertilizer whether is straight, mixed or complete fertilizer and the type of the nutrients which contain in the following fertilizer coding below:.

(i) 10:20:15 (ii) 40:0:0 (iii) 40:8:0 **(03marks)**

(c) The soil of Mawenzi farm contains the following nutrients where all the values are given inmeq per 100g of oven dry soil: Ca^{2+} =35, Mg^{2+} = 20, Na^{+} = 4, H^{+} = 7, Al^{3+} = 10.

Calculate;

(i) Cation exchange capacity

(ii) Percentage base saturation

(iii) The quantity of Mg^{2+} in grams present in 100g of the dry soil. **(06 marks)**

(d) A farmer required 240 kg of nitrogen. What weight of urea fertilizer coded 40:0:0 a farmer needs to add to his/her farm to meet the demand? Show clearly how you obtain your answer. **(04marks)**

10.(a) Primary alkyl halide **A** C_4H_9Br reacted with alcoholic KOH to give compound **B**. Compound **B** is reacted with HBr to give **C** which is an isomer of **A**. When **C** was reacted with sodium metal it gave a compound **D** C_8H_{18} that was different than the compound when n-butyl bromide was reacted with sodium.Give the structural formula of of compounds **A** to **D** **(04marks)**

(b) Suggest suitable tests to distinguish the following compounds.

(i) Cyclopentane and pent-2-ene

(ii) Cyclopentanol and phenol **(04 marks)**

(c) Briefly explain why $(CH_3)_3C\text{-}Cl$ reacts by S_N1 mechanism while $CH_3CH_2CH_2\text{-}Cl$ reacts by S_N2 mechanism **(02marks)**

(d) How does benzene react with the following:

(i) Chloroethane in the presence of $AlCl_3$

(ii) Chlorine in the presence of $FeCl_3$

(iii)Carbon monoxide in the presence of $AlCl_3$

(iv) Concentrated sulphuric acid and heat

(v) Chloroform in the presence of $AlCl_3$ **(05marks)**

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KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

CODE: 132/2 **CHEMISTRY 2**

TIME: 3:00 HOURS **NOVEMBER 2022.**

INSTRUCTIONS

1. This paper consists of **six (06)** questions.
2. Answer **any five (05)** questions.
3. Each question carries **twenty (20)** marks.
4. Mathematical table and non programmable calculator may be used.
5. Write your examination **number** on every page of your answer booklet(s).
6. Cellular phones are **not allowed** in the examination room.
7. For calculations you may use the following constants:
   - Atomic masses: **K = 39, Ag =108 , Br = 80, Cl = 35.5, Na = 23, S = 32, Ca = 40,Ar= 40, Fe = 56**
   - Atomic number: **Al = 13, O = 8, Li = 3, Cl = 17, K = 19, Cr = 24, Cu = 29, Fe = 26, Ca=20, Ag=47 ,Ne=10, Ar=18, Kr=36, Xe=54,Br=35,Mg=12,F=9,N=7.**
   - Gas constant **R= 0.0821 atmLmol^{-1} K^{-1}or 8.314 J mol^{-1} K^{-1}**

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1.(a) State partition law. **(01 mark)**

(b) 25 cm^3 of 0.2 mol dm^{-3} solution of copper (II) sulphate were mixed with 25 cm^3 of 1 mol dm^{-3} ammonia solution. When these solutions mix, a royal blue solution is made. This contains a complex ion, which we can write as $Cu(NH_3)_x^{2+}$. The total 50 cm^3 of the solution were shaken with 50 cm^3 of trichloromethane. After giving time for equilibrium to be achieved, the two solutions were separated. The ammonia was extracted from the trichloromethane. After performing a titration it was found that 0.2×10^{-3} mol of ammonia was present in the trichloromethane. Taking the partition coefficient for ammonia between water and trichloromethane as 25.

(i) Calculate the number of moles of free ammonia in the original 50 cm^3 of the royal blue solution.

(ii) What is the total number of moles of ammonia in the trichloromethane and the 50 cm^3 of the royal blue solution?

(iii) How many moles of ammonia were present before the complex ion was made?

(iv) How many moles of ammonia had been used in joining with the copper (II) ions?

(v) How many moles of copper (II) sulphate had been used

(vi) Given that every 1mol of copper (II) sulphate contains 1 mol of copper (II) ions, how many moles of copper(II) ions had been taken?

(vii) What is the ratio of moles of copper(II) ions to moles of ammonia molecules in the complex ion?

(viii) What is the formula of the complex ion? **(10 marks)**

(c)(i) State Raoult's law of vapour pressure **(01 mark)**

(ii) Benzene (C_6H_6) and toluene form a nearly ideal solution. At 313K the vapour pressure of pure benzene is 150mmHg and of pure toluene is 50 mmHg. Calculate the vapour pressure of a mixture of these two liquids containing equal masses at the given temperature. **(04 marks)**

(d) A 1.0g sample of Fe_2O_3 solid of 55.2 per cent purity is dissolved in acid and reduced by heating the solution with zinc dust. The resultant solution is cooled and made up to 100 cm^3. An aliquot of 25.0 cm^3 of this solution requires 17.0 cm^3 of 0.0167M solution of an oxidant for titration. Calculate the number of electrons taken up by the oxidant in the reaction of the above titration. **(04 marks)**

2..(a) Distinguish between the following terms:

(i) Rate constant and rate law

(ii) Elementary step and rate-determining step

(iii) Molecularity and order of reaction **(03 marks)**

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(b) The following results were obtained for the decomposition of nitrogen (v) oxide. $2N_2O_{5(g)} \longrightarrow 4NO_{2(g)} + O_{2(g)}$

Initial concentration of N_2O_5/moldm^{-3}	Initial rate(mol/dm^3/s)
1.6×10^{-3}	0.12
2.4×10^{-3}	0.18
3.2×10^{-3}	0.24

(i) What is the Order of reaction?
(ii) Determine the rate constant for the reaction
(iii) What is the initial rate of reaction when the concentration of N_2O_5 is 2.4×10^{-2}moldm^{-3} ? **(05 marks)**

(c) (i) The rate constant of a first order reaction becomes 5 times when the temperature is raised from 350K to 400K. Calculate the activation energy for the reaction.
(ii) During the nuclear explosion, one of the products is 90Sr with half life of 28.1 years. If 1μg of 90Sr was absorbed in the bones of a newly born baby instead of calcium,how much of it will remain after 10 years and 60 years if it is not lost metabolically? **(04 marks)**

(d)The decomposition of a certain insecticide in water follows first order kinetics with a rate constant of 1.45 year^{-1} at 285K. A certain amount of this insecticide is washed into a lake on June 1st leading to a concentration of 5.0×10^{-7} g cm^{-3}. Assume that the average temperature of the lake is 285K.
(i) Calculate the concentration of the insecticide on June 1st of the next year.
(ii) How long will it take for the concentration of the insecticide to drop to 3.0×10^{-7} g cm^{-3}? **(05 marks)**

(e) Iodide reduces iron (III) to iron (II) according to the reaction;

$$2Fe^{3+}_{(aq)} + 2I^-_{(aq)} \longrightarrow 2Fe^{2+}_{(aq)} + I_{2(aq)}$$

Experimentally, it was found that doubling the concentration of Fe^{3+} ions, doubled the rate of reaction. On the other hand, doubling the concentration of iodide ions increased the rate of the reaction by a factor of 4. Determine the order of reaction with respect to each reactant, the overall order and write the rate law of the reaction. **(03 marks)**

3.(a)(i) Give any three (3) applications of common ion effect
(ii) The solubility of $Pb(OH)_2$ in water is 6.7×10^{-6}. Calculate the solubility of $Pb(OH)_2$ in a buffer solution of pH = 8. **(06 marks)**

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(b) Hair bleaching solutions contain hydrogen peroxide, H_2O_2. The amount of hydrogen peroxide in the solution can be determined by making H_2O_2 react with an acidic solution of potassium dichromate. The *unbalanced* equation for the reaction is ; $H_2O_{2(aq)} + Cr_2O_7^{2-}{}_{(aq)} + H^+{}_{(aq)} \rightarrow O_{2(g)} + Cr^{3+}{}_{(aq)} + H_2O$
A 30.00g sample of the bleach solution needed 75.8 mL of 0.388 *M* $K_2Cr_2O_7$ to react completely with the bleach. Assuming no other compounds that reactwith $K_2Cr_2O_7$are in the solution, what is the mass percent of H_2O_2in thebleach? **(04 marks)**

(c) For the titration of 75.00 mL of 0.1M acetic acid with 0.1M NaOH, calculate the pH;

(i) before the addition of any NaOH solution,
(ii) after 25.00 mL of the base has been added,
(iii)after half of the $HC_2H_3O_2$ has been neutralized, and
(iv)at the equivalent point. **(06 marks)**

(d) When edta(ethylenediaminetetraacetic acid) is titrated against calcium salts, experiments show that one mole of edta reacts with one mole of Ca^{2+}.This technique is used in clinical analysis to estimate the concentration of calcium in blood serum. Concentration between 7 and 13mg of calcium per 100cm^3 of blood serum are normal.
One cubic centimeter of blood serum was taken from a patient and found to require 2.75 cm^3 of 0.0015M edta solution.

(i) Calculate the concentration of calcium in the patient's blood.
(ii) Is there an abnormal level of calcium concentration in the patient's blood?

(04marks)

4 (a) Consider the following ions; Cl^-, K^+, S^{2-}, Sc^{3+} and Ca^{2+}
Arrange them in order of:

(i) Increasing ionic size
(ii) Increasing polarising power
(iii) Increasing polarisability **(03marks)**

(b) Observe the isomers $[Co(NH_3)_5Br]SO_4$and $[Co(NH_3)_5 SO_4]$ Br, then answer the questions that follows:

(i) Name the isomers
(ii) What ions will the isomers yield in solution?
(iii) Give two chemical tests that would be used to distinguish between the isomers
(iv) What is the oxidation state and coordination number of cobalt in the complexes? **(04marks)**

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(c) $50cm^3$ of a solution of 0.1M $[Co(NH_3)_5Br]SO_4$ was mixed with $50cm^3$ of a solution of 0.1M KBr and the solution was made up to $200cm^3$. What is the concentration of Br^- in this solution? (Assume the two compounds ionize completely and supply two ions in solution) **(03marks)**

(d) Explain the following observations;

(i) Lithium salts have a greater degree of covalent character than the other halides of the group.

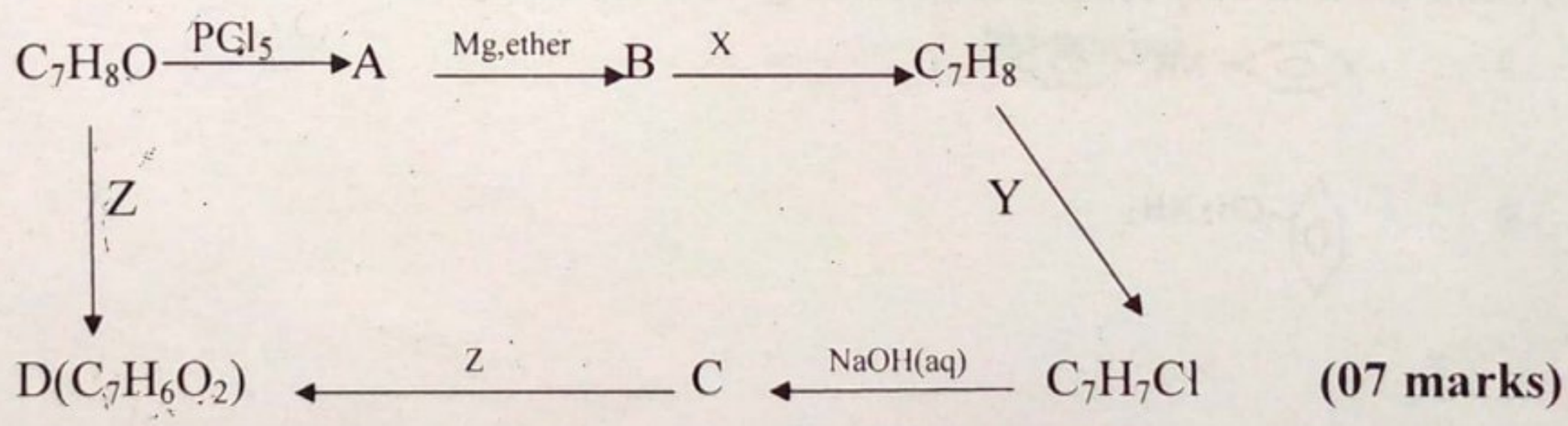
(ii) Li^+ is far smaller than the other metal ions but it moves through a solution less rapidly than the others.

(iii) It is not possible to prepare hydrogen iodide by the action of concentrated sulphuric acid on potassium iodide

(iv) $AlCl_3.6H_2O$ is acidic in aqueous solution while CH_3COONa is basic in aqueous solution.

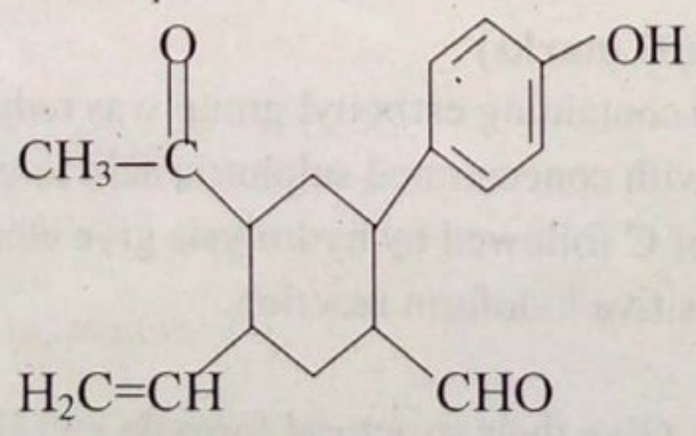
(v) When sulphur dioxide is bubbled through an acidified aqueous solution of $K_2Cr_2O_7$, the yellow colour of the latter turns green. **(10 marks)**

5.(a) Identify compounds A,B,C,D and reagents X,Y and Z in the following scheme of reactions



(07 marks)

(b) Given the structure of compound K



Write down the chemical equation for the reaction between compound K and

(i)bromine water

(ii) $FeCl_3$

(iii)Explain whether the compound will give positive iodoform test. If it gives positive iodoform test, what are the reagents and condition for the test? **(04marks)**

(c) The following experiment was carried out by a form six student.

A 9.2 g sample of ethanol and 20.4 g of 2-methylbutanoic acid were mixed in a

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flask and 2.0 g of concentrated sulphuric acid was added. The mixture was refluxed for four hours and then fractionally distilled to give 17.4 g of the crude ester. The ester was washed repeatedly with aqueous sodium carbonate until there was no more effervescence. After further washing with distilled water and drying, 15.6 g of pure ester were obtained.

By referring to the experimental procedure above,

(i) Explain why the crude ester was washed repeatedly with aqueous sodium carbonate.

(ii) State which gas was responsible for the effervescence.

(iii) Calculate how many moles of each reactant were reacted.

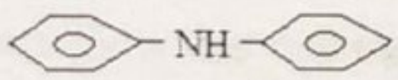
(iv) Use your answer in (c)(iii) to calculate the percentage yield of pure ester obtained in the above experiment. **(07 marks)**

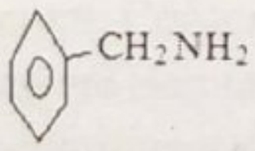
(d) Suggest the simple chemical test that would be used to distinguish the following compounds:

(i) Ethanal and acetone (propanone)

(ii) Ethanamine and N-methyl ethanamine**(02 marks)**

6.a) Name the following compounds according to the IUPAC system;

i) 

ii) 

iii) $CH_3CH_2-\underset{\underset{CH_2CH_2CH_3}{|}}{N}-CH_3$

(03 marks)

(b) An organic compound A ($C_5H_{10}O$) containing carbonyl group was reduced with $Li[AlH_4]$ to give compound **B**. **B** was dehydrated with concentrated sulphuric acid to give product **C** of molecular formula C_5H_8. Ozonolysis of **C** followed by hydrolysis give ethanal and compound **D** of molecular formula C_3H_6O. **D** gives positive iodoform reaction.

(i) Identify **A, B, C** and **D** compounds. Give their structural formula and IUPAC names.

(ii) Give equations for all reactions**(07 marks)**

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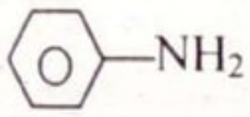
(c) Show how the following conversion may be achieved:

i. $C_{(s)} \longrightarrow$  $-NH_2$

ii. $CH_3CH_2OH \longrightarrow CH_3CH_2CH_2COOH$

iii. $-N_2Cl$

$4\frac{1}{2}$ ***Marks***

(d) Nylon 6-6 has a structure containing the following repeat unit;

[$CO-(CH_2)4-CONH-(CH_2)_6-NH$] —

(i) Give the structures of the monomers from which this polymer could be made.

(ii) What type of polymer is this? **(02 ½ marks)**

(e) Write the polymer section unit of :-

(i) Polystyrene

(ii) Dacron

(iii) Protein **(03 marks)**

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISIONER'S OFFICE

FORM SIX MOCK EXAMINATIONS

PHYSICS 1

CODE: 131/01

TIME: 3 HOURS **NOVEMBER 2022**

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 any two questions from section B
3. Section A carries seventy (70) marks and section B carries thirty (30) marks
4. Marks allocation has been indicated on each section
5. Cellular phones and any other unauthorized materials are not allowed in the examination room
6. Mathematical tables and non-programmable calculators may be used
7. Write your examination number on every page of your answer booklet (s)
8. The following information may be useful.
   a) Acceleration due to gravity $g = 9.8m/s^2$
   b) Universal Gravitational constant $G = 6.67 \times 10^{-11} Nm^2kg^{-2}$
   c) Radius of the earth $r_e = 6.4 \times 10^3 m$
   d) Pie, $\pi = 3.14$
   e) Specific charge $\frac{e}{m_e} = 1.8 \times 10^{11} C/kg$

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SECTION A (70 Marks)

Answer all questions in this section. Each question carries ten (10) marks

1. a) (i) What are the basic rules of dimensional analysis **(02 marks)**

(ii) The equation of wave is given by $y = r\sin\omega\left(\frac{x}{v} - k\pi\right)$where the symbols have their usual meaning .What is the dimension of $x$and k ? **(02marks)**

(iii) If the escape velocity, V depends upon accelerationdue to gravity, g of the planet and the radius of the planet, R .By using dimensional analysis establish the relationship between escape velocity, V and given quantities. Use proportionality constant value k as $\sqrt{2}$ **(02marks)**

b) The focal length,f of a lens is related to the object distance ,u and image distance, v by the formula $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$, A student recorded the value of $f = (10.00 \pm 0.05)cm$ and $u = (15.0 \pm 0.5)cm$.Find the percentage error in the image distance ,v **(04 marks)**

2. a) Name the types of motion described by the following bodies
   (i) Falling mango
   (ii) Dropped luggage from flying airplane
   (iii) Oscillating liquid inside a U-tube
   (iv) A car negotiating a corner **(@ 0.5 =02 marks)**

b) (i) Bullet of mass 5g moving with initial velocity ,u collide with a pendulum of mass 1kg that is suspended on string.The pendulum rises at a height 5m above the equilibrium level.Find the initial speed of the bullet **(03marks)**

(ii) Show that in collision where kinetic energy is conserved also linear momentum is conserved **(02marks)**

(iii) A boy can throw a ball 50m vertically upwards. Find the greatest horizontal distance he can throw. **(03 marks)**

3. a) (i) What would be the effect on the weight of a body if the earth stops rotating about its axis? **(02 marks)**

(ii) Show that Kepler's third law is consistency with Newton's law of universal gravitation **(03marks)**

b) (i) A small satellite revolves round a planet in an orbit just above the surface of the planet ,Taking G =$6.67 \times 10^{-11} Nm^2Kg^{-2}$ and mean density of the planet as $8 \times 10^3 kgm^{-3}$, Find the period of the satellite **(03marks)**

(ii) The escape velocity from the earth for a piece of 1g is 11.2kms^{-1}, what would it be for piece of 10g? **(02 marks)**

2
3
2
3
10

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4. a) (i) Elaborate two characteristics of simple harmonic motion (S.H.M). **(02marks)**

(ii) A particle executing S.H.M has a maximum displacement of 4cm and its acceleration at a distance of 1cm from its mean position is $3cms^{-2}$. What will be its velocity when it is at a distance of 2cm from its mean position? **(03marks)**

b) (i) Why are passengers of a car rounding a curve thrown outward? **(02marks)**

(ii) An airplane moves at $64ms^{-1}$ in a vertical loop of radius 120m. Calculate the force of the plane's seat on 72kg pilot while passing through the bottom part of the loop **(03marks)**

5. a) (i) Draw the energy distribution curve of black body radiation. **(02marks)**

ii) Explain briefly the change of colour observed as a piece of metal is gradually heated from the cold to hot and state the law that account for this phenomenon. **02 marks**

b) (i) What is albedo as used in concept of heat, Give one of its application **02marks**

(ii) If the mean equilibrium temperature of the Earth's surface is T and the total rate of energy emission by the sun is E show that $T^4 = \frac{E}{16\sigma\pi R^2}$ Where σ *is* the Stephen' constant and R is the radius of Earth' orbit round the sun (Assume that the Earth behaves as blackbody) **(04 marks)**

6. a) (i) Sketch graph showing the variation of temperature with distance along an unlagged bar when a quantity of heat flows through from one end to another **(02 marks)**

ii) Variety of cooking utensil are displayed for sale at Rafiki super market They are rated as 'high' or 'low' interms of their thermal efficiency for the *coefficient of conductivity*, *specific heat capacity* and *thermal expansion*. What thermal rating could you observe with respect to each of the property in purchasing cooking utensils? Explain **(03 marks)**

b) (i) Explain why we normally set air conditioner for cooling at the top of the room. **(02 marks)**

(ii) Mercury in faulty centigrade thermometer stands at 5° mark when placed in melting ice and at 95° mark when in steam at normal pressure. What will be its reading when it it placed in contact with abody of 40^oC.? **(03 marks)**

7. a) (i) The main interior of the earth core is believed to be in molten form. What seismic evidence support this belief? **03marks**

(ii) Explain two importances of Earth's magnetism. **(02 marks)**

b) (i) What are the advantages of wind breaks to plant environment.? **(02marks)**

(ii) List three physical changes that took place at location just before onset of an earth quakes at that particular location **(03 marks.)**

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SECTION B (30 Marks)

Answer only two (2) questions from this section. Each question carries fifteen (15) marks

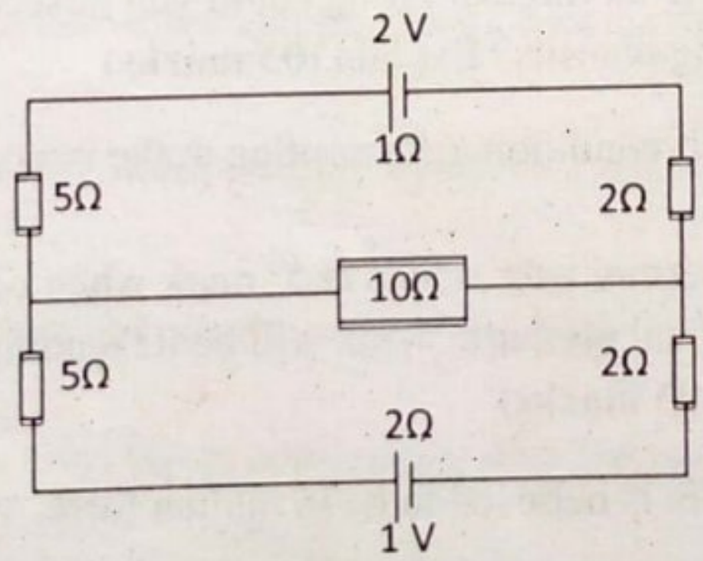
8. a)(i) Resistivity of copper, silver and manganin are $1.7\times 10^{-8}\Omega m$, $1.0 \times 10^{-8}\Omega m$ *and* $44 \times 10^{-8}\Omega m$ respectively which of these is the best conductor? Give reason for your answer **(02 marks)**

(ii) When resistances are connected in parallel, the total resistance decreases. Why? **(02 Marks)**

(b) (i) State the maximum power theorem. **(02 marks)**

(ii) A battery of 24V and internal resistance of 10Ω is connected to a variable resistor. At what value of current drawn from the battery when the rate of heat produced in the resistor is a maximum? find also the value of maximum power **(04 marks)**

(c): Figure below shows two cells of e.m.f 2V and 1V and internal resistance 1Ω and 2Ω respectively having their positive terminal connected by a wire of 10Ω resistance, and their negative terminal by a wire of 4Ω resistance. A resistance of 10Ω joins the mid- point of these two wire. Calculate the current through each cell and the potential difference across 10Ω.



05 marks

9.(a) Figure below shows a simple form of silicon common-emitter amplifier. The collector current is about 100 times the base current and base-emitter voltage

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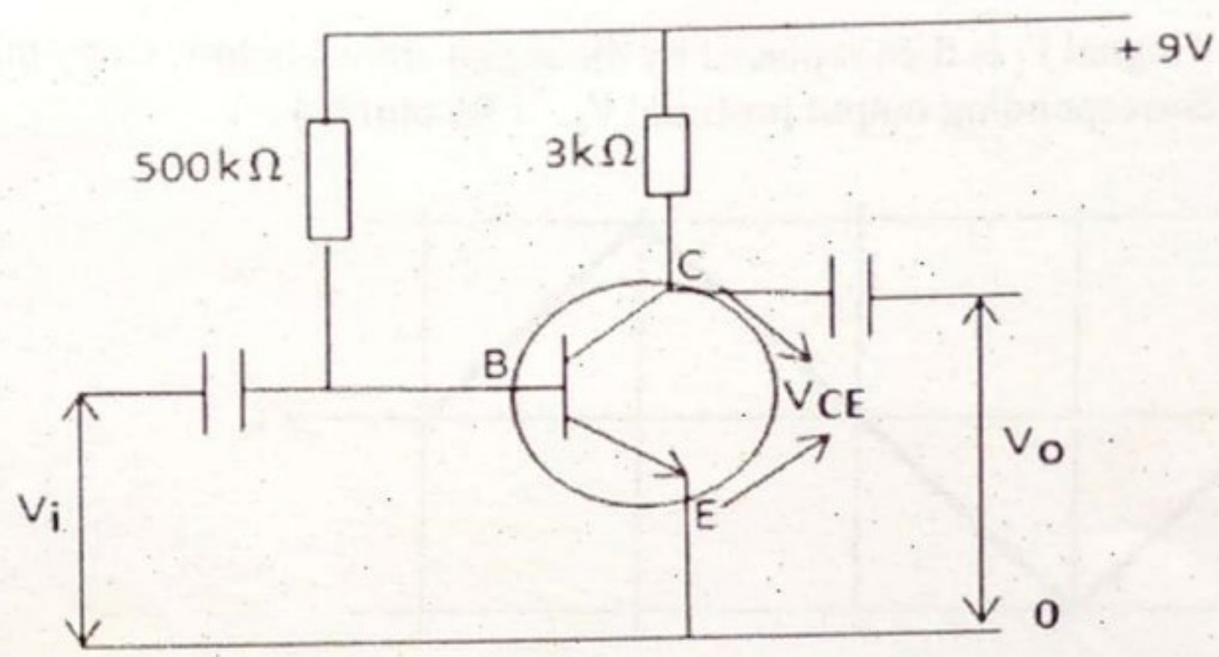
V_{BE} is about 0.7V



Calculate:

i) The base current I_b and the voltage V_{CE} **(05 Marks)**

ii) The voltage gain if the input (base-emitter) a.c resistance is 2000Ω **(02 Marks)**

(b)(i) Explain why collector is made very wide compared to the base and emitter. **(02 Marks)**

(ii) Distinguish between conductors and semiconductors on the basis of their energy band structures. **(02 Marks)**

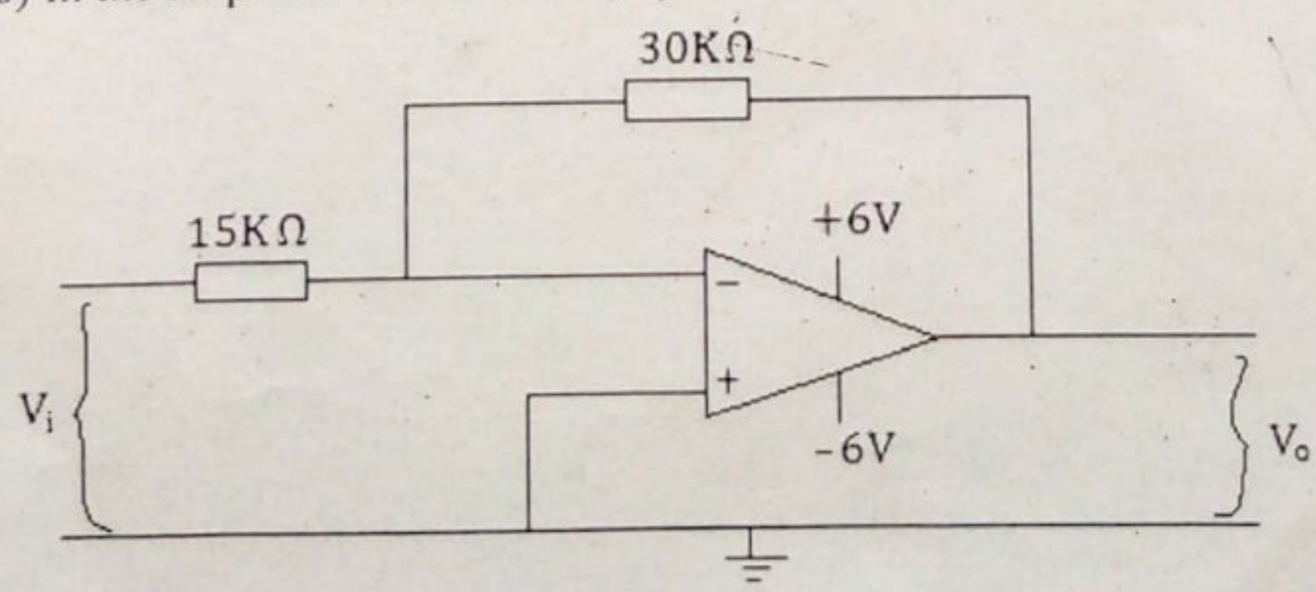
(c) (i) What is meant by depletion layer as used in p-n junction device? **02 marks**

(ii) Describe the effect of applying a reverse bias to the junction diode. **(02 Marks)**

10. a) (i) A semiconductor has negative temperature coefficient of resistance, what does this statementmean? **(02 marks)**

(ii) How do doctors use optical fibres to look at the inside of people's lungs and stomachs? **(02marks)**

b) In the amplifier circuit below, $V_i = +2.0V$



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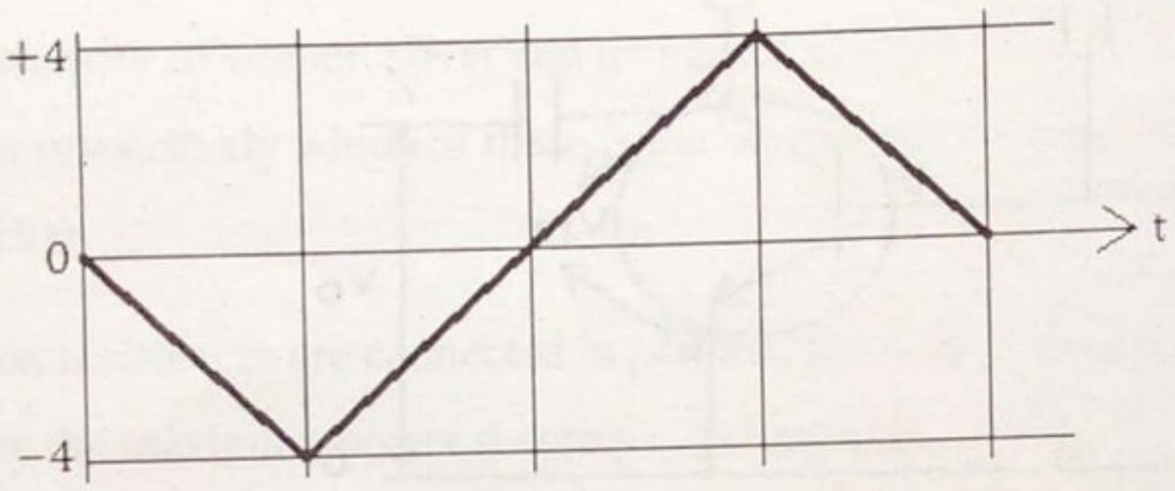
i. Calculate the output potential V_0. **(02 marks)**

ii. The input signal V_i is then replaced by the signal shown below. Copy this diagram and add to it the corresponding output potential V_0. **(04 marks)**



c) (c) (i) Why is NAND gate considered as a basic building block for a variety of logic circuit? **(02 Marks)**

(ii) Design a circuit using maximum number of logic gates that will give the truth table below

INPUTS		OUTPUTS
A	B	Q
0	0	1
0	1	0
1	0	1
1	1	1

(03marks)

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISIONER'S OFFICE

MOCK EXAMINATION

PHYSICS 2

CODE:131/2

TIME: 3:0 HOURS **NOVEMBER, 2022**

INSTRUCTIONS

1. This paper consists of six (6) questions.
2. Answer five (5) questions.
3. Each question carries twenty (20) marks.
4. Mathematical tables and non-programmable calculators may be used.
5. Cellular phones and any unauthorized material are**not** allowed in examination room.
6. Write your Examination number on every page of your answer booklet (s)
7. The following information may be useful:

   a) Acceleration due to gravity $g = 9.8m/s^2$
   b) Pie $\pi = 3.14$
   c) Avogadro's Number, $N_A = 6.02X10^{23}mol^{-1}$
   d) Density of air= $1.2\ Kg/m^3$
   e) Charge of an electron = $1.6\ x10^{-19}C$
   f) 1 year = $3.15\ x10^7 s$
   g) Speed of sound on air $c = 340\ m/s$
   h) Surface tension of water $\gamma = 7.2x\ 10^{-2}Nm^{-1}$
   i) Permeability of free space, $\mu_o = 4\pi x10^{-7}Hm^{-1}$
   j) Mass of an electron, $m_e = 9.1\ x10^{-31}kg$
   k) Mass of a proton, $m_P = 1.67x10^{-27}kg$
   l) Permittivity of free space, $\varepsilon_o = 8.854\ x10^{-12}Fm^{-1}$
   m) Young's modulus of steel, $E_s = 20\ x11^{10}Pa$
   n) ${}^{235}_{92}U = 235.04u$, ${}^{141}_{56}Ba = 140.91u$ ${}^{92}_{36}Kr = 91.91u$ and ${}^{1}_{0}n = 1.01u$
   o) 1 u = 931Mev = $1.661x10^{-27}Kg$
   p) 1Mev= $1.6\ x10^{-13}$J

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1. a) (i) Give the meaning of the terms ideal fluid and terminal velocity as used in fluid dynamics **(02 Marks)**

(ii) Why a parachute descends slowly where as a stone dropped from the same height falls rapidly? **(02 Marks)**

b)An air craft wing has a weight of 2.5KN and effective area of $6m^2$. The air flow over the top surface is effectively horizontal with a speed of $60m/s$. Whereas that of the underneath is of speed 50m/s. determine:

i) The aerodynamic lift on the wing. **(04marks)**

ii) The force exerted by the wing. **(04marks)**

c) i) list four applications of viscosity **(02marks)**

ii) A sphere is dropped under gravity through a fluid of viscosity . Taking an average acceleration as half of the initial acceleration, show that the time taken to attain terminal velocity is independent of fluid density. **(06 marks)**

2. a) i) What are four distinctive properties between progressive and stationary waves based on the nature and its conditions. **(02 marks)**

ii) if $y = a\cos\omega t + b\sin\omega t$ represent a stationary wave, determine its resultant amplitude. **(03 marks)**

b) i) Identify four methods used to form interference pattern apart from young's double slit experiment. **(02 marks)**

ii) Monochromatic light of wavelength 600nm is incident normally on optical transmission of spacing 2.0μm. Calculate the number of diffracted beams which can be observed and the maximum order possible **(04 marks)**

c) i) Explain Doppler effect in light waves **(02 marks)**

ii) Explain why a bell is made of metal and not of a plastic. **(02 marks)**

iii) The security alarm on a parked car goes off and produces a frequency of 960Hz. As you drive towards the parked car passing it and drive away from it you observe a change of frequency of $f = 95Hz$. Determine the speed of your car. **(05 marks)**

3. a) i) Explain why do spring balance show wrong readings after they have been used for a long time **(02 marks)**

ii) The rubber cord of catapult has a cross-section area of $1mm^2$ and total un-stretched length of 10cm. It is stretched to 12cm to release a missile of mass 5g, Calculate the velocity of the projection of the missile assuming that the total energy of catapult is conserved into kinetic energy without any heat loss **(04 marks)**

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b) i) Give qualitative distinction between surface tension and surface energy of liquid. **(02 mark)**

(ii)Two soap bubbles combine to form a single bubble. In this process the change in volume and surface area are respectively 'V' and 'A'. If Pa is the atmospheric pressure and 'T' is the surface tension of soap solution, then derive the relation $3PaV + 4TA = 0$

c) i) What is meant by angle of contact between the liquid and a solid as used in properties of matter. **(03 marks)**

ii) Outline four factors in which the value angle of contact depends on. **(03marks)**

iii) Mention three practical applications of capillarity in daily life activities **(03 marks)**

4. a) i) Basically an electroscope is a capacitor. Describe the statement. **(02 marks)**

ii) Use simple electron model to explain how insulators such polythene can be charged negatively by rubbing it with a dust. **(03 marks)**

b) i) Electrostatics was the first branch of electricity to be investigated and for longtime it was regarded as of no practical value. As an industrial engineer to be, you are supposed to crash the earlier statements.**(04marks)**

ii) Four points charges$q_A = +2\mu C$, $q_B = -5\mu C$, $q_C = +2\mu C$ and $q_D = -5\mu C$are located at the corners of a square ABCD of side 10cm. what is the force on a charge of$+1\ \mu C$ placed at the center of the square? **(04 marks)**

c) Prove that if two spherical shells of spherical capacitors have their radii approximately equal, the device approximates a parallel plate capacitor. **(04marks)**

5. a) i) Explain why the picture of a TV screen becomes distorted when a magnet is brought near the screen **(03 marks)**

ii. The pole faces of a cyclotron magnet are 120 cm in diameter and the field between the pole faces is 0.8T. The cyclotron is used to accelerate the $\propto$-particles. Calculate the kinetic energy in eV and the speed of $\propto$- particles as it emerges from the cyclotron. Find also the frequency of alternating voltage that must be applied to the Dees of the cyclotron.. **(04 marks)**

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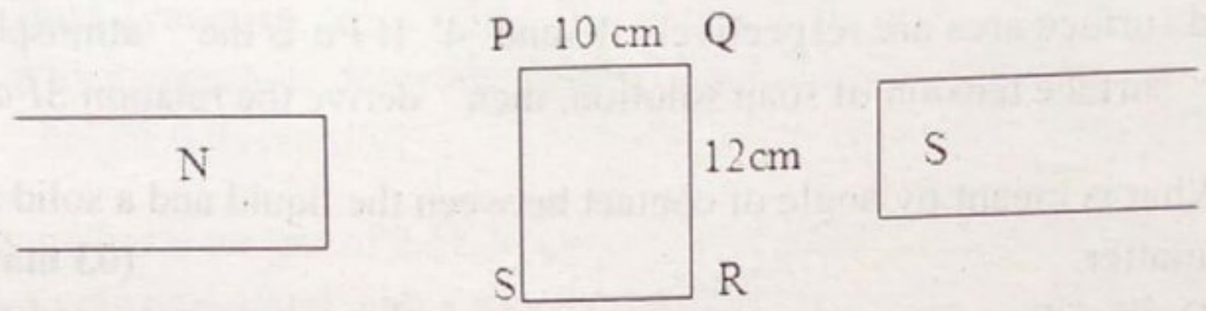
b) A rectangular coil of 50turns carries a current of 2A and is placed in a magnetic field of 0.25T as shown below:



i) What will be the direction of the field? **(02 marks)**

ii) What is the magnitude of torque acting on the coil? **(06 marks)**

c) A short coil of 20 turns is wound on a long air cored solenoid which has 1000 turns per meter and a cross sectional area of $1.2x10^3 mm^2$. Calculate the mutual induction of the arrangement. **(05 marks)**

6. a) (i) Briefly exp 'ain the term controlled nuclear reactionas used in atomic physics **(01mark)**

(ii) Outline four limitations and two success of Bohr's theory **(04 marks)**

b) i) Distinguish between nuclea' fission and nuclear fusion; give one example for each. **(03 marks)**

ii) Calculate the energy released when 50g of $U - 235$ undergoes fission according to:

$$^{235}_{92}U + ^{1}_{0}n \rightarrow ^{141}_{56}Ba + ^{92}_{36}Kr + 3\left(^{1}_{0}n\right)$$

(04marks)

c) i) Why lighter nuclei tends to fuse together? **(02marks)**

ii) Why are electrons not effective as neutrons when bombarding a particle in fusion reaction? **(02marks)**

iii) A radioactive material is reduced to $\frac{1}{16}^{th}$ of its original amount in four days. How much material should one begin with so that $4x10^{-3}$ kg of the material is left after six days? **(04 marks)**

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PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

CODE: 142/1 **ADVANCED MATHEMATICS 1**

TIME 3HRS **NOVEMBER 2022**

INSTRUCTIONS

1. This paper consists of ten **(10)** questions.
2. Answer **all** the questions.
3. All work done in answering each question must be shown clearly.
4. Scientific calculators and Mathematical tables may be used.
5. Write your index number on every booklet/answer sheet used.
6. This paper has four (4) printed pages.

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1. Using a non programmable calculator evaluate the following, giving your answer into two decimal places.

(a) $\left[\dfrac{\sqrt{yz}+(xt)^{2!}}{xyt+ze^{\pi}+y}\right]$; Where $x=\dfrac{1}{2}\sum_{i=1}^{3} i(i-2)(i-3)$, $y=\sqrt[4]{\pi e^{2}}$, $t=3$, $z=2!(\ln 1)$.

(b) $\sqrt[4]{\dfrac{15\ln\sqrt[3]{3008}+21.9\sec\left(\dfrac{\pi}{7}\right)}{800197.342-e^{-0.8}}}$

(c) $\dfrac{(1.4362)^{4}\times\cot^{-1}\left(\ln\sqrt{35}\right)}{\sinh^{-1}\left(\cos 48^{0}\right)+\log\sqrt[5]{7\sec 17^{0}}}$

(d) $\dfrac{\sqrt{\log(\ln 215)}+\log_{5}(\log(16\pi))}{\sqrt[6]{\ln\left(\sqrt{6^{\ln\pi}}+\ln\left(\log\left(\tan^{3}(85^{0})\right)\right)\right)}}$

2. (a) Find the condition that the equation $a\cosh x+b\sinh x=c$, should have equal roots,

(b) Find the minimum value of $y=5\cosh x+3\sinh x$,

(c) If $a>b>0$. Prove that $b<\dfrac{ae^{x}+be^{-x}}{e^{x}+e^{-x}}<a$,

(d) Evaluate $\int\dfrac{dx}{\sqrt{x^{2}+2x+10}}$.

3. (a) A furniture manufacturing company manufactures dining room tables and chairs. The relevant manufacturing data are given in the table below;

Department	Labor-Hour per unit		Max. labor hours available per week
	Tables	Chairs	
Assembly	8	2	400
Finishing	2	1	120
Profit per unit	Tsh.90	Tsh.25	

How many tables and chairs should be manufactured each week to realize a maximum profit? What is the maximum profit?

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(b) Dangote cement company shops cement from two origins S_1 *and* S_2 for three market centers M_1 , M_2 and M_3.The table showing the available tons of the cement and required tons together with the units transportation cost in shillings is shown below.

	M_1	M_2	M_3	Available
S_1	20/=	10/=	5/=	220
S_2	10/=	25/=	30/=	100
Requirements	120	80	120	

(i) Use the given information in the table to formulate the objective cost function Z to be minimized.

(ii) Write down all inequalities of the transportation problem.

4. The following is a distribution table for Advanced Mathematics test for 68 students at a certain secondary school;

Marks	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of Students	6	11	13	16	5	9	8

Find;

i. Mean and Variance by using the coding method. Use the modal class mark as the assumed mean value,

ii. The median and the mode,

iii. Inter-quartile range.

5. (a) Use the laws of algebra of sets to prove the following set identities;

(i) $(A \cap B) \cup (A \cap B') = A$

(ii) $[A \cap (A' \cup B)] \cup [B \cap (A' \cup B')] = B$

(b) If sets $A = \{x : x \in \Re; x > 2\}$ and, $B = \{x : x \in \Re; -4 \le x \le 2;$ Use the same notation to write $A - B$ and $B - A$.

(c) In sample of 100 high school students, 12 take Chemistry, Mathematics and Physics. 22 take just Chemistry and Mathematics, 3 take just Chemistry and Physics, 7 take just Mathematics and Physics and all 100 students take at least one of the three subjects. How many students take just one of the three subjects, if they are distributed equally?.

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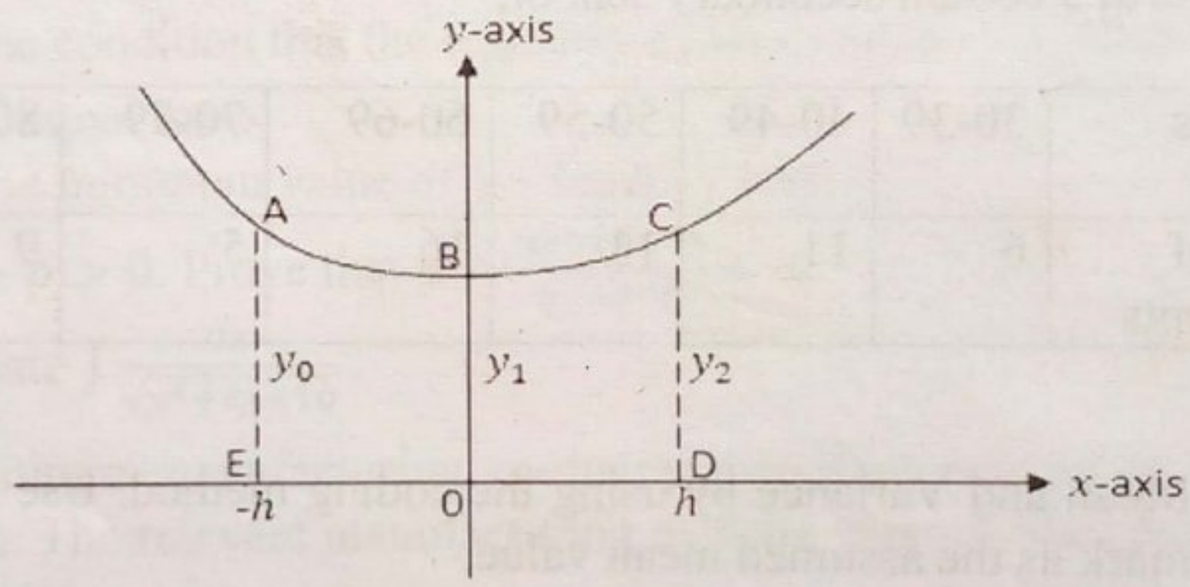
6. (a) Given that $f(x) = x^2 + 1$, $g(x) = x^2 - 1$ and $h(x) = x + 1$. Show that $(fog)oh = fo(goh)$

(b) On the same xy-plane plot the graphs $f(x) = 3^x$ and $g(x) = \log_3 x$ and hence state the domain and range of f and g.

(c) Sketch $f(x) = \frac{x+1}{2x^2+5x-3}$

7. (a) Use N-R method to approximate the root of $e^x(1 + x) = 2$ correct to 4 decimal places starting with $x_0 = 0.4$,

(b) The figure below has points A, B and C on the quadratic curve $f(x) = ax^2 + bx + c$. Derive the Simpson's rule to approximate the area ABCDE.



(c)Evaluate $\int_0^{\frac{1}{6}} \sqrt{1 - x^2}\, dx$ by both Simpson's and Trapezium rule, using 8 intervals correct to 4 significant figures. Which method gives a more accurate solution?

8. (a) Compute the distance of the tangent line from the point $P(9,8)$ to the circle which passes through the point $A(5,7)$, $B(2,6)$ and $C(6,0)$.

(b) A point P moves so that the distance from the origin is always equal to the shortest distance from $2x - 5 = 0$. Find the equation of the locus.

(c) Determine whether the line $3x + 4y = 9$ is a tangent to the circle $x^2 + y^2 + 2x - 8y = 8$.

(d) Verify that the circle with equation $x^2 + y^2 - 2rx - 2ry + r^2 = 0$ touches both the coordinate axes. Find the radii of the two circles which pass through the point (16,2) and touches both the coordinate axes.

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9. (a) Evaluate;

(i) $\int \frac{dx}{x^2-4x+3}$ (ii) $\int \sec^3 x dx$

(b) By making substitution of $x = a\cos^2\theta + b\sin^2\theta$, Prove that

$$\int_a^b \frac{x}{\sqrt{(x-a)(b-x)}} dx = \frac{\pi}{2}(a+b).$$

(c) Find the volume generated when the plane figure bounded by $y = 5\cos 2x$, the axis and Ordinates at $x = 0$ and $x = \frac{\pi}{4}$, rotates about the x-axis through a complete revolution.

10. (a) Differentiate $y = x^{\sqrt{x}}$,

(b) If $f(x,y) = x^2 + y^2 - 6xy + 3x - 2y + 15$, find and f_{yy},

(c) From the first principle find the gradient of curve $f(x) = e^{3x}$

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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILIMANJARO REGIONAL COMMISSIONER'S OFFICE

FORM SIX MOCK EXAMINATION

BASIC APPLIED MATHEMATICS

CODE:141

TIME:03 HOURS **NOVEMBER, 2022**

INSTRUCTIONS:

1. This paper consists of **ten (10)** questions.
2. Answer **ALL** questions.
3. Each question carries **ten (10)** marks.
4. Mathematical tables and non-programmable calculators **are allowed** in the examination room.
5. Cellular phones and any unauthorized materials **are not allowed** in the examination room.
6. Write your **examination number** on every page of your answer booklet(s).

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1. By using a non-programmable Scientific Calculator:

(a) Evaluate, $\sec^{-1}\left(\frac{\sqrt{ln2394}}{\log_3 tan\frac{\pi}{3}}\right)$, and leave your answer in three decimal places.

(b) Evaluate $\int_{\sqrt{2}}^{2}\left[\frac{xe^x}{1+x}\right]\frac{dy}{dx}$, leave your answer into standard notation.

(c) Find the mean and variance of the following data correct to four (4) decimal places

Intervals	4-8	9-13	14-18	19-23	24-28	29-33
Frequency	5	3	1	2	6	4

2. (a) Given that, $f(x) = \sqrt{19 - x^2}$ and $g(x) = x^2 - 3$. Solve for x if $gof(x) = 0$.

(b) The functions 'h' and 'g' are defined by $h(x) = x^2, 0 \leq x \leq 4$, $g(x) = x + 3$ where $\in \mathcal{R}$.

Sketch the graph of $goh(x)$ and state domain and range of the function.

(c) Find the turning points of the function given by $f(x) = x^3 - 2x^2 + x + 2$.

3. (a) The first term of a Geometric Progression (G.P) is 1. The sum of the third and fifth terms is 90.

Find the common ratio of the G.P

(b) If the sum of the 'n' terms of an Arithmetic Progression (A.P) is $3n^2 + 5n$ and $its\ n^{th}$is 164, find the value of n.

(c) Given $4x^2 - 12x + B = 0$, find the value of B if that equation has equal roots.

4. (a) Find the derivative of $f(x) = \sin(x^4 - 2x + 3)$

(b) Given that $y = \sqrt{t}\sin\sqrt{t}$ and $t = \sqrt{x^2 + 1}$, find $\frac{dy}{dx}$ in terms of t.

(c) Find the dimensions of the rectangle with perimeter $1000m$ so that the area of the rectangle is at maximum.

5. (a) Given $f^1(x) = 12x^2 - 12x^3$, find $f(x)$ and the value of $f(8)$ if $f(0) = 0$.

(b)Show that $\int tanxdx = ln(\sec x) + c$

(c) Find the area enclosed by the curves $x = y^2 - 1$ and $x = y + 1$

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6. Given the following distribution table

Class interval	7-14	15-22	23-30	31-38	39-46	47-54	55-62
Frequency	17	12	24	43	31	14	22

(i) Construct the cumulative frequency distribution curve, hence estimate median.

(ii) Calculate the mean by direct mean method

(iii) Calculate the mean by Assumed mean method, take A=34.5

7. (a) A card is drawn at random from a well shuffled deck of 52 cards. Find the probability that the card is a king or red card.

(b) How many numbers greater than 1000 can be formed with the digits 3,4,6,8,9 if a digit cannot occur more than one in a number?

(c) Given the events A and B are such that $P(A) = \frac{1}{2}$, P(B)=p and $P(A \cup B) = \frac{3}{5}$, find the value of p if A and B are:

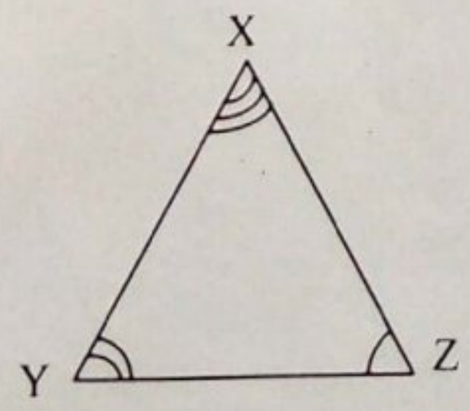
(i) Mutual exclusive events

(ii)Independent events

8. (a) Prove that $\sin 3\theta = \sin\theta - 4\sin^3\theta$

(b) Given that $x = \sin\theta$ then solve $8x^3 + 1 = 6x$ for $0^0 \leq \theta \leq 360^0$

(c) The triangle XYZ has an area of $225cm^2$ of which $XY = 25cm$ and YZ= 36cm as shown below:



Calculate (i) $<XYZ$ (ii) length XZ

9. (a) Evaluate $\int \frac{3x^2}{x^3-4} dx$

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(b) What will Tsh. 500 account to, in 10 years after its deposit in a bank which pays annual interest of 10% compounded annually?

(c) If Arithmetic mean and Geometric mean of roots of a quadratic equation are 8 and 5 respectively, then obtain the quadratic equation

10. A calculator company produces scientific and graphic calculators. Long term prediction indicates an expected demand of at least 100 scientific calculators and 80 graphic calculators each day. Because of limitations on production capacity, no more than 200 scientific calculators and 170 graphic calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators must be shipped each day. If each scientific calculator sold result in loss of 2000/= and each graphic calculator produces 5000/= profit, how many of each type should be made daily to maximize profit. What is the maximum profit?

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