WAKISSHA JOINT MOCK EXAMINATIONS
MARKING GUIDE
Uganda Advanced Certificate of Education
UACE August 2024
PHYSICAL GEOGRAPHY P250/1

Examiners are guided by the following standards.
Marking is by impression unless otherwise stated.
For purposes of impression marking please consider the following awards.
00 – completely irrelevant.
1 – 8 Rudimentary facts / scattered facts.
9 – 11 'O' level answer.
12 – 14 Basic 'A' level answer.
15 – 17 Good but not outstanding.
18 – 20 V. Good answer.
21 ++ Excellent answer.

SECTION A (MAP WORK)

1. (a) (i) 567328. **(01 mark)**

(ii)
- River confluence
- River valley **(01 mark)**
- River

(b) (i) Height of the hill

4182 ft **(02 marks)**

(ii) Area = Number of full squares + $\frac{\text{Number of Half squares}}{2}$

Area $= 5 + \frac{22}{2}$

$= 5 + 11$

$= 16\text{Km}^2$

Accept $15 - 17\text{Km}^2$ (02 marks)

(c) (i) On the graph ***(at the back)***

(ii) Horizontal equivalent of a cross section
= 1 square = 2 cm
1 square = 1 Km
18 cm = $^1/_2$ Km
18 x $^1/_2$ = 9Km.

OR

Using the linear scale provided on the map extract Horizontal equivalent = 9Km

(2 marks)

(d) Problems faced by the people living in Kampala business centre.

- Congestion due to many settlements.
- Road accidents due to numerous roads.
- Easy spread of diseases due to many settlements.
- Poor sanitation due to dense settlement.
- Unemployment due to many settlements.
- High crime rates due to many settlements.
- Moral decay due to many settlements.
- Pollution because of many roads and congested settlement
- Floods due to numerous Rivers

(Any 3 x 1 = 03 marks)

(e) Description of relief.

- There are conical hills at Mutungo, Nakawa.
- There are ridges at Namasuba, Makindye etc.
- There are saddles at Muyenga, Namasuba Bbunga etc.
- The area is steeply sloping at Naguru, Nakawa.
- There is a basin occupied by Lake Victoria.
- There is a bay e.g. Murchison bay.
- The area is gently sloping in the North East.
- There is a low land in the South East.
- The area has broad valleys in the North.
- The area has River valleys e.g. Kiyanja River valleyetc.
- The area has Islands e.g Namalusu, zinga Islands
- The area has flat topped hills eg Rubaga, Mengo, Bugolobi, Najera

(Any 4x1 = 04 marks)

2. (a) (i) It is an aerial photograph **(01 mark)**

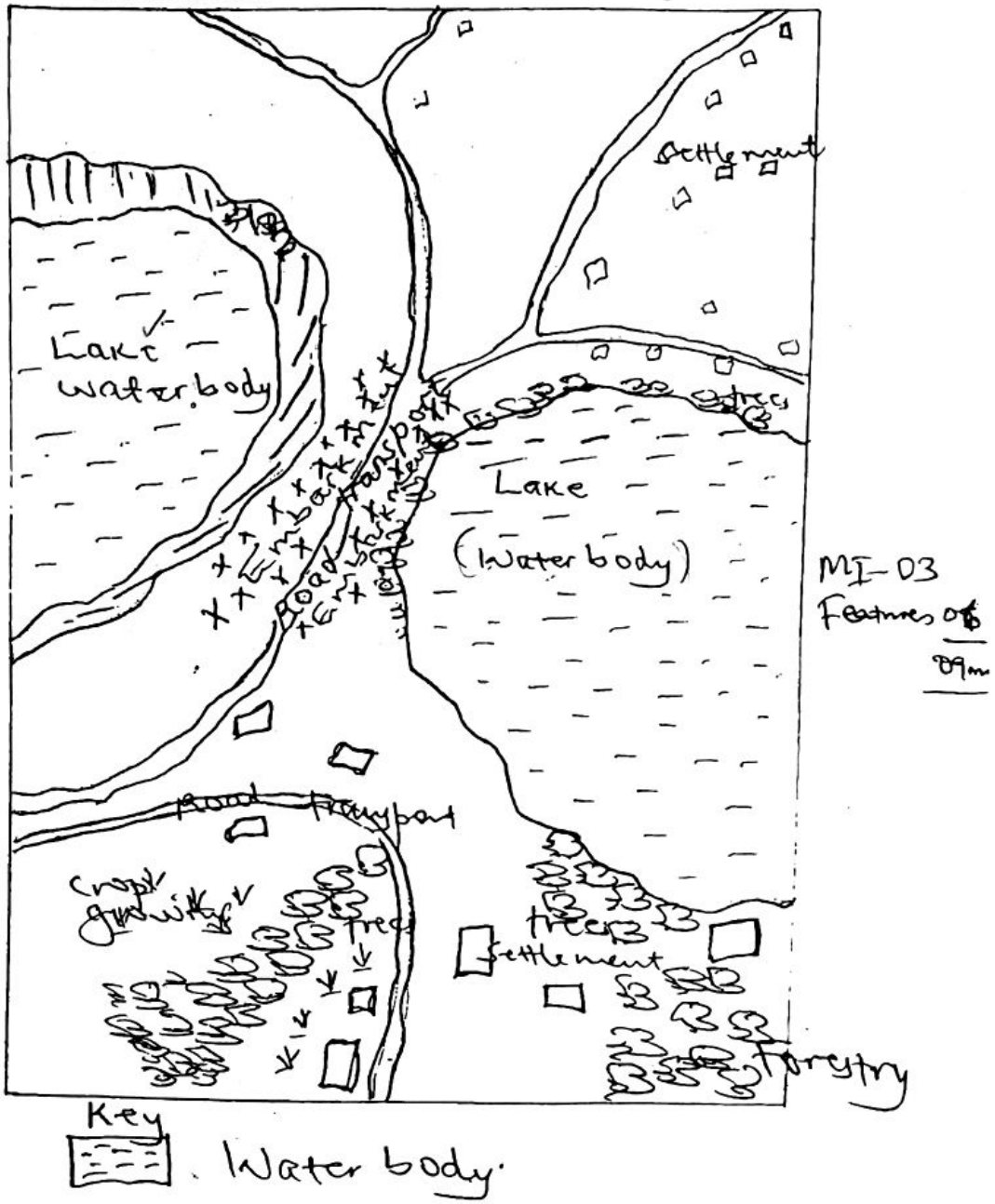
OR

Aerial vertical photograph

Reasons.

- No sky line is seen.
- It covers a wider area.
- Tops of the features are seen.
- Features appear flat on paper.
- Features appear small in size.
- Brighter surfaces appear dark. **(01 mark)**
- Dark surfaces appear brighter.

(ii) **A sketch of the area shown on the photograph showing water body, any three forms of land utilization, one vegetation type and an embarkment.**



MI-03
Features of
09m

Features

Water body (lake)

Land utilization

- Crop growing
- Settlement
- Road transport
- Forestry

Vegetation type

- Trees/ Forests.

(b) Influence of drainage on land use.

- The lake/well drained area has encouraged Forestry at the bottom and the centres.
- The lake/well drained area has encouraged road transport at the bottom, centre and top.
- The lake /well drained area has encouraged settlement at the bottom, top and center.
- The lake/well drained area has encouraged crop cultivation at the bottom.
-
- Correct location ⇒ bottom, centre & Top
-

(Any 3x2 = (06 marks)

NB: Stick to the relation on the gride

(c) Problems faced by the people living in the area.

- Drowning / water accidents due to the lakes in the centre.
- Water borne diseases due to the lakes in the centre.
- Attack from dangerous aquatic animals due to the lakes in the centre.
- Coldness due to the presence of the lakes in the centre.
- Attacks from dangerous wild animals due to forests at the bottom and centre.
- Forests at the bottom are hide outs for the wrong doers.
- Forests are breeding grounds for ~~distance~~ disease causing vectors at the bottom.
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(Any 4x1= 04 marks)

Note: A complete description must have the problem, its explanation and where it is on the photograph.

(d) Values of drainage feature:

- The lakes are tourist attractions
- Lakes provide water for domestic use.
- Lakes are used for fishing.
- Lakes modifies the micro- climate of the area.
- Lake encourages transport.
- Lakes are used for study and research purposes.
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(Any 2 x 1 = 02 marks)

Note: Values must only be positive.

(e) Areas where the photograph could have been taken.

- Rubirizi /Bunyaruguru
- Kasese
- Kabarole / Fort portal
- Kamwenge etc.

Any 2 x 1 = (02 marks)

3. Explain the theories justifying the present-day distribution of continents and ocean basins.

Candidates are expected to;

- define the continental drift.
- distribute the continents and ocean basins
- describe any three (3) theories of continental drift.

- The theory of continental drift states that continental land masses have changed their relative positions, they have not been stationery and continue to change positions.
- It involves movement of continental blocks away from each other and towards each other.
- The world is made up of seven (7) continents namely; Africa, S. America, Australia and Antarctica in the southern hemisphere while Europe, Asia and North America in the Northern hemisphere.
- It is also made up of four (4) ocean basins namely; Indian, Pacific, Atlantic and Arctic oceans.
  Note: one can draw the world map to illustrate the above information.
- Several theories have been presented to justify continental drift and they include;
  - **Alfred Wegners theory;**
    - It was presented in 1916 by Wegner.
    - The theory states that there existed one super continent stationed in the South pole called Pangea, Surrounded by a large water body called panthalassa.
    - About 250 years ago, Pangea drift Northwards and later split into two super continents i.e Laurasia near the equator and Gondwanaland in the southpole.
    - The two were separated by a narrow sea called the sea of Tethys.
    - During the carboniferus period, there was extensive glaciation of Gondwanaland.

- In the late Paleozoic and early Mesozoic eras (180m yrs) cracks developed in Laurasia and Gondwanaland.
- About 135-70 m years ago, the super continents broke up.
- Laurasia split into Europe, Asia, North America and the Islands of Iceland and Green land.
- Gondwanaland split into Africa, South America, Australia, Antarctica Indian sub-continent and the Island in the southern hemisphere.
- During Continental drifting, the gaps between the continental blocks became wider forming the present day ocean basins.
- About 65m years ago, Europe and Asia drifted East wards, while North America drifted westwards.
- In the southern hemisphere, Africa moved astride the Equator to attain its presents day position, Indian drifted Eastwards and Northwards to join Asia, South America moved Westwards and Northwards towards the Equator, Australia moved Eastwards away from Antarctica.
- Wegners attempted to explain the forces that led to drifting and he said the movement was as a result of the Equatorial centrifugal forces.
- Wegner supported the theory with evidence ie
- The Himalaya Mountains were formed when India and Asia collided with each other.
- The Rocky and Andes mountains were formed as a result of the resistance to the Westward drift of the Pacific Ocean floor.
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- **Sea floor spreading theory.**
  - It was presented by an American geologist by names H. Hess in the 1960's.
  - He said that in the interior of the earth, there is spontaneous heating by radioactivity, geophysical and geochemical reactions.
  - The heating causes melting or nearly melting of the mantle rocks.
  - The materials rise inform of convective currents and flow horizontally just below the crust; pushing crust in the direction of movement.
  - This is called continental drifting
  - As convective currents from the interior of the earth, they moved upwards, depositing new rocks in the middle of the oceanic ridge like the mid-Atlantic ocean ridge.
  - The newly deposited rocks replaced the old ones horizontally, widening the ocean floor leading to sea floor spreading.
  - While continents move away from each other.
  - It is believed in this way that the gap between Africa and South America is widened.
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Illustration.

- **The plate tectonic theory;**
  - A plate is any part of the crust and tectonism means movement.
  - Plate tectonism in the process through which movement of the plates of the earth's crust is effected.
  - Plates float on the more denser rocks of the mantle, they are mobile, they move like rafts etc.
  - There are six (6) major plates and about 12 minor plates.
  - The major plates include the African plate, Eurasian plate, American plate, Indo- Australian plate, pacific plate and Antarctica plate.
  - The minor plates include Nazca, Caribbean plates etc.
  - According to the theory in the interior of earth in the mantle there is intensive heating by radioactivity, geophysical and geochemical reactions.
  - The heating causes melting / nearly melting of the mantle rocks leading to convective currents.
  - The materials heated rise by convective currents and on reaching the crust, they move horizontally causing lateral movement of the plates.
  - Since continents form part of the crustal plates as plates move due to convective currents, the continents move with them resulting into continental drift.
  - Three types of movements are caused by convective currents and affect the distribution of the continents.

- Convergent movement i.e continents move towards one another and get closer. In the process, sediments are folded leading to fold mountains eg when India moved towards Asia, there was folding that led to the formation of the Himalaya mtns.
  Illustration

- Also continents may move towards the oceanic crust causing subduction of the denser simatic rocks hence trenches and volcanic mountains are formed e.g. the North American plate moved towards the Nazca plate hence formation of the Nazca trench and Andes mountains.
  Illustration

- The oceanic crust may move towards each other causing narrowing of the ocean basins and continents move nearer. In the process, trenches and volcanoes are formed e.g the pacific plate and the Eurasian plate led to formation of the Mariana trench and the japan Arc.

- Divergent movements; they cause drifting of the crust and consequently outward movement of the continents.
  - New rocks come to the surface and the old ones are pushed away.
  - This leads to sea floor spreading. In the process, mid ocean ridges like the mid-Atlantic ridge between Africa and South America are formed.
    Illustration.

- Transform boundary;
  - Involves plates moving passed each other without any collision or diversion.
  - They offset sections of the continent and lead to formation of ridges and trenches eg North America moved passed the pacific plate to form the San Andreas fault and Romanche fracture.
    Illustration

- Other theories can as well be brought out e.g.
  - Taylor's theory
  - Expanding Earth theory.

  Note: A candidate should explain any three theories.

Impressional marking (25 marks)

4. **Describe the formation of landforms resulting from physical and chemical weathering in East Africa.** **(25 marks)**

Candidates are expected to

- Define physical and chemical weathering.
- Identify areas where they occur in East Africa.
- Identify process of each type
- Give some cause of each type.
- Explain the landforms resulting from each type.

- Physical weathering refers to the disintegration / break down of the rock in smaller particles insitu without any changes in chemical composition of the rocks.
- Physical weathering is very common in the dry areas ie semi-arid areas such North Eastern Uganda, Eastern Kenya etc.
- It involves processes like exfoliation, block disintegration, granular disintegration, salt crystallization etc.
- It is majorly caused by temperature changes, nature of the rock, burrowing animals etc.
- Chemical weathering refers to the decomposition/ decay/rotting of the rock ~~into~~ insitu involving change in the chemical composition of the rock.
- It commonly occurs in the humid areas with hot temperatures and heavy rainfall eg around Lake Victoria basin, East African coast and wind ward slopes of mountains

- It involves processes like carbonation, oxidation, hydration, hydrolysis, reduction, solution etc.
- It is majorly caused by heavy rainfall, hot temperatures, permeability of the rock, rock jointness, plant roots, minerology of the rock etc.
- Physical and chemical weathering have led to formation of a variety of landforms and these include;
  - Exfoliation dome: These are smooth and round topped hills formed due to alternate heating and ~~cooking~~. cooling
  - Alternating expansion and contraction during day and night leading to development of cracks on the rock and eventually the surface layer peels off and fall on ground.
  - This gives the rock around shape to form an exfoliation dome eg parabong in Gulu and Kalengo hill in Nebbi, Taita hills in Nyika plateau in Kenya, mubende,Serengeti etc.
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Illustration

- Inselbergs: These are residual hills or rock upland/ isolated hill.
- Formed due to exposure of formerly intrusive igneous rock.
- The weak/ soft surrounding rocks are weathered away leaving behind the hard-igneous rock / granite to form an inselberg e.g Mubende, Kumi, Nakasongola in Uganda Voi, Morogoro, Kachumbala, Soroti etc.
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Illustration

- An Arena: This is a bowl shaped depression between steep hill/ uplands of granite rock.
- Formed when a relative weak/ soft granite rock is worn down by weathering over along period of time.
- The weathered materials are later eroded away by agents like running water leaving behind a huge depression called an arena e.g Rubanda in South western Uganda.
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Illustration

- Granitic tors: They are rock pillars with widened joints.
- Formed on exposed jointed granites rock by weathering ie by physical and chemical weathering.

- Block disintegration and chemical processes widen the rock joints hence forming granitic tors e.g Mubende, Ntungamo, Kumi, mwanza etc
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Illustration

- Grikes and clints
- Grikes are deep, numerous grooves with u- shaped in lime stone areas.
- Clints are ridges/ upland between grikes/ separating grikes.
- Grike and clints form in areas with alternating limestone and non-limestone rocks.
- The limestone rocks are weathered chemical through carbonation and solution giving rise to deep narrow depressions known as grikes.
- The non-lime stone rocks are not chemically weathered and therefore remain standing up as clints e.g in Tororo, parts of Kasese, Tanga in T. Z and Kilifi in Kenya.
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Illustration

- Under ground caves/ caverns: These a chambers in limestone area.
- Formed when calcium carbonate (lime stone) is dissolved by weak carbonic acids form weak calcium bicarbonate that is weak and is removed in solution leaving behind chamber known as caverns/ underground caves.
- Caverns form due to the process of carbonation and solution e.g Nyakasura, Kilifi, Tanga, Tororo etc.
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Illustration

- Stalactites : These are rock columns of calcium carbonate vertically hanging from the cave roof
- Formed due to water with dissolved calcium carbonate dripping from the cave roof.
- Upon evaporation, deposits of calcium carbonate are left behind, accumulate over time, dries and hardens in columns of calcium carbonate known as stalactites e.g at Nyakasura.

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Illustration

- Stalagmites: These are mounds/columns of calcium carbonate on the cave floor.
- They form when water dissolves with calcium carbonate drops from the cave floor.
- Upon evaporation deposits of calcium carbonate are left behind. They accumulate over time, dries and hardens to form mounds of calcium carbonate known as stalagmites e.g at Nyakasura.
- Pillars: These are vertical rock columns connecting the cave roof to the cave floor.
- They are formed when the stalactites and stalagmites meet or join e.g Nyakasura, Tanga, Kilifi etc.
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Illustration

- Dolines : These are shallow depressions with gently sloping sides.
- They are circular /oval in shapes.
- They are formed by processes of solution and carbonation in limestone areas.
- Calcium carbonate is dissolved in water and carried away in solution leaving behind shallow depressions known as Dolines.
- Dolines can also be formed due to collapse of the underground cave roof giving rise to depression called doline.
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Illustration

- Uvalas: These are depression limestone region
- They form through processes carbonation and solution.
- Several adjacent dolines gradually enlarge due to carbonation or solution and they join forming a wide depression called Uvala.
-

Illustration

- Poljes: Is an elongated basin having a flat floor and steep walls.
- Poljes form through carbonation and solution of lime stone.
- Poljes form small residual hills called hums.

Illustration

- Sinkholes: Are depressions on the earth surface formed by surface collapse or by dissolving of limestone.
- Formed when limestone is dissolved in one or more joints by solution.
- This is followed by the sinking water.

E.g at Malindi, Mombasa etc.

Illustration

Note: Candidates are expected to connect the land forms to the weathering processes.

Limestone gorge

- Is a deep and steep sided valley formed where there are lime stone rocks.
- Formed when a large river erodes/ weathers away the soft limestone rocks by solution.
- This leads to a gorge with almost vertical sides.

Duricrusts;

- This is a hard crust formed at the earth's surface or just below the ground surface on a result of oxidation.
- The most common are the lateritic duricrusts formed when the weathered layers become mixed with iron solutions due to leaching.
- On removal of the top layer, laterites harden after drying to form duricrusts.
- Examples are found on the flat topped hills of the Buganda landscape.

Impressional marking (25 marks)

5. a) **Distinguish between denudational and tectonic lakes** **(06 marks)**

Denudational lakes are lakes formed in depressions on the earth's surface as a result of ~~denudational~~ exogenic/ external forces. /sub earral ~~geel~~ processes

- The major agents include running water in rivers, ice, waves and ~~wind.~~

- Examples include; L.Nabugabo, L. Teleki taru, Lac du speke, ox – bow lakes on R. Semiliki etc.

Lagoon Lake, ox-bow lake Crater lakes Factual marking

(03 marks)

While,

Tectonic lakes; Are lakes formed due to internal/ Endogenic / ~~Tectonic~~ processes.

- Such processes include faulting, warping and volcanicity.
- Examples include L.Mutanda, L.Bunyonyi, L.Victoria, L.Katwe, L.Albert, George etc.

Caldera, Oxbow lakes, dam created lake **Factual marking (03 marks)**

(b) Account for the formation of lakes resulting from Earth movements.

Approach

A candidate is expected to;

- Define a lake
- Give characteristics of lakes.
- Define earth movements.
- Give/explain the origin of earth movements.
- Identify and describe the resultant lakes.

- A lake refers to water mass contained in a depression on the earth's ~~crust~~ surface.
- Lakes are characterized by being large, small, deep, shallow, fresh water and salty lakes.
- Earth movements are endogenic processes that destabilize deforms the Earth's crust without necessarily giving out new materials. These include faulting and warping.
- They originated from the upper plastic mantle of the earth due to geo-chemical, geo-physical and radio- active decay.
- Pressure of the over lying rocks compressing the under lying rocks resulting into friction, generate heat that makes under lying rocks melt forming a molten substance which eventually gives off giant convective currents that drag the crustal materials into different directions causing tensional and compressional forces.

Lakes due to Earth movements include;

Those as a result of faulting.

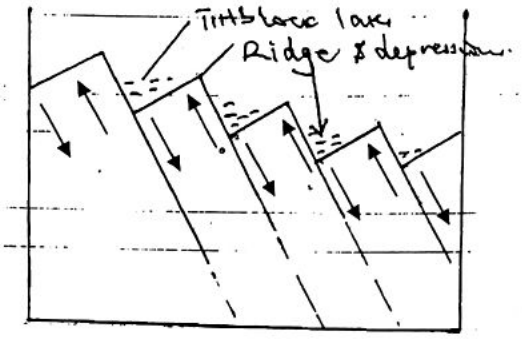
Faulting refers to the fracturing or breaking of the Earth's crust due to tectonic forces such as compression, tension that result into horizontal or vertical displacement of the crustal rocks.

Tilt block lakes.

- These are lakes found in depressions that are separated by ridges or uplands on a tilt block landscape.

- It is formed when compression or tension forces generated by convective currents create multiple parallel fault lines.
- This is followed by a general uplift of the faulted region. The uplift is not uniform on either side of the faulted blocks such that depressions that are separated by ridges are created.
- When they are filled up with water they form tilt block lakes ~~such as lake~~. An example is L. Olbolossat on the ~~Aberd~~ Aberdare ranges of Kenya

Illustration.



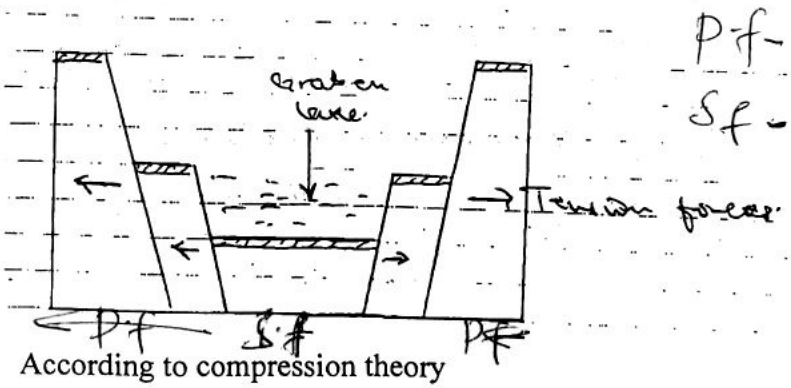
Graben lakes.

These are narrow, deep, elongated depressions and with steep sides, formed at the rift valley floor. They are formed through process of secondary faulting within the rift valley.

Due to tension theory.

- Heating by radio activity and geo- chemical reactions results into convective currents. When convective currents reach the crust they trend to diverge leading to tension forces that caused normal faults, the middle block sunk on its weight forming a rift valley.
- Secondary faulting and secondary sinking of the part of the rift valley floor to form a depression.
- The depression was filled with water forming a rift valley lake e.g. L. Albert, Tanganyika, Naivasha, L. Nakuru, L. Magadi, L. manyara etc.

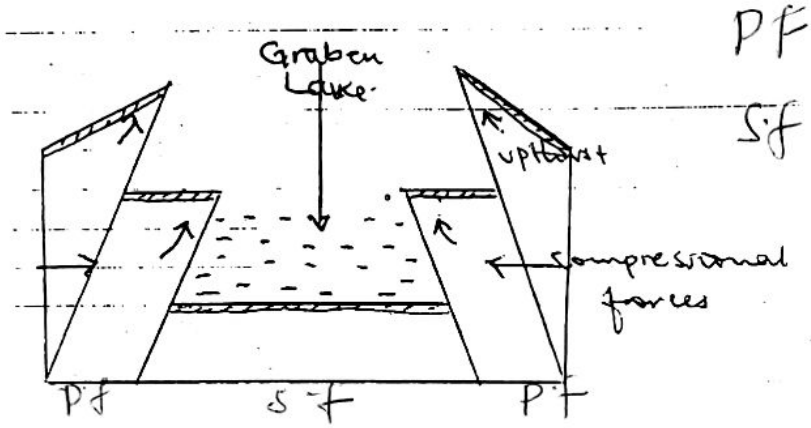
Illustration



- According to compression theory
- There was heating by radio activity and geo- chemical reactions that resulted into convective currents. As they reached the earth's crust, they tended to converge leading to reversed ~~faulting~~ fault lines

- The side blocks tended to override the middle block which remained as the rift valley.
- AS convective currents continued there was secondary faulting that resulted into the formation of secondary fault or hollow. The hollow was filled up with water to form a lake e.g. L. Albert, L. Tanganyika etc, Edward and George.

Illustration



PF - Prime faulting
Sf - Secondary faulting

- According to differential uplift.
- According to this theory in the interior of the earth there was heating by radio activity and geo- chemical reactions leading to convective currents, The convective currents resulted into faulting that divided the crust into blocks, the side blocks, rose faster while the middle block rose slowly to form the rift valley.

- As convective currents continued rising, there was secondary faulting of part of the rift valley floor that resulted into secondary uplift that formed secondary depression. The hollow was filled with water to form ~~crust~~ a lake e.g Turkana.
- These lakes are salty, deep, enlongated and ~~re~~ are found in steep banks.
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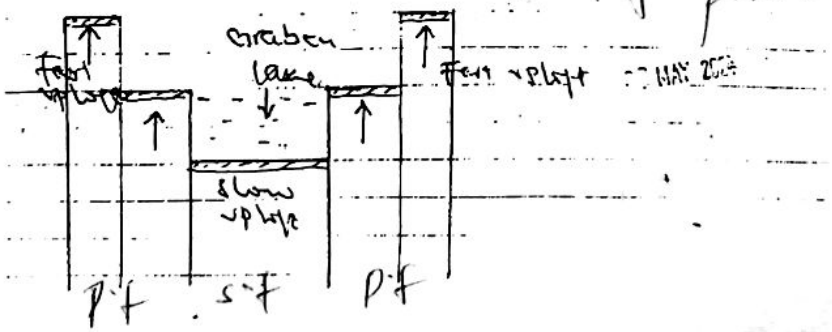
Sf - Secondary faulting
Pf primary faulting

Illustration



- Warping (Down warped lakes)

- This is the downward movement of crustal rocks caused by the sinking of convective currents within the interior of the earth. This leads in a saucer shaped basin.

- Down warping occurred in central and South Eastern Uganda to form depression occupied by lakes Victoria, Kyoga, Wamala, Nakivale.

- Before warping took place, land in central Uganda was sloping to the west and rivers Katonga, Kagera, Rwizi, Kafu were flowing to the West.
- Due to up warping and down warping led to reversal of these rivers filling the depressions forming down warped lakes.
- They are fresh water, have numerous Islands.
- They are large, they are shallow and surrounded by extensive swamps.
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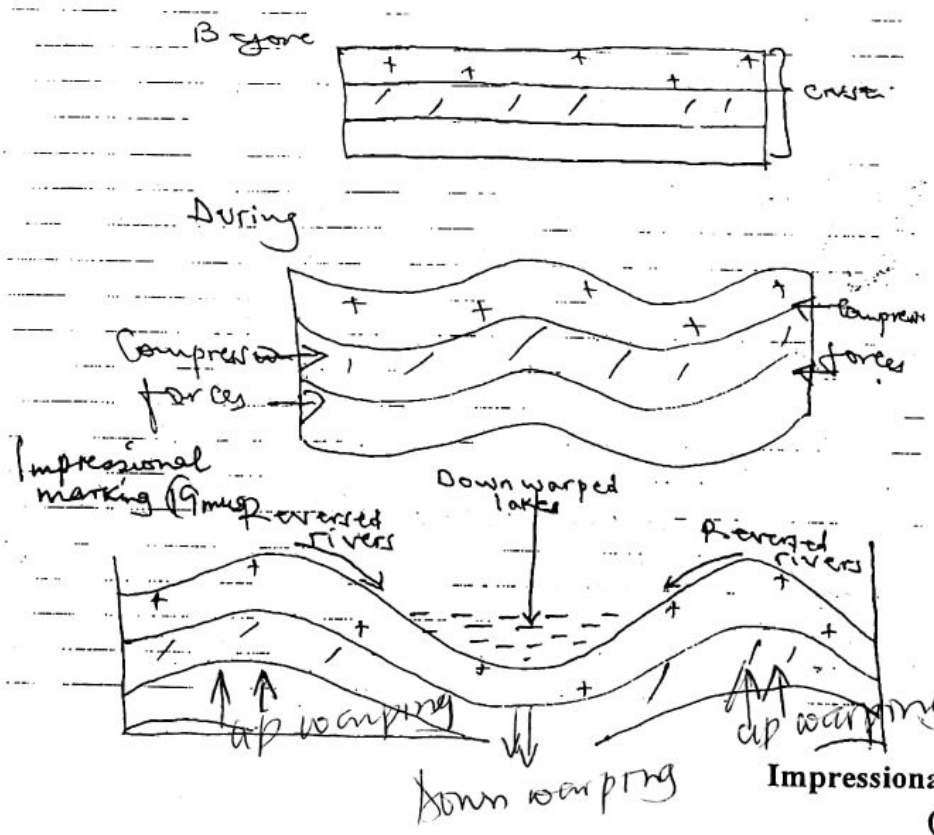
Illustration



Impressional marking
(19 marks)

6. (a) **Distinguish between tropical air masses and polar air masses** **(06 marks)**

(b) **Examine the influence of tropical air masses on the climate of East Africa.** **(19 marks)**

(a) Candidates are expected to;

- Give the origin of each air mass.
- Characteristics of each air mass.
- Give example of each air mass.

- Tropical air masses originate from low latitudes.
- They move towards the poles (pole wards)
- They are characterized by being warm.
- They have high humidity.
- Examples of tropical air masses include the westerlies, North East trade winds and ~~South~~ East trade. winds

(03 marks)

While

- Polar air masses originate from the cold-polar regions of high latitudes.
- They move towards the equator (tropics)
- They are characterized by being cold.
- They have low humidity.
- Examples of polar air masses include polar Easterlies, polar westerlies

factual marking **(03 marks)**

(b) Examine the influence of tropical air masses on the climate of East Africa. **(19 marks)**

- Candidates are expected to define climate.
- Identifying different climatic types.
- Give location and characteristics of each type.

Climate refers to the average weather condition of a place studied and recorded over a long period of time usually 35 years and above.

East Africa has a variety of climatic types and these include;

- Equatorial climate which can be seen as areas around Lake Victoria basin, found in Uganda north of Kalangala astride the equator and the E. African coast.
- It is characterized by;
- Heavy rainfall of over ~~10,000~~ 1000mm per annum.
- Hot temperatures of over 20°C
- Small diurnal temperature range of 3^0 C
- High humidity of over 80%
- Thick cloud cover
- Experience double maxima

- Savannah / tropical climate which can be seen in areas like Northern Uganda, central Tanganyika, Nyika plateau, rift valley floors of Western Uganda etc.
  - It is characterized by; moderate rainfall between 760-1000mm per annum.
  - Hot temperatures of over 27^0C
  - Convectional rainfall is received.
  - Alternating wet and dry season.
  - Moderate humidity of 50%
  - Experiences mono-modal pattern
- Semi desert climate which can be seen in areas like North Eastern Uganda, Northern Kenya, Ankole- Masaka Corridor etc.
  - It is characterized by low and un reliable rainfall of below 500mm per annum.
  - Very hot temperatures of over 30^0C during day.
  - Cold temperatures in the night.
  - Low humidity of below 20%
  - Limited cloud cover.
  - High evaporation rates.
  - High diurnal range of temperature of over 10^0C
  - High annual temperature range
  - Strong winds blow in the area.
  - ~~Rain fall is major cyclonic in type~~.
- Montane climate which is experienced in high land areas such as mountain Rwenzori, Kilimanjaro, Elgon, Kenya etc. It is characterized by;
  - Heavy rainfall is received on the wind ward side.
  - Relief rainfall is major received.
  - Temperatures decrease with increase in altitude.
  - The lee- ward slope is dry i.e low rainfall is received on the lee-ward slope.

- Tropical maritime air masses like the South East trade winds originate from the Indian Ocean and blow to the shores causing cloudy conditions and heavy rainfall in coastal areas of East Africa.

➢ The South East trade winds move into the interior of East Africa when they are dry after losing moisture at the coast and southern Tanzania leading to low rainfall and low humidity in central and Northern Tanzania.

➢ The south East trade winds recharge as they blow over Lake Victoria leading to cloudy conditions, high humidity and heavy rainfall on the Northern shores of Lake Victoria.

➢ The South East trade winds are deflected to the right after crossing the equator due to ~~corridors~~ coriolis force effect causing hot temperatures, low cloud cover, low humidity and low rainfall in the Ankole Masaka corridor.

- Tropical continental air masses like the North East Trade winds originate from the Asian land mass, get ~~charged~~ recharged with moisture from the red sea, lose moisture on the Ethiopian highlands and proceed to East Africa when dry leading to hot

temperatures, low humidity, limited cloud cover and low rainfall in North Eastern Uganda and Northern Kenya.

- The westerlies are tropical maritime air masses that blow over the Congo basin leading to heavy rainfall on the windward side of mountain Rwenzori as they move East wards.
- ➢ The westerlies lead to hot temperatures, limited cloud cover and low rainfall in areas of Kasese and Lake Albert as they descend further Eastwards.
- Tropical maritime and tropical continental air masses meet at the inter tropical convergence zone (ICTZ) giving rise to cloudy conditions, high humidity and heavy frontal rainfall as the warm moist tropical maritime air masses are forced to rise up.
- ➢
- ➢
- ➢
- ➢
- ➢
- ➢
- ➢

Impressional marking (19 marks)

4 **Describe the factors responsible for natural vegetation variation in East Africa (25 marks)**

Approach:

- Define the term natural vegetation.
- Identify the different types of natural vegetation in E. Africa and where they are found.
- Describe the characteristics of each type of natural vegetation identified.
- Then show the factors responsible for the distribution of the various vegetation types.

Answers:

- Natural vegetation refers to the plant cover which exists in a given place in its original form/state without human interference. This occurs due to the existence of specific ~~edaphic and climate factors~~ natural factors.
- The different types of natural vegetation cover in East Africa include; tropical rain ~~factors~~ forests / equatorial forests, savannah vegetation (wood land, grass land and dry savannah / scrub) Montane forest vegetation, Mangrove forests etc.
- The tropical rain forests;
- Include Mabira, Budongo, Bugoma , Bwindi and kibaale forests in Uganda, Kakamega, Kisii and Bungoma forests in Kenya etc.
- These tropical rainforest have the following characteristics i.e. tall, ever green, have buttress roots, hard wood, smooth barked etc.
- Savannah vegetation

- This is the most wide spread form of natural vegetation in East Africa. It is divided into three types namely; Savannah woodland, savannah grassland vegetation and the dry brush and thicket or dry Savanah.

The savannah woodland and vegetation is found in central Tanzania where it is referred to as Miombo woodlands. In Uganda, It include Kei, Timu and Morongole woodland forests in the North and North east, in Kenya. It is characterized by hard wood trees, deciduous trees, long tap roots, waxy leaves, stunted growth etc.

- Savannah grassland vegetation;

This is formed in Nyika Plains of Kenya, northern Uganda, Nakasongola and Kiboga areas, the Rift valley areas of western Uganda, areas of Bukoba in Tanzania etc. It is characterized by elephant and spear grass, short trees, hard wood trees, tall grasses, deciduous trees etc.

- The dry savannah vegetation (Dry bush and thicket)

This is common in Northern Kenya, North Western and North Eastern Kenya, Central Tanzania, North Eastern Uganda like in Kotido and Moroto etc.

N.B It is characterized by short trees, bare patches of land, stunted growth, small waxy leaves etc.

- Montane Vegetation:

These are concentrated in highland areas of East Africa e.g Mt. Kenya, Mt. Elgon, Mt. Rwenzori and Mt. Kilimanjaro forests. This Montane forest vegetation includes the temperate forest, the Bamboo forests and the heath and Moor land vegetation.

N.B (Give some of the characteristics of the temperate forests, bamboo forests and heath and Moor land vegetation)

- Drainage influences distribution of natural vegetation.

In flat areas and valleys, the drainage is always impeded and characterized by swampy conditions leading to growth of water loving plants like mangrove at the coast of East Africa and papyrus vegetation.

Well drained areas lead to the growth of tropical rain forests like Mabira with tall trees which are luxuriant. Also well drained areas support the growth of woodlands and grasslands.

The supportive government policy gazetting forests has favoured the growth of tropical rainforest like Mabira, Kibaale and Bwindi forests in Uganda, Kisii and Kakamega forests in Kenya etc.

- Man's activities which involve clearance of vegetation cover like cultivation, bush burning, and lumbering, animal grazing lead to the growth of secondary vegetation types i.e. degenerated or transformed from forests to savannah grassland and then dry savannah with very poor grass.

- Swamp reclamation mainly for agriculture and settlement has led to disappearance of swamps / papyrus vegetation e.g. in Kabale areas, around Kampala like lubigi swamp, swamps in Iganga and Pallisa etc.

- The human interferences through afforestation and reforestation programmes have led to introduction of exotic trees species which as eucalyptus, pine etc. which

have replaced the previously existing natural vegetation like Mukono, Kigezi, Highlands, Mbale, Kenya highlands etc.

- The living organism like wild animals such as elephants, Zebras, giraffe etc, Influence vegetation distribution through overgrazing hence natural vegetation changes to secondary type e.g in some parts of Queen Elizabeth, National park, Tsavo National park etc. also insects , locusts and termites destroy the natural vegetation of an area like in North Eastern Uganda (Kotido and Moroto) etc.

- Relief / topography influence vegetation distribution as follows;
- The steep slopes with excessive water run-off and poor soils lead to growth of heath and moor land, temperate forests and Bamboo vegetation.

- The gentle slopes lead to the growth of tropical rain forests with tall and huge trees, this is due to well drained conditions; deep and mature soils on such gentle slopes e.g. on the lower slopes of Mt. Elgon, the shores of lake Victoria with forests like Mabira, Bunya forests etc.

- The relatively flat lands with fair drainage favour the growth of woodlands and savannah grasslands like in Northern Uganda, Eastern Uganda and central Tanzania etc.

- The low land and broad valleys support the growth of swampy vegetation e.g the Mangroove at the East Africa coast and the papyrus around Lake Kyoga and in broad valley like Naigombwa. This is due to the impeded drainage.

- The factors responsible for variation of Natural vegetation in East Africa include the following;
- Climate has led to the growth of various vegetation types as follows;
- Heavy rainfall which is well distributed of about 1500mm and above the hot temperatures of about 20^0C promote the growth of luxuriant trees which are huge and tall hence growth of tropical rain forests like Mabira and Bunya forest around the shores of Lake Victoria, forests on Ssese and kalangala Islands, Budongo and Kibaale forests etc.

- Moderate rainfall distributed in a seasonal pattern ie of between 760- 1000mm per annum favours the growth of woodland vegetation while the seasonal rainfall 500-760mm per annum supports the growth of savannah grassland vegetation.

- The low and unreliable rainfall of less than 500mm per annum leads to the growth of dry savannah (dry bush and thicket) characterized by stunted poor vegetation of thorny tree, scrubs and thickets like in Kotido and Moroto In North Eastern Uganda, Northern Kenya.

- Areas having high percentage of humidity of about 80 have very thick and huge trees hence the development of tropical rainforests where trees are ever green due to reduced evapotranspiration.

- Areas with low humidity have poor vegetation in form of scrubs and thickets hence growth of dry savannah due to high levels of evapotranspiration like in Kotido and Moroto, Northern Kenya etc.

- Very low temperatures below 10^0C like at the upper slopes of mountains with relatively high rainfall lead to the growth of alpine Vegetation like the temperate and bamboo forests on Mt. Rwenzori and Kilimanjaro while the hot temperatures of about 30^0C in the semi- arid areas have led to the growth of stunted trees and scrubs hence the development of dry Savannah like in Kotido and Moroto, Northern Kenya etc.

- The mangrove forests grow in areas with hot temperatures like at the East Africa coast.

- The nature of soils also influences the distribution of natural vegetation types in East Africa as follows;
  - The deep and fertile soils encourage the growth of luxuriant vegetation in form of tropical rainforest e.g Mabira forest, Bunga forest and Kalangala forests in the Lake Victoria region.
  - Soils of moderate fertility have supported the growth of savannah woodland vegetation e.g in some parts of Northern and Northern Eastern Uganda, central Tanzania.
  - The rocky and immature infertile soils on the steep slopes , generally support the growth of stunted vegetation with poor and short grasses plus the thickets hence the growth of heath and moorland type of vegetation on top of mountains like Rwenzori, Elgon and Kilimanjaro
  - The volcanic fertile soils on the lower slopes of mountains like Elgon, Kilimanjaro and Kenya, have led to the growth of tropical rainforests and the temperate forests because such soils support the growth of huge trees which are luxuriant.
  - The laterite soils like on Buganda hills which are thin have supported grasses.
  - The clay soils in the valley like Naigombwa and Lumbuye in Iganga have supported the growth of papyrus vegetation while the peat soils give rise to riverine forests like along river Katonga.
- The altitude range of about 500-1000 meters above sea level favours the growth of savannah vegetation characterized by the woodlands, savannah grasslands and dry savannah e.g in central Tanzania, Northern Uganda etc., This is due to fairly fertile soils and Moderate rainfall at this altitude.
  - The altitude of about 1000-2500 meters above sea level supports the growth of tropical rain forests which are mainly found on the slopes of high lands like Bwindi, Rwenzori and Elgon forests. Their growth at that altitude is supported by heavy rainfall and the deep fertile soils.
  - The altitude of about 2500-3500 meters above sea, level supports the growth of temperate forests with cone shaped trees of soft wood species like pines, camphor, pod carp etc. This is due to moderate rainfall and reduced temperatures at the higher slopes of Mt. Elgon and Mt. Kilimanjaro.

- Between 3500- 4000m above sea level, supports growth of Bamboo with soft wood, segmented stems due to reduced rainfall and cold temperatures.
- Between 4000 – 4500m above sea level, there is heath and moorland with flowers and mosses due to cold temperatures and little rainfall.
- Altitude which is the height of the land above sea level influences the growth and distribution of vegetation types as follows;
- The altitudinal range of about 0- 500 meters above thesea level is dominated by swampy vegetation like the mangrove at the East Africa coast and papyrus in broad valley low lands. This is due to impeded drainage associated with low altitude areas.

Impressional marking **(25 marks)**

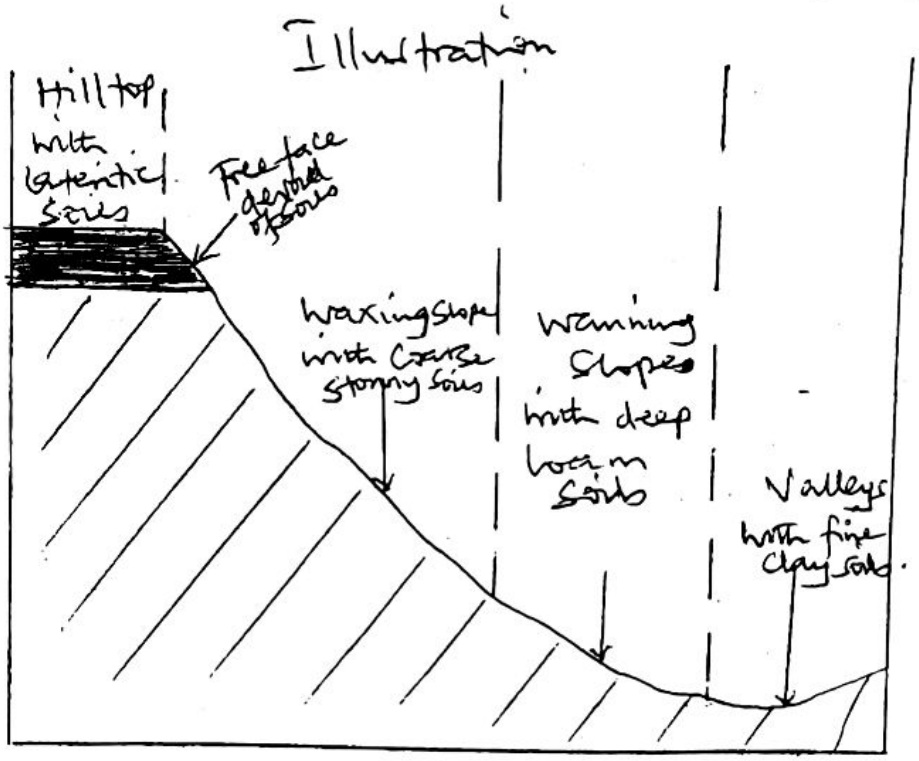
8. To what extent has drainage influenced the development of a soil catena in E. Africa?

Candidates are expected to;

- Define soil catena.
- Describe the soil catena
- Bring out the influence of drainage on soil catena development.
- Bring out the other factors
- Conclude with a judgement

- Soil catena refers to the ~~consequence~~ sequence of soil types along a slope.
- It is horizontal arrangement of soils down the slope due to soil water movement.
- A soil catena usually has 4-5 different types with different soil characteristics.
- The difference in the soil catena are caused by variations in relief and drainage.
- The soils along the slope differ in colour, texture, water retention etc.
- A fully developed soil catena has the following soil types;
- At the hill top, there is a lateritic capping characterized by thin and skeletal soils.
- The free face/vertical slope follows with bare rocks devoid of soil.
- The waxing / steep slope follows with coarse stonny sandy soils.
- The waning/ gentle slope has deep loam mature soils due to deposition of materials from the steep slopes hence erosion and deposition are in balance.
- Valleys / broad valleys have fine clay soils because of maximum deposition.
- An ideal soil catena is formed in Buganda land scape, Kigezi Highlands and Kenya highlands.

Illustration



Candidates are expected to bring out the role of drainage as;

- Well drained wanning/gentle slopes have well drained soils because they encourage high rates of water percolation which promotes high rates of chemical weathering hence deep mature loam soils in Mukono, Wakiso etc.
- Thin, stonny, dry soils are found on steep slopes due to high rates of erosion that limit water percolation.
- Fine clay soils, boggy soils, grey soils which are immature are found in water logged conditions that limit chemical weathering eg in Wakiso and Mukono valleys.

Candidates are expected to bring out the other factors;

- **Relief / topography;**

- The hill top has lateritic capping / laterites which are skeletal because of leaching that leaves the insoluble Iron and aluminum compounds on surface that are later weathered and hardened to form a layer of the lateritic cappings.
- Vertical slope/ free face have bare rocks without soils because of the high rates of erosion e.g in Mukono and Wakiso.
- Waxing / steep slopes /upper slopes / convex slopes have coarse stonny soils due to the high rates of erosion by running water along the hillsin Kampala.
- Waning / gentle slope / concave slope form deep, mature loam soils because erosion, weathering and deposition are balanced. They are associated with high rates of deposition hence the deep soils.
- Valleys/ broad valleys have fine clay soils due to maximum deposition and the high rates of water logging.
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- **Nature of parent rocks;**
  - Parent rocks that are hard lead to development of vertical slopes that are associated with high rates of erosion hence bare rocks.
  - Hard rocks also create waxing /steep slopes with thin and skeletal soils due to high rates of erosion.
  - Soft rocks ~~results into~~ on gentle/wanning slopes and valleys with deep mature loam soils and fine clay soils. This is because they encourage high rates of weathering and deposition.
  - Rock ~~x~~ porosity on gentle slopes encourages water percolation resulting into deep loam soils since chemical weathering is encouraged.
  - Rocks that are rich in Iron and aluminum compounds on hill tops encourage leaching which leads to concentration of Iron and aluminum compounds on the surface hence the lateritic ~~rocks~~ soils on the hill tops of Buganda landscape.

- **Climate:**
  - Heavy rain fall encourages high rates of leaching on the hill tops hence the formation of lateritic soils.
  - Heavy rains on the ~~gentle~~ steep slopes or waxing slopes encourages high rates of erosion resulting into coarse stonny soils.
  - On the wanning / gentle slopes, there is deposition by the heavy rains. This results into deep loam soils.
  - In valleys and lowlands, the heavy rains lead to water logging forming fine clay soils.

- **Vegetation;**
  - Soil catena is well developed in areas without vegetation cover. This is because the rate of erosion and transportation is faster on the waxing slopes hence skeletal soils and creation of deep loam soils on wanning slopes due to the deposition of materials.
  - Thickly/ densely vegetated areas slow down the rate of erosion & transportation, on waxing slopes and therefore soil catena is reduced or slowed down.

- **Human activities;**
  - Deforestation, settlement and cultivation result into removal of surface cover which encourages high rates of erosion on the upper slopes forming ~~thick~~ thin, coarse stonny soils on the waxing slopes.
  - However, the above activities encourage deposition on the wanning slope and valleys forming deep loam soils.
  - Human activities like quarrying, cultivation lead to removal of the surface soils in a catena hence exposing to erosion hence coarse stonny soils on the steep slope

- **Time;**
  - A well-developed soil catena requires along period of time that leads leaching, erosion and deposition to operate.

Impressional marking (25 marks)

EV- 02marks
Content- 23 marks
Total 25marks

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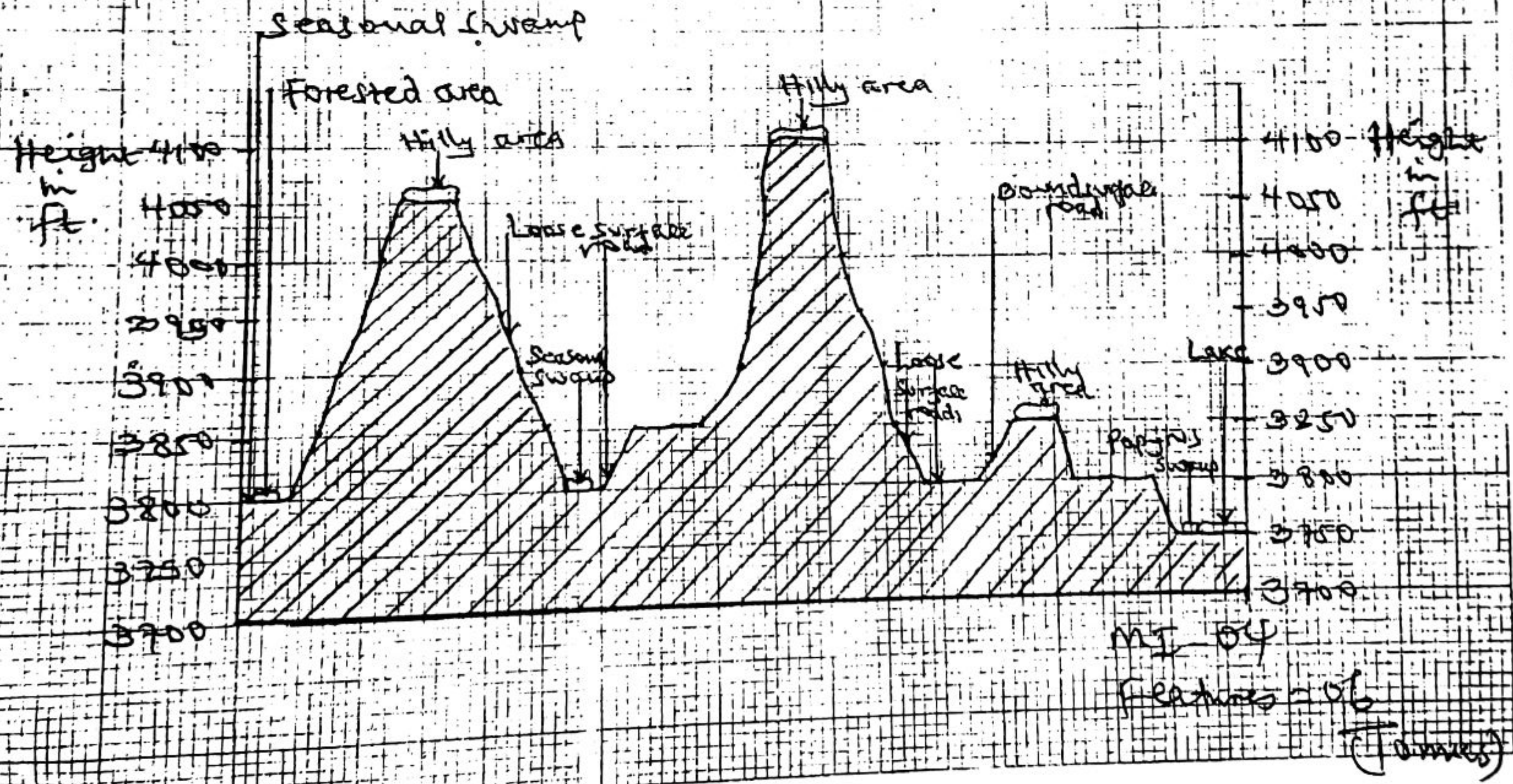
An Annotated Cross-section on the Kampala map extract along northing 30 from Eastings 51 to 60 Ft showing name two drainage features, forested area, road type and any two hilly areas.



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