UMSS NAMUGONGO 'A' LEVEL GEOGRAPHY SEMINAR GUIDE 2023

P250/1

1. **Study the East Africa 1:50,000 (Uganda) Budadiri map extract, part of sheet 54/4, (Kenya sheet 74w/4) series Y732, edition 2-U.S.A provided and answer the questions that follow;**

(a) (i) Distance of the loose surface ring road is 17.5km.

(ii) Why Budadiri is hilly?

- Winding roads e.g. along Bukigai hill in the South East.
- Numerous ridges e.g. Bukigai, Bundagala, Namugabwe. etc.
- Fairly Straight River courses e.g. River Sume in the South East.

(b) (i) Major drainage patterns shown on the map include;

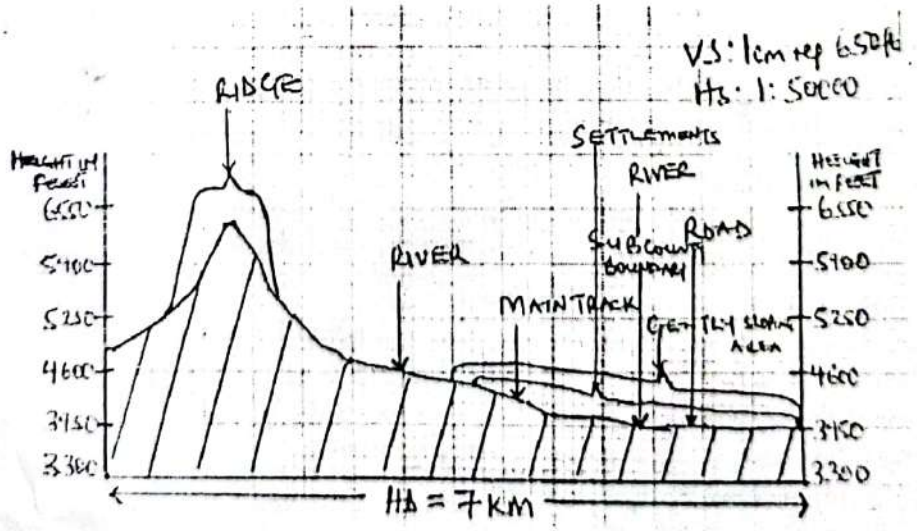
- Annular drainage pattern around Bukigai hill.
- Dendritic drainage pattern e.g. River Sanoli in North West. River Manafwa in the East.
- Radial drainage pattern around Bukigai dissected dome
- Trellis drainage pattern e.g. River Sakusaku, River Sanoli. River Manafwa

(ii) The Characteristics of the drainage pattern displayed by river Manafwa.

- River Manafwa displays dendritic drainage pattern.
- Has a shape of a tree and its branches.
- Tributaries converge on the main channel.
- Tributaries join the main river at acute angles.
- Flows over massive homogenous rocks.
- Flows in areas of heavy rainfall.
- Flows where there are gentle slopes.

(c)(i)

A RELIEF SECTION OF BUDADIRI ALONG EASTING 47 FROM NORTHING 24 TO 31 SHOWING A RIDGE, GENTLY SLOPING AREA RIVERS, COMMUNICATION LINE, SETTLEMENTS AND SUB-COUNTY BOUNDARY.



(ii) **Calculate the;**

- **Horizontal equivalent,**

➢ 1sq = 1km

➢ 1sq = 2cm

➢ 1cm = ½ km

➢ HE = 14cm x ½km

➢ HE = 7km

OR

➢ Using the linear scale provided on the map extract HE = 7km.

- **Vertical exaggeration of the cross section drawn**

➢ $VE = \frac{VS}{HS}$

➢ $\frac{1}{650ft \times 30} \div \frac{1}{50000}$

➢ $\frac{1}{19500} X \frac{50000}{1}$

➢ VE = 2.56times

➢ $\cong 2.6times$

(d) **The formation of the highland Cliffs in the North East.**

➢ A highland cliff is a vertical slope or a steep rock face.
➢ Formed due to uplift followed by denudation/erosion/slope retreat.
➢ Occurs on massive hard rocks
➢ Due to undercutting of the rock, creating a vertical slope or cliff.

Illustration:

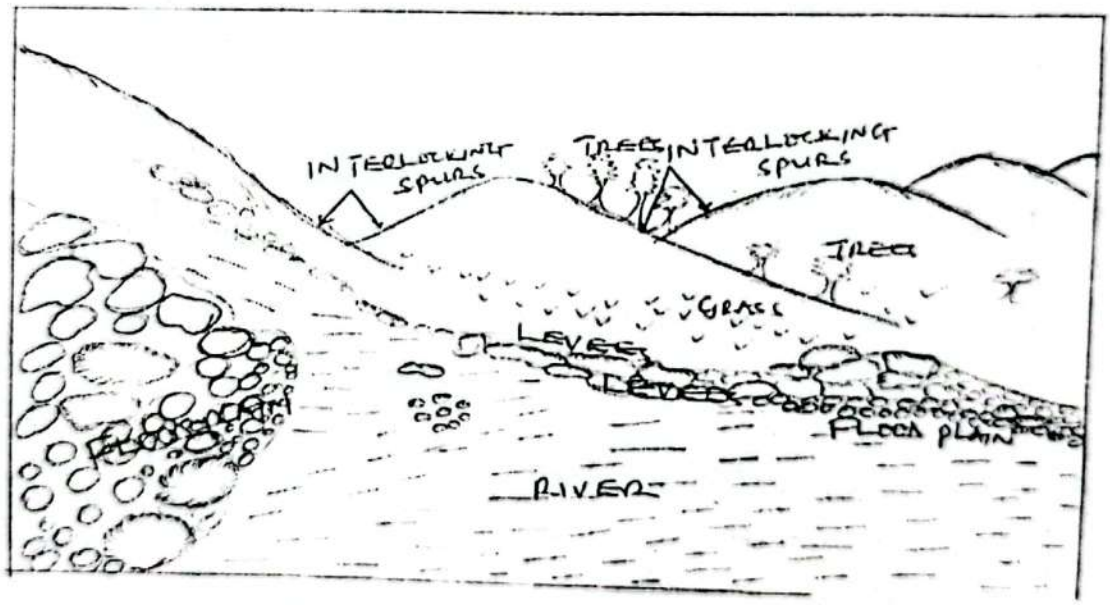
(e) Relationship between Relief and communication.

➢ Bududa- Buwangani loose surface ring road around Bukigai ridge follows river valleys and gentle slopes for easy accessibility.
➢ Budadiri – Bigitimwa dry weather road follows river valleys for easy accessibility
➢ Bumirisa – Bukama –Bumumulo motorable tracks follows a ridge top, gentles for easy accessibility.
➢ Foot paths are on steep slopes to access highlands eg. Sirarano.
➢ Steeply sloping areas are avoided by the major communication lines e.g. South East because it's difficult to construct.

Relationship between Settlement and communication.

- Settlements are found along loose surface roads e.g. the Bududa –Buwangani ring road along Bukigai ridge because of easy movement /accessibility.
- Settlements are found along all weather loose roads eg. Budadiri –Busulani – Bugitimwa due to easy accessibility.
- Settlements are found along road junctions Budadiri in the North due to easy accessibility.
- Settlements are found along motorable tracks e.g. Buweri –Bumirisa due to easy accessibility.
- Settlements are found along footpaths e.g. in the North West due to easy accessibility.
- Areas without communication lines are avoided by settlements e.g. South East because they are inaccessible.

2. (a) **A LAND SCAPE SKETCH OF THE AREA SHOWN ON THE AREA SHOWN ON THE PHOTOGRAPH SHOWING FLOOD PLAIN, LEVEES, MAJOR DRAINAGE FEATURE, INTERLOCKING SPURS AND VEGETATION TYPES**



Drainage feature – River. Vegetation type - Trees, grass

(b) Account for the formation of;

- **Flood plain,**

- Is a wide flat plain of alluvium in the old stage of the river.
- It is formed due to downstream migration meanders.
- This causes widening of the river valley.
- The spur ends are eroded to form low walls called bluffs.
- In the wide valley filled with alluvium, the river floods without touching valley sides hence a flood plain.

Illustration

- **Interlocking spurs,**
  - These are resistant obstacles around which the river winds in the youthful stage.
  - Formed due to river erosion by abrasion and hydraulic action.
  - Formed in areas with alternate soft and hard rocks.
  - As hard rocks resist erosion, the river concentrates and erodes the soft rocks.
  - Bends are gradually emphasized to form spurs.
  - Spurs do alternate on the opposite side of the river banks and seem to overlook or overlap into each other forming interlocking spurs.

Illustration

- **Rapids**
  - Turbulent flow of water in a river channel.
  - Develop where the gradient of river bed increases without sudden break in the slope.
  - Soft rocks are easily eroded and the slope dips downstream.
  - Hard sections of rocks remain protruding hence irregular bed of the river.
  - River therefore flows at moderate rate or gently over it forming rapids.

OR.

  - The presence of boulder deposits may make the channel irregular forming rapids.

Illustration

(c) Account for the;

(i) Differences in the Sizes of the rock boulders.

- Rock boulders differ in sizes i.e. large, medium and small particles. This is due to;
  - Distance and time travelled.
  - Difference in rock resistance / hardness.
  - Attrition on the river bed.

(ii) Why Rock boulders exist in the foreground and middle ground of the photograph.

- Weathering in the highland areas.
- Erosion and transportation of the weathered materials.
- Deposition of boulders / materials.

(iii) Why are materials deposited?

- Reduced gradient and velocity causing changes in the slope.
- Roughness of the channel bed of the river.
- A decrease in the volume of water in the river channel.
- Widening of the river channel due to lateral erosion leads to friction hence deposition.
- Excessive sediment load / heavy load.
- Deposition occurs when the river is carrying heavy rock boulders.
- Existence of potholes at the channel bed of the river.

(d)(i) **Problems faced by the people living in the area shown on the photograph.**

- Destructive flooding due to the river in fore ground.
- Water borne diseases because of the river in the fore ground.
- Dangerous aquatic animals due to the river in the fore ground.
- Drowning or water accidents because of the river in the fore ground.
- Severe soil erosion because of the steep slopes in the back ground.
- Destructive landslides due to steep slopes in the back ground.
- Difficulty in construction of settlements due to steep slopes in the background.

(ii) Area in East Africa where the photograph could have been taken include;

- River Nyamwamba in Kasese.
- River Mpanga in Kabarole.
- River Sironko and Manafwa in Mbale.
- Kabale
- Bundibugyo
- etc.

Reasons:

- Presence of uplands.
- Wide river valleys
- Interlocking spurs.
- Flood plains with large rock boulders.

2. (a) Distinguish between fissure and vent volcanic eruption.

- Fissure volcanic eruption involves ejection of materials through cracks/joints/lines of weakness.
- Majorly basic lava, gases, steam and water are ejected.
- It is associated with quiet/effusive eruption.
- Forms gently sloping /lava plain or plateau.
- Such as lava plateaus and shield volcanoes.

Illustration

While;

- Vent volcanic eruption involves ejection of materials through a central opening /hole within the earth's Crust.
- Acidic lava are the major materials ejected.
- Associated with violent/explosive volcanic eruption.
- Forms dome shaped /cone shaped/steeply sloping volcanic plug and cumulo dome.

Illustration

(b) **Candidate should define intrusive vulcanicity as** a process through which molten rock materials are injected, cool, crystallize and solidify within the earth's crust.

Give origins.

- Originates with in the earth's interior (mantle)

- Due to spontaneous heating by radioactivity and geochemical reaction.
- The heating causes melting of the mantle rocks hence convective currents.
- Convective currents and tectonic movements create lines of weakness within the earth's crust.
- The lines of weakness are then filled by magma materials. Injected from the interior due to intense pressure.
- The injection is due to viscosity/low or insufficient pressure hence cool and solidifies within the earth's crust at different depth levels to form different volcanic features.
- These features do not have a direct effect /influence on relief unless they are exposed by denudational processes i.e. erosion, mass wasting, weathering.

- **Batholith:**
  - Very large dome shaped intrusion made up of granitic materials/rocks.
  - Formed at a great depth within the earth's crust due to deep seating of acidic magma.
  - Over time the batholith is exposed to form rocky highlands where it is harder than the surrounding area.
  - These resistant hills/out crop rocks stand out as inselbergs/residual hills e.g. include Mubende, Nakasongola, Singo, Kachumbala, Parabong, etc.
  - Where the batholith is weaker/softer, the surrounding rocks are eroded to form an arena e.g the Rubanda Arena.

- **Dyke:**
  - Is a vertical/wall like/steeply inclined rocks intruded across the rock strata.
  - Where the dyke is harder than the surrounding rocks, an elongated hill/ridge develops e.g. Isingiro ridges, Sukuru ridges, ridges in Busia and Kisumu Rungwe complex.
  - While where the dyke is softer, linear trenches evolve e.g. around Lake Turkana.

- **Sills:**
  - Tabular sheet of igneous rocks lying horizontally along the bedding plane of the rock strata.
  - Formed when magma rises and spreads horizontally in between the bedding planes of the rock strata or beneath the earth's surface.
  - When exposed, escarpments/cliffs or flat topped hills are formed e.g. Kakinzi in Luwero, the Thika falls as sills are crossed by river Thika in Kenya.

- **Laccolith:**
  - Dome shaped intrusion with a flat base.
  - Formed from injection of viscous magma into the earth's crust.
  - Since viscous, it forces the overlying rocks to bend upwards.
  - On expose, laccolith form uplands e.g. Voi and Kitui in Kenya.

4.(a) Differentiate between Carbonation and solution.

- **Carbonation** is chemical weathering process where rain water combines with carbon dioxide in atmosphere to form weak Carbonic acid.
  - Carbonic acids react with rocks to produce new compounds.
  - Produced in limestone areas where calcium carbonate reacts with carbonic acids to produce calcium hydrogen carbonate.
  - This process is important in weathering calcareous rocks like limestone and dolomite under conditions of heavy rainfall.
  - Results into formation of stalactites and stalagmites in underground caves and formation of clints and grikes.
  - Occurs commonly in limestone areas like Nyakasura in Western Uganda, along the East African coast, etc.

While;

- **Solution** is the process that involves rain water dissolving minerals of the rock.
  - Occurs in areas where there are soluble minerals such as sodium chloride, calcium chloride, calcium sulphate and magnesium chloride when there is rainfall.
  - The weak carbonic acid as a result of combination of rain water and carbon dioxide in atmosphere help to turn insoluble minerals into minerals that are soluble.
  - The solution is carried away in solution leaving behind cracks, joints and hollows in the rock.
  - Common in sedimentary rocks e.g. lime stone along the East African coast and rock salt in Katwe.
  - This process helps in formation of rock salt in Lake Katwe and soda ash in Lake Magadi.

(b) Influence of carbonation in formation of relief in East Africa.

Candidates should describe carbonation process as:

- Process which occurs when rain water combines with carbon dioxide in atmosphere to form weak carbonic acid. When the weak carbonic acid falls on calcium carbonate rocks it changes calcium carbonate into calcium bi-carbonate taken in solution form. This process helps to weather limestone rocks. This process takes place in limestone areas like Nyakasura in western Uganda and East African coast.

$$\underset{\text{Calcium carbonate}}{CaCO_3} + \underset{\text{Water}}{H_2O} + \underset{\text{Carbon dioxide}}{CO_2} \longrightarrow \underset{\text{Calcium bicarbonate}}{Ca(HCO_3)_2}$$

Candidates should explain influence of carbonation on landform formation

- **Stalactites and stalagmites**

Stalactites are protrusions found at the top of a chemically weathered limestone cave.

- Carbonation leads to formation of stalactites and stalagmites. This happens when rain water combines with carbon dioxide in the atmosphere forming a weak carbonic acid which dissolves calcium carbonate to form calcium bi-carbonate/hydrogen carbonate taken in solution form.
- When the solution reaches underground caves calcium carbonate is deposited on roof of the cave hanging up from the roof to form stalactites.
- These are seen in Nyakasura caves in Western Uganda, Tanga in Tanzania.

➢ **Stalagmites.**

These are protrusions found at the base of the cave facing upwards.

- Carbonation leads to formation of stalactites and stalagmites. This happens when rain water combines with carbon dioxide in the atmosphere forming a weak carbonic acid which dissolves calcium carbonate to form calcium bi-carbonate/hydrogen carbonate taken in solution form.
- When the solution reaches underground caves calcium carbonate is deposited on the floor of the cave facing upwards to form stalagmites.
- These are seen in Nyakasura caves in Western Uganda, Tanga in Tanzania.

➢ **Pillars**

These are vertical columns of solidified calcium carbonate found in an underground cave.

- These are formed in underground caves when stalactites and stalagmites continue to grow towards each other. With time eventually the two join. Pillars can be seen in caves of Nyakasura in Western Uganda.

➢ **Caves**

➢ A cave is a natural underground space formed as a result of carbonation. it is formed during carbonation when there is chemical dissolution of dolomite or limestone.

➢ The rock is dissolved by natural acid in ground water that seeps through bedding planes, faults and joints.

Illustration

➢ **Grikes and clints (limestone pavement)**

- Grikes are hollows/depressions while clints are ridges formed as a result of carbonation in limestone areas.
- Formed in limestone areas with rocks of different chemical composition
- Limestone is dissolved by acid rain (formed when rain water combines with carbon dioxide in atmosphere) to form depressions or hollows called grikes while undissolved rocks form ridges called clints.

Illustration

Sinkhole

- Sinkhole is a natural depression or hole in the earth surface formed when limestone is dissolved by acidic rain water.
- It is formed through the process of carbonation involving the removal of soluble rock by percolating acidic rain water in solution and the collapse of the roof of a cave.

➢ **Dolines**

- These are shallow circular depressions which are larger than sinkholes.
- They are formed through the process of carbonation either through solution of surface limestone done by acid rain or by collapse of underlying caves. In latter case they are called collapse doline.
  Examples are found in Karamoja and Tororo area.

➢ **Polje**

- Is an elongated basin having a flat floor and steep walls.
- The poljes are formed by coalescence of several sinkholes when being formed through the process of carbonation and solution.
- In some poljes small residual hills known as hums are formed.

➢ **Uvalas.**

- This is a large depression formed between the dolines and the poljes.
- Formed when several dolines join up together to form a very large depression called a hummocky.

➢ **Limestone gorge**

- Is a deep steep sided valley formed where there are limestone rocks.
- Formed when acid rain seeps into the cracks in limestone rocks and dissolves the limestone.
- Or they are formed when there is weathering of soft limestone rocks by solution.

5. (a) What is;

(i) River Capture.

➢ Is the diversion of part of the course or the whole of the stream into the course of another adjacent powerful stream which is able to erode its valley more rapidly.

- The river that effects a capture is called a pirate stream.
- The stream that has been captured is called a misfit / beheaded stream.
- The point where capture has been effected is referred to as an Elbow of capture.
- The capturing river is usually flowing at a lower level than the victim.
- The capturing stream has more erosive energy.
- Examples of river capture include;
  - R. Nile captured Okole, Tochi and Arocha.
  - The lower Tiva captured the upper Tiva a tributary of river Galana.
  - River Wassa captured Nyaboroga in Kabarole.
  - Reversed rivers of Rwizi and Katonga captured the weaker rivers in western Uganda.

Illustration

(ii) River rejuvenation.

➢ This is a situation where the rivers' erosive capacity is renewed.

- The river starts undercutting its valley a characteristic of the youthful stage.
- The main goal of the river is to remove all obstacles, so that it develops a smooth concave slope from the source to the mouth.
- River rejuvenation is mainly due to heavy rainfall, river piracy, glaciation, reduction of load, etc.
- Resultant features include; Knick point, river terraces, incised meanders, valley within a valley, etc.
- Rejuvenation has been experienced on rivers Mwachi, Mkomazi, Nyando, Kafu, Rwizi, Manafwa and R. Mubuku.

(b) Effects of river capture on the landscape of East Africa.

- Candidates are expected to provide the effects of river capture as;

➢ **Elbow of capture.**

- This is a bend formed at a point where the head waters of captured stream are diverted to capturing streams.
- In some rivers the elbow of capture is marked by a waterfall and knick point.

➢ **Windgap**

- This is either the dry gap or swampy area between the elbow of capture and point where the beheaded stream flows again.

➢ **Misfit stream / Beheaded stream**

- This is a stream whose head waters have been captured.
- It will be flowing through the valley much bigger than the volume of water it is carrying.
- It will be too small to occupy the entire valley hence misfit stream.

➢ **Over fit stream.**

- This is the stream that captured the head waters of a weaker stream and the volume of water within the stream becomes too big compared to the current size.

➢ **Knick point.**

- This is a sharp break in the slope created near the point of capture.
- It is formed due to river rejuvenation.

➢ **Gorge.**

- This is the undercutting of the pirate river near the point of capture.
- The increased erosion leads to the formation of a gorge.

Illustrations

➢ **Examples of river capture.**

- River Aswa captured Agago, Pager and Meroto.

- River Nile captured Okole, Tochi and Arocha.
- The lower Tiva captured the upper Tiva a tributary of R. Galana.
- River Wassa captured R. Nyaboronga in Kabarole.

6. To what extent has long shore drifting influenced the development of depositional coastal features in East Africa?

- Candidates are expected to define the term long shore drift,
- talk about constructive waves,
- Give the land forms that result from long shore drift.
- Then bring out other factors.

➢ **Long shore drift is a method** of wave transport where there is a general movement of materials along a shore line due to the effect of waves breaking obliquently, such that the materials transported by swash is obliquely pushed up the shore line but backwash flows back and drags material down the beach at right angles to the shore.
In this way material moved by long shore drift follows a zigzag path along the shore.

Illustration

Candidates should bring out the role of long shore drift in the formation of depositional features (To a larger extent)

➢ **Beach**

- Beach accumulation of the material along the coast on gently sloping coastline.
- **Barrier beach;** long ridges of sands deposits approximately parallel to the coast separated from the coast by a lagoon formed on gently sloping coastlines by long shore drift and constructive waves breaking off shore. Materials are deposited under water as off shore sand bars appear above high tides.
- **Beach cusps;** series of small corn-shaped projections separated by a shallow indentation that Point Sea wards. Formed by eddies of powerful swash that scours course materials in the depression. Examples are found at Mombasa.
- **Bay head beaches;** being a crescent of sand and shingle lying between headlands formed where there are bays and headlands by long shore and constructive waves. Examples Bugongo beach, Nyali beach, Lutembe beach, Lido beach, etc.
- **Storm beach;** Formed when strong waves deposit materials several metres above the water level in periods of storms.
- Contain large boulders and rocks.
- **Beach rocks;** a hard crust-like deposits projecting above the sea. They are formed shells, pebbles cemented together by calcium carbonate.

➢ **Berms;** ridge like features formed by larger materials that accumulates at furthest limit of swash action. Develop where swash is stronger than back swash e.g. Lutembe beach, Lido etc.

➢ **Bars;** ridges of sand, mad, gravel, shingle are deposited off shore parallel to the coast formed on gently sloping coast or irregular shore lines.

- Formation is attributed to either wave which drifts materials along the shore, backwash depositing materials directly down the beach.

- Similarly, the long shore drift and breaking waves cause sand grains to move sea wards resulting into accumulation of material and the submerged line known as break point bar. Repeated processes form a bar behind which develops a lagoon, mudflats and marshes.

Types of bars include;

- **Offshore bars;** these are long ridges of sand and shingle deposited along a coast separated from the coast by the lagoon.
- Formed by waves breaking some distance offshore where the continental shelf is shallow leading to the formation of a submarine bar that is slowly built upwards through continued deposition of materials.
- **Foreshore sand bar**; a bar formed by constant accumulation of sand causing offshore bars to rise above the water surface.
- **Bay-bar**; a bar which extends across a bay. Forms when a spit continues to grow length wise from one headland towards another linking the two headlands enclosing a lagoon e.g. at Nabugabo bay.

➢ **Barriers island**; a bar which gradually moves inland by wave attack and encloses the area of shallow water (sounds) and have no connection to the mainland.

➢ **Spit**; a long narrow ridge of sand, shingle or pebbles in a linear form joined to the land at one end with the other end projecting into the sea or across.

- It grows out from the coastline due to the effect of long shore drift often at a location where the line coast changes direction, usually at the mouth of the estuary and delta e.g. Kabo spit and Tonya spit on Lake Albert.

Types of spits include;

- **Hooked spit**; this is when the open end of a spit being hooked or curved across the bay or estuary formed by waves moving obliquely to the shore tending to swing around the end of the spit or waves approaching the shore from several directions forced the open part of the spit to bend or curve the deep water off the spit allows wave action to curve hence forming a curved spit e.g. at Kibanga.
- **Cuspate spit**; applies to two spits converging offshore. It is also a curving of a simple spit until it comes attached to the shore at the ends.
- **Winged headlands**; these are spits attached at both sides of the headland.
- **Cuspate forehead**; it is a triangular shaped deposit of sand, shingle projecting seawards formed by convergence to an apex of two separate curved spits broadly at right angles or by two sets of constructive waves. When two spits converge in water, the enclosed water is filled with deposits then colonized by vegetation leading to a cuspate foreland e.g. at Tonya point.

➢ **Tombolo**; a ridge / bar of sand or shingle joining an island to the mainland or joining an island to an island. When the long shore drift operates between an island and the mainland, sediments may gradually be laid in that zone. Deposition may start on one end of the mainland linking the two up e.g. Bukakata-Lambu Island.

➢ **Mudflats**; platforms of mud, silt and other forms of alluvium along gentle coasts especially in bays and estuaries.

- They develop when rivers and waves deposit material along gentle coasts especially in bays and estuaries between high and low tides e.g. near R. Rufigi, Murchison bay.

Candidates are expected to bring other factors like (To a small extent)

- Wind direction; which should be on-shore such that material is carried and deposited by on-shore wind along the coast.
- Availability of weathered and eroded materials are transported by constructive waves and deposited at the coast to form various landforms e.g. beaches.
- Presence of relatively shallow continental shelf to form the base upon which materials are deposited.
- Organic deposits or corals due to deposition and accumulation of dead polyps.
- Nature of the coastline i.e. gently sloping areas allow deposition and accumulation of materials leading to formation of deposition coastal features.
- Human activities i.e. dumping of industrial wastes at the coast or shoreline, soil and rock, boulder to construct piers etc.
- River deposition at the mouth forming deltas.
- Diagrams should be drawn.

Conclude the judgement.

7. Examine the influence of tectonic movements on formation of lakes in East Africa.

Candidates are expected to: Define a lake, Define tectonic movements and give origin of tectonic movements, Explain the role of tectonic movements on the formation of lakes in East Africa

- **A lake is a body of water** contained in a hollow or depression. It may be natural or man-made; it may be permanent or seasonal lake.
- They are characterized by being large / small, deep / shallow, fresh water / salty.
- Tectonic movements are differential movements of the earth crust which are either lateral or vertical, rapid or slow occurring within the earth crust.
- Tectonic movements originate from the mantle due to heating by radioactivity and geochemical reactions which generate heat and pressure that melt rocks in the mantle leading to convective currents that produce tension, compression and vertical forces that lead to faulting, warping and volcanicity responsible for formation of various lakes in East Africa. Presence of faults and fissures assist in tectonic movements in earth crust.

Lakes have been formed due to FAULTING which is" fracturing followed by relative displacement of rocks of earth crust". Lakes due to faulting include:

- **Rift valley lakes**

- This lake is formed as a result of secondary faulting of part of the Rift valley floor
- Continued convective currents due to heating by radioactivity and geo-chemical reactions result into secondary faulting of part of Rift valley floor followed by secondary sinking of part of Rift valley floor to form a secondary depression called graben.

- The lake formation is completed when the depression is filled with rain water or waterfrom inflowing streams and rivers.
- Examples include lakes Tanganyika, Albert, Edward, George, Turkana, Naivasha. Magadi, and Eyasi.

Illustration

➢ **Tilt block lakes**

- These are lakes formed in depressions separated by ridges in tilt block landscape formed due to tension and compressional forces that lead to several faults dividing the crust into several fault blocks.
- Formed when faulted landscape is subjected to uplift or sinking at different rates and this was followed by tilting in one direction resulting into formation of angular ridges and depressions
- Water from rain or rivers filled these depressions to form lakes.
- E.g. Lake Olbolsalt in Aberdare ranges in Kenya.

Illustration

Lakes due to down warping.

➢ **Down warped lakes**

- These are lakes that occupy down warped depressions formed as a result of warping.
- Before warping land in central Uganda was sloping to the west and rivers Katonga, Kagera, Rwizi and Kafu were flowing westwards.
- When the Rift valley was being formed the edges of the Rift valley were up warped while central part of East Africa experienced down warping that resulted into formation of Lake Victoria and Lake Kyoga basins.
- Rivers Katonga, Kagera and Kafu reversed their direction to flow eastwards filling the depressions to form Lake Victoria and Lake Kyoga.

Illustration

Lakes due to Volcanicity

➢ **Lava dammed lakes**

- These are lakes formed as a result of tectonic movements that result into volcanicity that lead to lava damming.
- These lakes were formed when in the interior of the earth there was heating by radioactivity and geo-chemical reactions leading to development of convective currents.
- Magma / lava rose by convective currents through fissures and reached the earth surface where it started flowing and blocked river valley leading to back ponding of water which flowed back filling the valley to form a lake.
- After filling the valley, the river overflowed and continued with its movement.
- In this way lake Bunyonyi, Mutanda, Mulehe in South western Uganda were formed.

Illustration

➢ Explosion Crater Lake

- This is a lake that occupies shallow circular depression formed during tectonism as a result of violent eruption
- This happened when there was heating by radioactivity and geo-chemical reactions that resulted into convective currents.
- Gases which were under pressure violently ejected blowing up rocks of earth crust.
- The rocks of earth crust broke into pyroclasts which fell back to form a raised rim.
- Crater Lake formation was completed when the depression was filled with water from rainfall and inflowing streams.
- Examples include lakes Katwe, Nyungu, Nyamunuka.

Illustration

➢ Mountain Crater Lake

- This is a lake that occupies a crater of extinct or dormant volcanoes.
- Formed as a result of tectonic movements when as a result of volcanicty the top ofvolcano is blown off.
- This leaves behind a crater that is filled with water to form mountain Crater Lake.
- Examples include one on Mt. Muhavura and one on top of Mt. Elgon

Illustration

➢ Caldera Lake

- This is a lake that occupies large circular depression formed as a result of volcanicityduring tectonic movements
- Caldera lake is formed in two ways: -
- **As a result of violent eruption** when due to heating by radioactivity and geo-chemical reactions, leading to development of convective currents, there is violent eruption that blows up the top of volcano leaving a large crater.
- The large crater is filled with water from rain and inflowing stream to form Caldera Lake.
- **A caldera lake is formed through subsidence**
- Happens when after numerous eruptions a chasm is created below the volcano
- With time the volcano collapses into the chasm leaving behind a large crater.
- The larger crater is filled with rain water or water from inflowing streams to form acaldera lake
- Examples include Lake Ngozi South East of Mbeya, Lake Ngorongoro in Tanzania andLake Longonot.

Illustration

8. **Examine the causes and effects of Equatorial climate in East Africa.**

- **Candidates should define climate as" average weather conditions of a place studied and recorded over long period of time usually 30 years and above."**
- ***Candidates should point out areas where this climate is experiences in East Africa i.e. Lake Victoria basin and some parts of the East African Coastal areas.***

Candidates should come out with characteristics of Equatorial climate.

- Heavy rainfall of 1000 -2000mm on average
- Rainfall is reliable, well distributed throughout the year with no clear marked dry season.
- Rainfall is in form of two maximas with peaks in March – April and October – November.
- Rainfall is mainly convectional and an afternoon phenomenon accompanied by lightning and thunderstorms.
- The temperatures are hot throughout the year ranging between $23^0C - 29^0C$. There is great uniformity of temperature throughout the year ranging between $25^0C - 28^0C$ on average.
- Hottest temperatures are 38^0C and the coolest are 15^0C depending on the location.
- The annual temperature range is small $1^0 - 4^0C$ on average. Also, the diurnal temperature range is small.
- Humidity is high around 80% due to high rates of evaporation and evapotranspiration.
- There is dense cloud cover due to high evaporation and condensation.
- It is dominated by air masses that converge to inter tropical convergence zone (ITCZ) due to persistent low pressure or doldrums.

Candidates should explain factors that are responsible for Equatorial climate:-

- **Latitude**

• Equatorial climate is received in areas which are between 5^0N and 5^0S of the Equator leading to hot temperatures throughout the year leading to high evaporation, high humidity and heavy rainfall.

- **Altitude**

• Equatorial climate is experienced in areas which are at low altitude of less than 1000 metres leading to hot temperatures throughout the year.

- **Water bodies**

• Water bodies like Lake Victoria, Lake Kyoga, Indian Ocean experience high evaporation, water vapour goes to atmosphere leading to high humidity, dense cloud cover, heavy rainfall in surrounding areas typical of Equatorial climate.

- **Vegetation**

• There is equatorial climate in East Africa because of forests like Mabira, Budongo, Itwara, Kalinzu and Imaramagambo. From these forests there is high evapotranspiration leading to high humidity, dense cloud cover and heavy rainfall.

➢ **Cloud cover**

- Presence of dense cloud cover along the equator has contributed to equatorial climate as it prevents heat from escaping to space leading to hot temperatures and small range typical of Equatorial climate.

➢ **Air masses**

- Air masses particularly South East trade winds have contributed to Equatorial climate. It picks a lot of vapour from Indian Ocean leading to heavy rainfall and high humidity on the coast typical of Equatorial climate. When it reaches Lake Victoria it is recharged leading to high humidity, dense cloud cover and heavy rainfall on Northern and North Eastern shores of Lake Victoria. The westerly winds from Congo forest also pick a lot of water vapour from the forest leading to high humidity, dense cloud cover and heavy rainfall typical of Equatorial climate.

➢ **ITCZ and apparent movement of overhead sun.**

- East Africa is astride the Equator and therefore experiences hot temperatures throughout the year particularly around March and September when the ITCZ is around the Equator leading to areas like Lake Victoria basin being zones of convergence of winds
- Because of movements of overhead sun places around Equator like Lake Victoria basin have rainfall throughout the year, have dense cloud cover, double maxima of rainfall March – April and September – October, typical of Equatorial climate.

Effects of equatorial climate in East Africa include;

- ➢ Lead to growth of forests that promote forestry and lumbering
- ➢ Lead to presence of many water bodies like lakes, rivers and swamps that promote fishing.
- ➢ Heavy rainfall and hot temperature promote the growing of plantation crops
- ➢ Lead to presence of swamps leading to handicraft industry
- ➢ Lead to presence of forests, swamps and rivers that promote wildlife conservation and tourism
- ➢ Lead to heavy rainfall accompanied by hailstorms and floods which cause destruction of crops leading to food shortage and famine.
- ➢ Heavy rainfall lead to presence of forests and swamps which encourage pests and disease like tsetse flies and mosquitoes and wild animals like lions, leopards and elephants which are threat to man and his property.
- ➢ Heavy rainfall and hot temperatures encourage leaching and formation of lateritic soil not suitable for cultivation of crops
- ➢ Heavy rainfall encourages soil erosion where there are hills which leaves the soil infertile not suitable for Agriculture.
- ➢ Heavy rainfall lead to floods that displace people.

10. (a) Account for the growth of Savanna woodland in East Africa.

Candidates should locate Savanna woodland / Miombo type of vegetation, describe characteristics of Miombo woodland, Account for its occurrence in East Africa

- **Savanna woodland is a type of vegetation** found in East Africa between tropical rainforest and savanna grassland. It is found in western and southern Tanzania, isolated areas ofNorthern Uganda like Otzi and Kei and some parts of western Rift valley.

Miombo woodland has the following characteristics:

- More or less continuous cover of trees due to moderate rainfall
- Trees are of medium height of 8 – 20m
- Trees are deciduous shedding leaves during dry season.
- Trees have thick barks and swollen trunks meant to store water
- Trees are umbrella shaped
- Trees have small leaves meant to reduce on evapotranspiration.
- There is dense cover of grass, bushes and shrubs
- Grass, bushes and trees are drought and fire resistant
- Trees have long/tap roots that search for water from deep underground
- The common tree species in savanna woodland are acacia and baobab.

Savanna woodland type of vegetation grows in East Africa because of thefollowing reasons:

- **Climate**
  - Moderate rainfall of 750 – 1000mm,
  - hot temperatures of $24^0C - 29^0C$
  - moderate humidity of 50% - 60%

- **Altitude**
  - Savanna woodland vegetation is found at low altitude of less than 1500metres above sea level. At this altitude temperatures are hot, rainfall and humidity are moderate suitable for growth of savanna woodland with continuous cover of trees.

- **Relief**
  - Found in lowland areas and gentle slopes of western and southern Tanzania where it is known as Miombo woodland, isolated of Northern Uganda like Otze, Kei and someparts of western rift valley around lakes Edward and George.

- **Soils**
  - Found in areas with fairly fertile soils like western and southern Tanzania, isolated ofNorthern Uganda and some areas around Lake George and Lake Edward.

- **Drainage**
  - Found in well drained areas of western and southern Tanzania, isolated of NorthernUganda allowing growth of continuous cover of trees of moderate height.

Biotic factors:-

- Miombo woodland exists in different areas because of government policy of conservation as national parks and forest reserves e.g. some parts of Queen Elizabeth National Park.
- Pests and diseases have attacked tropical rainforests in East Africa turning them into woodlands
- Destruction by wild animals like elephants and giraffes has turned forests into woodland like in Queen Elizabeth national park
- Activities of man like cutting tree for timber, firewood, poles has turned forests into woodlands
- Presence of tsetse flies has scared people away from some areas allowing growth of woodlands like in Western and Southern Tanzania.

(b) The importance of Savanna woodland type of vegetation in East Africa.

- Source of wood fuel in form of charcoal and firewood for domestic and industrial use.
- A source of building materials like building poles
- Source of timber for furniture making etc.
- Food gathering for fruit, nut etc. improving people health.
- Research and education giving knowledge to people
- Filming and photography advertising different areas
- Provide materials for the crafts i.e. wood curving
- Source of medicinal plants that cure diseases
- Wildlife conservation maintaining bio diversity
- Tourism earning foreign exchange used in international trade and development ofinfrastructure
- Reducing soil erosion thus maintain soil fertility, *Etc.*

Negative:

- Pests and diseases like tsetse flies that transmit Nagana to livestock and sleepingsickness to man leading to loss of life (livestock and man)
- Harbour wild animals which attack man leading to loss of life and destruction ofproperty
- Hideouts of criminal activity / rebel activity e.g. the forest of Northern Uganda
- Increased inaccessibility as construction of roads through woodlands is difficult.

11. To what extent has climate influenced the distribution of Natural forests in East Africa?

- ***Candidate should define natural forest as*** "tree cover that covers a wide area and grow as a result of natural factors like climate, soils and drainage". Such natural forests include tropical rain forests, mangrove forests in lowlands and broad river valleys, temperate forests and bamboo forests on upper slopes of high mountains like: Kirimanjaro and Elgon.

- Areas where there is growth of natural forests include Mabira, Budongo, Bugoma, Imaramagambo, Kalinzu, Itwara with tropical rain forest; East African coast and along rivers Rufigi and Ruvuma with mangrove forests and montane forests (temperate and bamboo forests) on high mountains like Kilimanjaro, Kenya, Rwenzori, Elgon and Muhavura.

Candidates should bring out characteristics of different types of forests.

➢ **Tropical rain forests**

- Tall trees which reach the height of 50 metres.
- Dense canopies which are in three layers of 30 – 50m, 15 – 30m and 8 - 15m becauseof growth at intervals.
- There is little or no undergrowth because of thick canopy.
- There are climbing plants like lianas which climb in search of sunlight and epiphyteswhich are plants that grow on other trees for nutrients.
- Trees have broad leaves for transpiration to get rid of excess water due to heavyrainfall.
- Trees are evergreen because of heavy rainfall and rainfall throughout the year.
- Trees are mainly hardwoods like mahogany, ebony, iron wood, Mvule. Rosewoodbecause they take a longtime to mature.
- Trees have buttress roots to support huge and tall trees
- Trees have big and straight trunks
- Trees do not grow in pure stands. They are in mixed stands.

➢ **Mangrove forests.**

- They are located along East African coast and along river valleys like Rufiji andRuvuma
- They are characterized by growth of dense cover of trees which are in pure stands
- Trees are evergreen because of heavy rainfall and too much water because of poordrainage.
- Trees have broad leaves for transpiration to get rid of excess water.
- Trees have short stumps and trunks
- Trees have aerial roots to support stout trunks
- Trees are hardwood trees that take long to mature.
- Trees are of medium height of 8 – 20 metres
- They have grey leathery foliage that appear to float on the water
- Mangrove forests grow as a belt of various species that grow parallel to the shore.

➢ **Montane forests**

(i) Temperate forests

- Found on high mountains like Kilimanjaro, Rwenzori and Elgon at the height of 2500 - 3000 metres
- There is growth of trees of medium height of 10 -- 20 metres because of moderate toheavy rainfall.

- Trees are in pure stands because very few species can grow under cool conditions ofupper slopes.
- There are few tree species like podocarp, camphor and cedar
- Trees are evergreen because rainfall is fairly distributed throughout the year and cooltemperatures.
- Trees have small leaves
- Trees are cone shaped
- Trees have wax to protect them from cold temperatures
- There are soft wood tree species which take a short time to mature.

(ii) Bamboo forest

- Found at the height of 3000 – 3500 metres on high mountains like Kilimanjaro,Rwenzori, Elgon and Muhavura
- They are found in single layers of trees
- Bamboo trees are of medium height of 6 – 12 metres and are 3 -7 centimetres thick
- Trees are reed like in appearance
- Trees have hollow stems and are segmented
- Trees have hard stems
- Bamboo trees have tough pointed leaves to reduce on transpiration
- Trees are evergreen because of moderate rainfall, well distributed and cool temperatures
- Bamboo trees have prop roots
- Bamboo trees have leaves that have wax to protect them from cool temperatures
- Bamboo trees are quick maturing taking 8 – 20 yeas
- Bamboo trees flower at 7 – 15 years simultaneously.

Role of climate in growth of natural forest

- **Tropical rain forest and mangrove forest** grow where there is heavy rainfall of 1000 – 2250mm, rainfall well distributed throughout the year, high humidity of around 80% and hot temperatures of $24^0C - 30^0C$ and abundant sunshine.
- **Temperate forest** grows where there is moderate rainfall of 800 – 1200 mm, rainfall is throughout the year, relatively cool temperatures of $15^0C - 21^0C$ and moderate humidity of 50% - 60%.
- **Bamboo forest** grows where there is moderate rainfall of 600 -800mm, cool temperatures of $8^0C - 14^0C$ and humidity of around 40%

Other factors:

- **Relief**
  - Mangrove forest grows in coastal lowlands and broad river valleys like those of Rufiji and Ruvuma

- Tropical rainforest grows on gentle slopes and well drained lowlands
- Temperate and bamboo forest grow on steep slopes of high mountains like Kilimanjaro, Elgon and Rwenzori

➢ **Altitude**
- Mangrove forest grows at an altitude of 0 – 500 metres a.s.L where there is heavy rainfall, hot temperatures and high humidity
- Tropical rain forest grows at an altitude of 1500 – 2500 metres above sea level where there is heavy rainfall, high humidity and hot temperatures
- Temperate forests grows at an altitude of 2500 – 3000 metres with moderate rainfall, moderate humidity and relatively cool temperatures suitable for growing of treespecies like podocarp, cedar and camphor.
- Bamboo forest grows at an altitude of 3000 – 3500 metres above sea level with moderate rainfall and cool temperatures.

➢ **Soils**
- Tropical rainforests grow in areas with fertile soils like Lake Victoria basin and on gentle slopes of volcanic mountains like Kilimanjaro, Elgon, Muhavura where there are fertile volcanic soils
- Mangrove forests grows where there is clay, alluvial, peat and saline soils like thoseof coastal areas.
- Temperate forests grow where there are shallow soils on steep slopes of high mountains
- Bamboo forest grows where there are thin, skeletal and infertile soils

➢ **Drainage**
- Mangrove forest grows in areas with poor drainage like coastal lowlands and broad river valleys
- Tropical rainforests, temperate forests and bamboo forest grow in well drained areas.

➢ **Biotic factors**
- Tropical rain forests, temperate forests and bamboo forests grow because of government policy ofconservation as national parks, game reserves like Bwindi national park, Mugahinga national park and Mt Elgon national park, forest reserves like Mt Elgon forest reserve, Echuya forest reserve
- Mangrove forests on East African coast have grown due to conservation as wetlands

➢ **Other factors:-**
- Presence of coral reefs that protect alluvial soils from wave erosion and presence of low tidal range of water that creates marshy saline conditions has led to growth of mangrove forest.

NB. In such question an evaluation is required.

12. Describe the processes responsible for formation of soil types in East Africa.

Candidates should define soil as "thin loose surface layer on top of the earth crust composed of mineral rock particles, water and air that assist in germination of seeds, decomposing organic matter or humus and microorganisms such as bacteria, worms, fungi and protozoa."

Candidates should bring out different soil types in East Africa.

➢ **Zonal soils**

- These are mature soils with well-developed soil profiles.
- They are soils resulting from mainly climatic factors working hand in hand with vegetation types
- They are well drained soils formed where there is good drainage
- They develop on gentle slopes and lowlands with good drainage.
- They are of two categories: pedalfers rich in iron and aluminium with low calcium carbonate content and Pedocals that develop under conditions of low rainfall and have high calcium carbonate content.

Examples of zonal soils in East,Africa include:

- Latosols or laterites formed in hot and wet areas
- Black earth soils formed in areas with seasonal rainfall but where leaching is limited
- Chestnut soils or brown soils in Semi-arid areas
- Sierozems in desert areas with limited organic matter

➢ **Azonal soils**

- Are young skeletal soils with immature soil profile.
- Being young soils, they show characteristics of the original parent rock material
- They are derived from unconsolidated material like alluvium, sand and volcanic ash.
- They are of two categories namely lithosols and regosols
- **Azonal soils have numerous examples:**
- Scree soils on mountain slopes
- Mudflat soils or marine clays
- Glacial soils like till, moraine and outwash sandy soils
- Wind blown soils such as loess and sand dunes
- Volcanic soils such as ash and cinder, lava and pumice.

➢ **Intrazonal soils**

- They develop where special local conditions like parent rock material or relief /drainage exert strong influence on the soil
- They may depend on a specific rock material and the presence of large amounts ofsalt or the presence of much water i.e. poor drainage in lowlands and

valleys **Examples of intra zonal soils include:**

- Saline soils in hot and dry areas e.g. Solonchaks and solonetz
- Hydromorphic soils in poorly drained areas e.g. peat soils
- Meadow soils like clay, mud due to flooding
- Calcerous (calicmorphic) soils formed in limestone areas like Rendzina and Terrarosa.

Candidates should describe the process for formation of soil types as:

➢ **Weathering**

- Disintegration or decomposition of rock into soil particles at or near earth surface
- It mainly depends on nature of rock and climate
- Physical weathering in hot and dry areas like Northern Kenya on rocks like sandstone and quartzite give rise to sandy soils while physical weathering on volcanic areas under humid conditions give rise to fertile volcanic soils
- Deep chemical weathering and leaching give rise to clay soils

➢ **Leaching**

- Is a process by which mineral constituents are taken from A to B horizon of soil profile in solution form.
- The minerals taken are soluble ones like salts and carbonates and some of removed constituents include clays, sesquioxides of iron and Aluminium and humic acids.
- Occurs under hot and wet conditions where the rock compounds having silica, iron and Aluminum.
- There is leaching of silica while iron and Aluminium accumulates in top layers of soilprofile leading to formation of laterites.
- Common in humid areas like Lake Victoria basin.

➢ **Eluviation**

- This involves the movement of soil materials in solution and suspension, verticallyand laterally in soil profile.
- The movement is from A to B horizon of the soil profile.
- Common in hot and wet areas like Lake Victoria basin and East Africa coast due toheavy rainfall.
- Results into formation of deep, mature zonal soils.

➢ **Illuviation**

- Involves the deposition and accumulation of eluviated or leached substances in B horizon of the soil profile
- There is deposition of clay in B horizon and other materials like organic matter and soluble minerals.

➢ Occurs under hot and wet conditions

➢ It leads to formation of zonal soils like clay loam soils

➢ These can be seen in humid areas like Lake Victoria basin.

Humification

- This is a process by which organic matter is decomposed and converted into humus
- Decomposition is done by living organisms like bacteria, fungi and worms under hot and wet conditions
- The decomposition is done in A horizon where there is organic matter
- It leads to formation of dark loam soils
- This especially happens in areas with dense vegetation like Mabira, Budongo, Bugoma, Kalinzu, Kibaale.

➢ **Mineralization**

- This is the process by which decomposition of organic matter goes further thanhumification
- It takes place in A horizon of the soil profile where there is organic matter or humus
- The organic residues or humus breaks into mineral substances like water, silica,calcium compounds.
- Leads to formation of fertile loam soils
- Occurs in hot and wet areas like Lake Victoria basin.

➢ **Calcification**

- Occurs in low rainfall areas where precipitation either balances or is slightly higherthan evaporation
- Involves movement of water upwards by capillary action with dissolved calcium
- When the solution reaches the surface, water evaporates leaving behind calcium in Ahorizon of soil profile
- This leads to accumulation of calcium leading to formation of soils rich in calcium known as pedocals.

➢ **Salinization**

- **Occurs in hot and dry areas when water moves upwards with dissolved salts to the Ahorizon of the soil profile.**
- When it reaches the surface the water evaporates leaving behind salts
- This leads to formation of saline soils like solonetz and solonchaks
- Saline soils can be seen in Lake Katwe area and Northern Kenya

➢ **Laterization**

- This is a process that occurs in hot and wet areas like Lake Victoria basin where thereis heavy rainfall and hot temperatures
- It involves leaching of silica from A horizon of the soil profile as a result of heavy rainfall.
- As a result of hot temperatures iron and Aluminium are deposited in top layers of thesoil profile where they harden to form a duricrust
- This leads to formation of laterites on hills of Buganda

➢ **Gleization**

- Occurs under conditions of poor drainage
- Under conditions of poor drainage living organisms like bacteria find it difficult tofully decompose dead plants and animals
- The partial decomposition lead to formation of intrazonal soils like peat soils
- These soils can be seen in swampy lowlands and broad valleys around Lake Kyoga,Lake Victoria, Lake Mutanda and in valleys of Kigezi.

13. To what extent has the parent rock influenced the formation of soil types in East Africa?

Candidates should define soil, identify soil types in East Africa, explain the role of parent rock in formation of soil types, explain the role of other factors, give an evaluation

➢ **Soil is a thin surface layer on top** of earth crust composed of mineral rock particles, waterand air that assist in germination of seeds, decomposing organic matter or humus and micro-living organisms such as bacteria, worms, fungi and protozoa.

In East Africa there are numerous soil types that include:

➢ Zonal soils

- They are mature soils with well-developed soils profiles
- They are soils resulting from mainly climatic factors working hand in hand with vegetation types.
- They are well drained soils formed under conditions of good drainage.
- They develop on gentle slopes and lowlands with good drainage
- They are of two categories: Pedalfers rich in iron and Aluminium with low calcium carbonate content and Pedocals that develop under conditions of low rainfall and have high calcium carbonate content.

Types of zonal soils in East Africa include: -

- Latosols or laterites formed in hot and wet areas
- Black earth soils formed in areas with seasonal rainfall but where leaching is limited.
- Chestnut or brown soils in semi-arid areas
- Sierozems in desert areas with limited organic matter.

➢ **Azonal soils**

- Are young skeletal soils without a clear soil profile
- Being young soils they show characteristics of the original parent rock material
- They are derived from unconsolidated materials like alluvium, sand and volcanic ash.
- They are of two categories namely Lisothols and regosols.

Azonal soils have the following types:-

- Scree soils on mountain slopes
- Mudflat soils or marine clays
- Glacial soils like till, moraine and outwash sandy soils
- Windblown soils such as loess and sand dunes
- Volcanic soils such as ash, lava and pumice

➢ **Intrazonal soils**

- Formed where the local factors like parent rock and relief or drainage are dominant
- Governed by the parent rock material and presence of large quantities of salts leading to saline soils.
- May be governed by drainage where poor drainage in lowlands lead to peat soils

Types of intrazonal soils include:

- Saline soils in hot and dry areas e.g. solonchaks and solonetz
- Hydromorphic soils such as peat soils due to poor drainage
- Meadow soils in river valley and lowlands due to flooding
- Calcerous (calimorphic) soils formed from limestone parent rock material e.g. Rendzina and Terra rosa.

Role of parent rock

➢ **Hardness of the rock**

- Hard crystalline rocks resist weathering leading to production of thin skeletalazonal soils on mountain slopes.
- Soft parent rocks are easily weathered to produce deep mature zonal soils.

➢ **Jointing of the rock**

- Jointed rocks are easily subjected to physical weathering breaking the rock into soil particles leading to deep mature zonal soils. Also, the joints allow water to percolate leading to leaching, eluviation and illuviation leading to deep mature zonal soils.
- Rocks which are not jointed experience limited physical weathering and limited percolation of water leading to limited leaching, eluviation, and illuviation thus leading to formation of shallow immature azonal soils.

➢ **Colour of the rock**

- Dark coloured rocks like basalt and pumice absorb a lot of heat leading to physical weathering and breaking into soil particles leading to deep mature zonal soils.
- Light colored rocks like sandstone absorb limited heat and reflect more heat leading to limited physical weathering and limited breaking into soil particles leading to shallow immature azonal soils like sandy soils.

➢ **Permeability of rock**

- Permeable rocks like limestone allow water to percolate leading to leaching, eluviation and illuviation resulting into deep, mature zonal soils.
- Impermeable rocks do not allow water to percolate leading to limited leaching, eluviation and illuviation resulting into shallow immature azonal soils.

➢ **Mineral composition**

- Quartzite rocks and granites with high silica content tend to resist physical weathering leading to limited breaking into soil particles that result into shallow immature azonal soils.
- Limestone rocks when subjected to soil formation processes give rise to soils rich in lime like Rendzina and Terra rossa.
- Rocks rich in iron and aluminum are affected by leaching under hot and wetconditions leading to formation of laterites.
- Basic igneous and previously weathered sedimentary rocks are difficult to weather leading to formation of shallow azonal soils.

Other factors:

➢ **Climate**

- Under hot and wet Equatorial climate the heavy rainfall encourages leaching, eluviation and illuviation leading to deep, mature zonal soils. The heavy rainfall leads to leaching of silica and hot temperatures lead to accumulation of iron and Aluminium leading to formation of laterites.
- Under tropical (Savanna climate there is alternate wet and dry season. The heavy rainfall during the wet season lead to leaching, eluviation and illuviation and during dry season there is physical weathering as a result of hot temperatures. This leads to fairly deep, mature zonal soils like black earth soils.
- In arid and semi-arid areas the hot temperatures lead to physical weathering while leaching, eluviation and illuviation are limited due to low rainfall leading to shallow, immature azonal soils.

➢ **Relief**

- Steep slopes are susceptible to erosion and transportation of eroded material which results into thin, skeletal azonal soils. Although soil formation occurs due to constant exposure of fresh rock, the erosion lead to thin skeletal a zonal soils.
- On gentle slopes there is slow rate of erosion but instead deposition is encouraged leading to deep mature well developed soils like clay, loam soils.
- In valleys and lowlands of East Africa there is extensive deposition and where there isgood drainage there is leaching, eluviation and illuviation leading to deep mature and well developed zonal soils.
- However, in broad valleys and lowlands with poor drainage there is partial decomposition of organic matter leading to grey soils or peat soils.

➢ **Plants:** When plants/vegetation die and rot, there is humification that add

humus to the soil leading to formation of loam soil rich in humus. Also, as the trees grow they break the rock into soil particles leading to deep mature zonal soils.

- **Human activities:** Through mining and quarrying, ploughing and digging manbreaks the rock into soil particles. Through application of fertilizers and manure, irrigation farming, man encourage chemical weathering, leaching, eluviation andilluviation which leads to deep, mature zonal soils.
- **Other living organisms:** Rodents, termites, moles and rabbits and worms help in loosening the rock breaking it into soil particles. These animals and insects create passage taken advantage of by rain water causing deep chemical weathering, leaching, eluviation and illuviation leading to deep mature well developed zonal soils.
- **Time**

• The longer the time of interaction of soil formation processes, the more developed and mature are soils. A rock exposed for short time forms shallow immature azonal soils and that exposed over a long time forms deep, mature zonal soils.

14.a) Account for extensive soil erosion in highland areas of East Africa.

Candidates are expected to define soil erosion as; "the removal/washing away of the top thin layer of soil by agents like wind, running water, glaciers and transported and deposited in some other place"

Candidates should identify highland areas where soil erosion is serious problem like Kenya highlands, Kigezi highlands (Kabale,. Rubanda, Kisoro, Kanungu, Rukungiri) Mt Elgon, slopes of Mt Rwenzori (Bundibugyo and kasese) slopes of Mt Kilimanjaro, Usambaramountains, and southern Tanzania highlands.

Candidates are expected to bring out types/processes of soil erosion which include:

- **Soil splash erosion**

• Caused by the impact of rain drops on the soil
• Rain drops dislodge soil particles and scatter them in different directions.
• Occurs on any surface which is bare whether steep, gentle or lowland.

- **Sheet erosion**

• Involves uniform removal of a thin surface layer of top soil
• Occurs on gentle slope.

- It involves slow movement and occurs over wide area.

➢ **Rill erosion**

- Is uneven removal of surface soil by running water in form of small channels knownas rills.
- Occurs when the rate of precipitation is more than infiltration.
- Occurs on both steep and gentle slopes.

➢ **Gully erosion**

➢ This is a form of soil erosion in form of deep wide channels created by running water.

➢ It is common on steep slopes

➢ Occurs where there is heavy rainfall.

➢ **Deflation**

- This is erosion by wind which involves the removal of soil material from one part ofthe earth surface to another.
- It is common in semi-arid areas.
- Occurs when soil particles are removed by wind through traction, saltation and suspension.

Candidates should explain causes of soil erosion in highland areas of East Africa.

➢ **Climate**

- Heavy short torrential rainfall results into run off and loss of soil leading to gullyerosion e.g. Mt Elgon area
- Prolonged but gentle rainfall leads to rill erosion
- Strong winds especially in very low rainfall areas lead to wind erosion e.g. leeward side of mountains like Moroto.

Relief

- Steep slopes of highland areas like Kapchorwa, Bundibugyo encourage gully erosion
- Gentle slopes encourage sheet erosion

➢ **Limited vegetation cover**

- Areas with limited vegetation cover like in Karamoja, on mount Moroto lead to wind erosion especially during the dryseason.

➢ **Nature of soil**

- Porous and unconsolidated soils offer less resistance to forces of wind and running water like where there are volcanic soils in Bududa on Mt Elgon, Chaggaland on Mt Kilimanjaro leading to sheet erosion.

➢ **Biotic factors:-**

- Harvester ants common in pastoral and semi-arid areas eat all the grass leaving landbare. This leads to wind erosion and runoff water easily carrying away the soils leading tosoil erosion.

- In similar way locusts like in Karamoja also destroy the vegetation encouraging wind erosion e.g. on mount Moroto.

➢ **Deforestation** Which is the clearing of forests by man reduces the protective cover of the soil and encourage run off which lead to soil splash, sheet, rill and gully erosion e.g. in Kigezi highland.

➢ **Overgrazing /overstocking:** the rearing of large herds of animals and lack of controlled grazing particularly in areas occupied by nomadic pastoralists like Karamojong, Turkana and cultivators distort the soil binding factors thus exposing soil to agents of erosion like wind and running water resulting into wind, sheet and rill erosion.

➢ **Monoculture:** which is the persistent growing of one crop in an area lead to soil exhaustion, soil becomes loose and is easily carried away in form of sheet erosion. Occurs where plantation farming is carried out like tea growing in highlands of Kigezi.

➢ **Up and down ploughing** without using proper methods of cultivation along steep slopes encourages run off leading to gully erosion on steep slopes like in Kapchorwa.

➢ **Over cropping** which involves continuous cultivation of crops on the same piece of land for a long time without putting it to rest leads to soil exhaustion, the soil becomes loose and is easily eroded by soil splash, sheet, rill and gully erosion. This happens in Kigezi highlands.

➢ **Mining/quarrying** lead to destruction of vegetation cover leading to soil splash, rilland gully erosion like at Kilembe copper mines in Rwenzori highlands.

➢ **Construction** of roads and settlements encourage soil erosion because of destruction of vegetation cover leading soil splash erosion. The drainage channels put in place during road construction encourage gully erosion like in Bundibugyo and Kapchorwa.

➢ **Planting non-cover crops** leads to direct impact of rain drops on soil encouraging soil splash erosion.

(b) Explain the measures being taken to control soil erosion in highland areas of East Africa.

➢ **Terracing** that involves building embankments across the slope cutting flat or nearly flat surfaces along steep slopes reduces runoff and speed of running water thus reducing sheet erosion like Kigezi highlands and Kenya highlands.

➢ **Contour ploughing** where crops are planted in farrows that follow contours check runoff and sheet erosion like in Kigezi highlands

➢ **Strip farming** involving cultivation in alternation along the slope so that if one strip is made bare the other strip is under grass or growing crop. Grass or growing crop encourage water infiltration thus reducing sheet, rill and gully erosion, like in Kigezi highlands and slopes of Mt Elgon

➢ **Ridging** where cultivation is in form of mounds reduces runoff and sheet erosion as soil is trapped between mounds. This is done in Kigezi highlands.

- **Mulching** which is covering the soil with some material like banana leaves, banana fibers, maize stalks, saw dust, coffee husks etc. prevent soil splash erosion and encourage infiltration thus reducing sheet erosion like in Kigezi highlands
- **Crop rotation** where there is cultivation of crops in alternation on the same plot of land maintain soil fertility crops that grown are strong and effectively cover the soil thus reducing soil plash, sheet, rill and gulley erosion.
- **Planting cover crops** like pumpkins etc. reduce direct impact of rain drops on soil thus reducing soil splash erosion
- **Application of fertilizers** leads to growth of crops which are strong and roots bind soil particles together while branches effectively cover the soil reducing soil splash, sheet and rill erosion.
- **Controlled grazing** through the use of paddocks allows grass to regenerate thus reducing bare patches and wind erosion
- **Afforestation** which is planting trees where they formerly never existed while **reforestation** which is planting of trees where they existed and were cut allow rootsto bind soil particles together thus reducing sheet erosion while branches reduce directimpact of rain drops thus reducing soil splash erosion e.g. Muko, Mafuga .
- **Planting shelter belts** reduces speed of wind thus reducing wind erosion.
- **Use of gabions** which are structures constructed using wire mesh then filled with stones constructed across gullys or on steep slopes where roads have been constructed reduces gulley erosion like in Kigezi highlands Kapchorwa and Bundibugyo.
- **Filling rills and gullys** with stones and soil reduces rill and gully erosion
- **Mass education** through seminars, TVs and radio programmes, Newspapers and magazines reduces all types of soil erosion.

PAPER 250/2

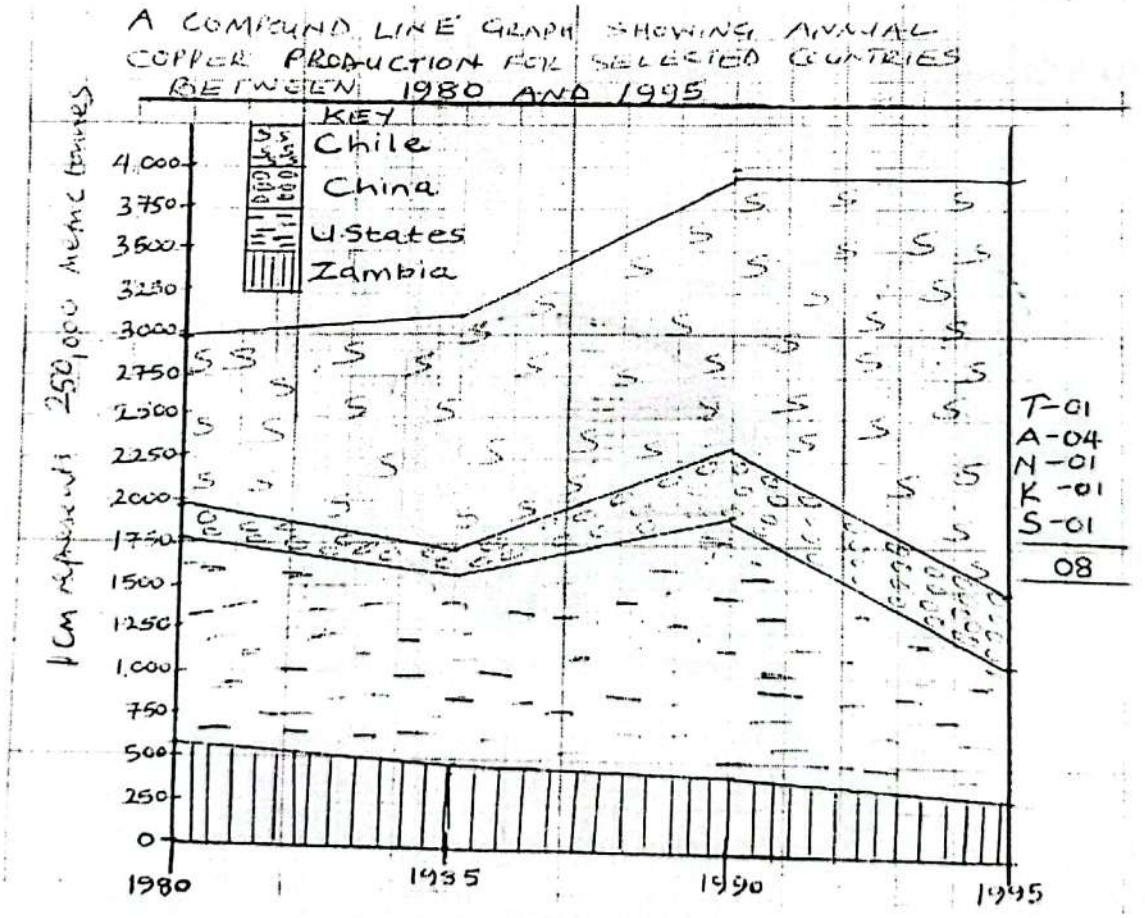
1. Study the table below showing annual Copper production for selected countries between 1980 and 1995 (000's metric tonnes) and answer the questions that follow.

Country	1980	1985	1990	1995
Chile	1,063	1,360	1,628	2,488
China	115	185	375	370
United states	1,181	1,105	1,498	729
Zambia	596	453	445	329
TOTAL	2,955	3,103	3,946	3,916

Option 1:

CUMULATIVE TABLE

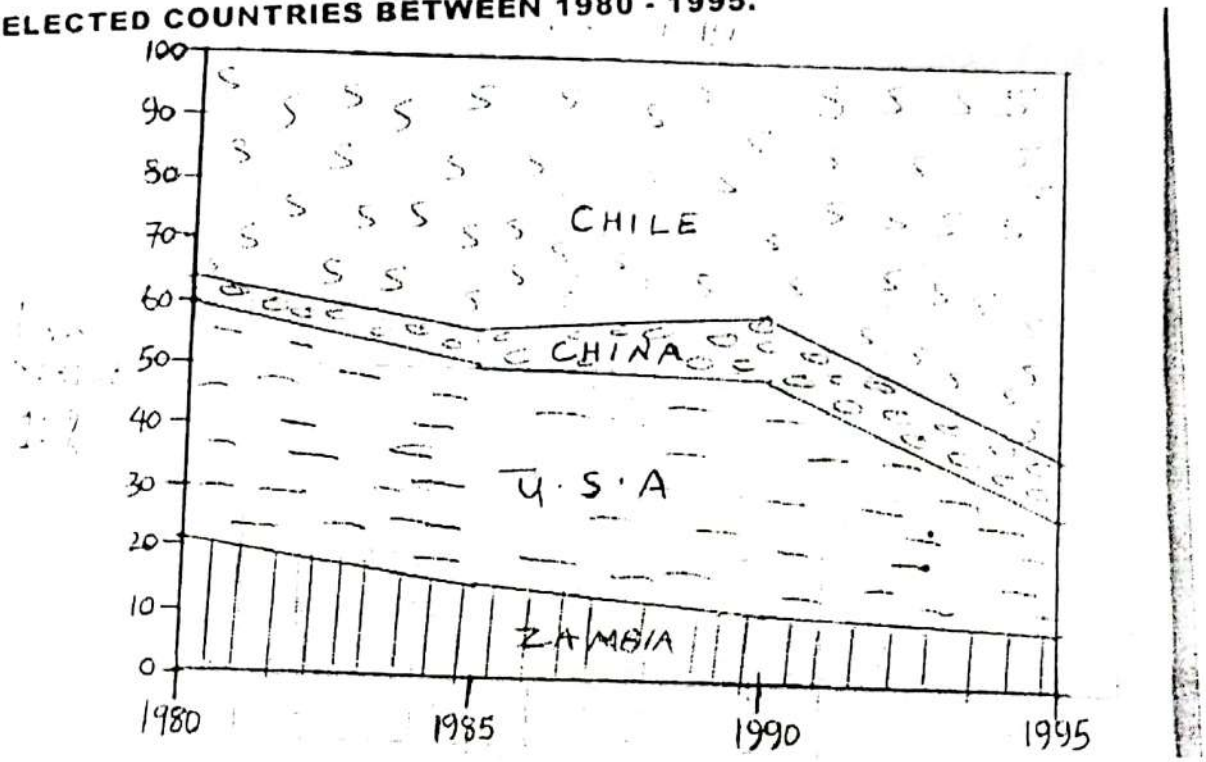
COUNTRY	1980	1985	1990	1995
CHILE	2,955	3,103	3,946	3,916
CHINA	1,892	1,743	2,318	1,428
UNITED STATES	1,777	1,558	1,943	1,058
ZAMBIA	596	453	445	329



Option 2:

One may convert values in percentages.

A COMPOUND LINE GRAPH SHOWING ANNUAL COPPER PRODUCTION FOR SELECTED COUNTRIES BETWEEN 1980 - 1995.



(b) State the merits and demerits of the method.

Merits include:

- ✓ Easy to draw.
- ✓ Used for comparison purpose.
- ✓ Has a good visual impression.
- ✓ Easy to interprete.
- ✓ Shows variety of information.

Demerits:

- ✓ Takes time to draw.
- ✓ Takes space.
- ✓ Involves calculations i.e. cumulative additions.
- ✓ Finding the scale is difficult.
- ✓ Can appear congested with many components.

(c) **(i) The country with the least amount of Copper produced in 1995.**

- ✓ Zambia.

(ii) The declining trend in Copper production is as a result of;

- ✓ Exhaustion of some deposits.
- ✓ Price fluctuation
- ✓ Limited market / competition with other countries.
- ✓ Poor technology
- ✓ High cost of mining.
- ✓ Low grade of Copper.
- ✓ Instability.
- ✓ Poor government policy.
- ✓ Small quantities of Copper deposits.
- ✓ Transport problems, e.t.c.

(d) Explain the importance of the Copper mining industry in any one country given in the table.

Select one country and give positive and negative of Copper mining.

Positive:

- ✓ Employment opportunities.
- ✓ Promoting tourism.
- ✓ Promotes education and research.
- ✓ Source of local revenue.
- ✓ Skills.
- ✓ Urban development.
- ✓ Foreign exchange is obtained.
- ✓ Promotes international relations.
- ✓ Development of transport, e.t.c.

✓ Negative:

- ✓ Pollution.
- ✓ Urban related problems.
- ✓ Exhaustion of minerals.
- ✓ Loss of agricultural land.
- ✓ Loss of settlements.
- ✓ Loss of vegetation.
- ✓ Accidents, e.t.c.

2. Study the table below showing population in selected provinces of China (in millions) and their gender status in percentage.

Province	Population (in millions)	Percentage by gender 1990	
XIJIANG	12.5	48.1	51.9
TIBET	3.9	47.3	52.7
JILIN	20.6	49.0	51.0
SICHUAN	80.2	52.3	47.7
TOTAL	2,955	3,103	3,946

(a) Area of the proportional circles, using square root to find radius.

Xjiang = $\sqrt{12.5}$ = 3.5 Tibet = $\sqrt{3.9}$ = 2.0

Jilin = $\sqrt{20.6}$ = 4.5 Sichuan = $\sqrt{80.2}$ = 9

Scale: 1cm represents 2 units.

Xjiang = $\frac{3.5}{2}$ = 1.8cm (Radius)

Tibet = $\frac{2.0}{2}$ = 1.0cm

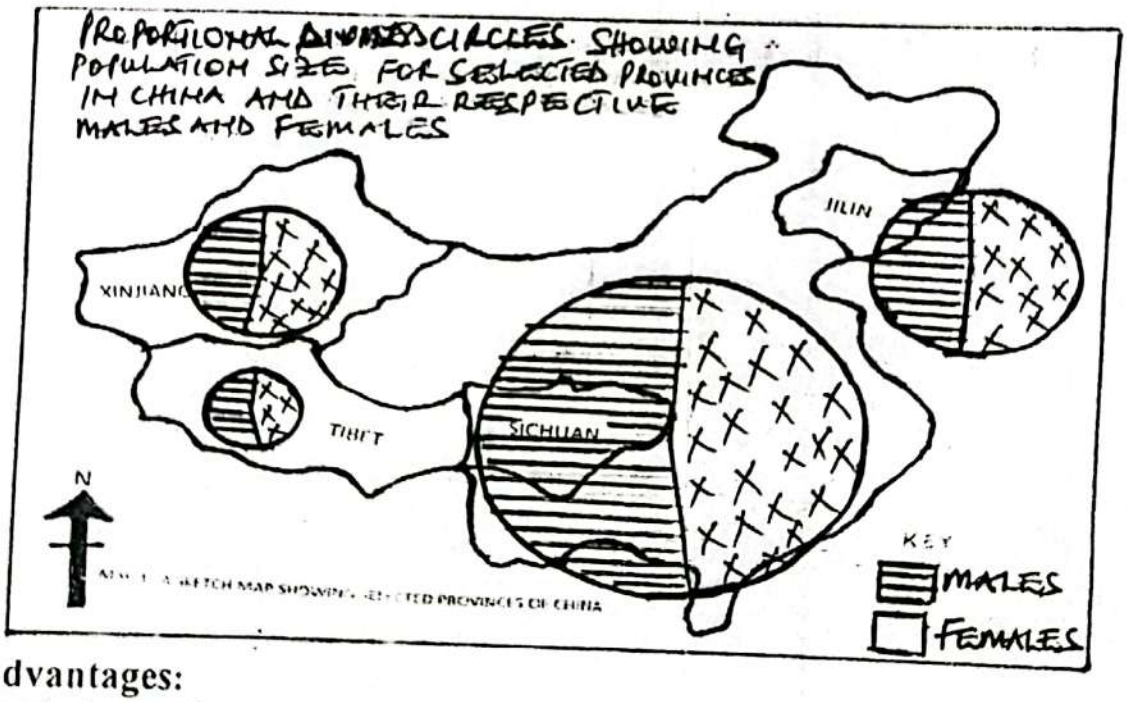
Jilin = $\frac{4.5}{2}$ = 2.3cm

Sichuan = $\frac{9}{2}$ = 4.5cm

NB: You can use the πr too as an option to square root.

Divisions in the circles by gender.

	Males	Females
Xjiang =	$\frac{48.1}{100} \times 360 = 173.2^o$	$\frac{51.9}{100} \times 360 = 186.8^o$
Tibet =	$\frac{47.3}{100} \times 360 = 170.3^o$	$\frac{52.7}{100} \times 360 = 189.7^o$
Jilin =	$\frac{49.0}{100} \times 360 = 176.4^o$	$\frac{51.0}{100} \times 360 = 183.6^o$
Sichuan =	$\frac{52.3}{100} \times 360 = 188.3^o$	$\frac{47.7}{100} \times 360 = 171.7^o$



Advantages:

- ✓ Can be imposed on maps.
- ✓ Easy to draw.
- ✓ Has a good visual impression.
- ✓ Shows variety of information.
- ✓ Easy to interprete.
- ✓ Used for comparison purposes.

Disadvantages:

- ✓ Takes space.
- ✓ Can appear congested.
- ✓ Takes time to draw.
- ✓ Involves lengthy calculations.
- ✓ Doesn't show absolute values.
- ✓ Finding the scale can be difficult.

(c) The causes of rapid population increase in China include;

- ✓ Favourable government policy.
- ✓ High fertility rate.
- ✓ Political instability.
- ✓ Influence of culture.
- ✓ Early marriages.
- ✓ Influence of religions.
- ✓ Increased health care.
- ✓ Foreign migrants, e.t.c.

3. (a) Distinguish between Overpopulation and Under population.

Overpopulation refers to a situation of having very many people compared to resources and technology available to maintain an adequate standard of living.

Resources include; energy, food, minerals, land, e.t.c. over populated countries tend to suffer from natural disasters e.g. drought, famine and floods. The incomes per person is very low and there is general poverty. Population density may be over 700 persons per km^2.

This is experienced in parts of India, China, Ethiopia, e.t.c. There is a lot of migration to other countries.

While;

Under population is where there are more resources available to sustain adequate standards of living to the people.

There is more land, food, minerals and energy resources than what can be used, the level of technology is high, the incomes of people are high therefore high living standards. These countries attract many foreigners who go there to stay permanently and these originate from overpopulated countries. Canada and Sweden are good examples.

(b) Account for the varying population densities in Kenya.

The varying population distribution in Kenya is a result of physical and human factors.

Introduction

Population in Kenya is unevenly distributed. The central highlands and Kisumu province have many places with over 500 persons per km^2. Northern Kenya to include Turkana, Marsabit and the Nyika plateau have between 0 – 50 persons per km^2. Areas between Kisumu province and the central highlands have densities between 120 - 350 persons per km^2.

The following physical factors influence population distribution in Kenya.

- ✓ Variations in soil fertility i.e. fertile areas are favourable for agriculture development hence high population densities e.g. shores of Lake Victoria and the central volcanic Highlands. Northern Kenya and the barren Nyika plateau have soils that are not good for crop growing hence small population densities.
- ✓ Climate influences agricultural development and human habitation. Western Kenya and central highlands receive heavy, reliable rainfall of over 1200mm and temperatures between 20 – 28°C. The highlands are cooler. South eastern, Rift valley areas and the north are extremely hot and dry.
- ✓ Drainage refers to circumstances under which excess water leaves the surface. Well drained areas have high population densities e.g. the Kenya highlands. The coastal areas in Mombasa district that are poorly drained have small population densities. Drainage affects construction of settlements and transport routes.
- ✓ Altitude influence population distribution. The rift valley higher slopes of Mt. Kenya are a problem to settlement and development of transport routes.
  The western plateau is conducive for development of transport and construction of homes.
- ✓ Water supply for agricultural use, industrial and domestic purposes. Areas of plenty supply of especially fresh water have a high population density, with scarcity small population density. North and south east have limited water supply, Nyanza province, Lake Victoria, Nzoia River, e.t.c.
- ✓ Influence of pests and diseases; influence of tsetse flies in the south east compared to the disease free highlands.
- ✓ Influence of natural disasters like drought in the north east and floods at the coastal areas compared with areas free from natural disasters.
- ✓ Presence of minerals e.g. coral rock for manufacture of cement at the coast and exploitation of soda ash from Lake Magadi compared to less prevalence of minerals.

- ✓ Influence of vegetation i.e. the dry bush land in south east, northern and rift valley areas suitable for nomadic herding hence small densities. Grassland areas in highlands and western plateau easily ploughed for settlement and farming.

Human factors are also complementary in influencing population distribution.

- ✓ Availability of employment in manufacturing, mining, trading especially in urban centres than in rural areas.
- ✓ Presence of urban centres / cities with social services like schools, leisure centres, health services, e.t.c. compared to rural areas.
- ✓ Historical factors e.g. early contact of the interior with traders at the coast leading to dense settlement in Mombasa. Slave trade led to depopulation near the coast.
- ✓ Accessibility i.e. railway, road and water transport attracting settlements compared to remote rift valley areas with steep escarpments, e.t.c.
- ✓ Traditional way of life e.g. in Turkana land and rift valley areas nomadism doesn't permit permanent settlements while in Nyanza and Kikuyu areas they have permanent settlements / farms.
- ✓ Influence of stability in western and central as opposed to instability in North western and north eastern parts.

4. Account for the development of the St. Lawrence Seaway as an international transport route.

Introduction:

The Seaway is an inland water way jointly controlled by U.S.A and Canada. It covers a distance of about 3,760km from port Duluth on the shores of Lake Superior to the Gulf of St. Lawrence on the coast of the Atlantic Ocean.

It covers Lake Superior, Huron, Michigan, Erie, Ontario and River St. Lawrence.

The factors that have influenced the development of the sea way include the following;

- ✓ They are deep water channels to accommodate large ocean going vessels.
- ✓ They are National water ways therefore the cost of development is cheaper.
- ✓ Presence of settlements along the way that need transport.
- ✓ The government(s) policy of regional development / cooperation and joint funding.
- ✓ The presence of space for construction of canals.
- ✓ The presence of lakes and river St. Lawrence which are navigable.

- ✓ The presence of complementary means of transport like roads, railways and canals e.g. the New York state Berge canal.
- ✓ Availability of bulky mineral resources like coal, iron and oil in the great lakes region that are exploited.
- ✓ The development of agriculture e.g. on the Canadian Prairies making the sea way the Eastern export route for wheat.
- ✓ The influence of technology in removing hazards between the city of Montreal and Lake Ontario, drowning of falls, e.t.c.
- ✓ The presence of tourist sites like the Niagara Falls, e.t.c. that have to be accessed.
- ✓ Availability of funds to put up ports, maintenance of the Seaway and removal of bottlenecks.
- ✓ The Seaway traverses through gently sloping relief making it accessible.
- ✓ Political stability.
- ✓ They are operational throughout the year.
- ✓ The desire for trade between U.S.A, Canada and other parts of the world.
- ✓ To facilitate movement of labour.
- ✓ To enhance government(s) political control and distribution of social services i.e. Canada and U.S.A.

5.(a) Differentiate between a Hinterland and Urban field.

Hinterland means, that area where imports handled by the port are distributed and where items handled as exports by the port come from. For example, the hinterland of Rotterdam includes Germany, Switzerland and Netherlands.

While; Urban field means the city being taken as a central place, there is that area where customers for the goods and services in the city come from Urban field is also known as the sphere of influence of a town. Capital cities have wider spheres of influence. (Whole country).

(b) Account for the development of Mombasa as a port.

Introduction: A port is a place where people and merchandise can enter or leave a country. Mombasa is a sea port found at the coast of the Indian Ocean.
It is the main port for Kenya and East Africa.
It is situated on Mombasa Island in the Kilindini and Mombasa habours.

Consider the following factors:-

- ✓ The presence of natural sheltered harbours i.e. Kilindini and Mombasa harbours.
- ✓ The strategic location of the port along the Trans-Indian Ocean trade route.
- ✓ The presence of deep water for anchoring of large ships.
- ✓ The presence of hard basement rocks to enable construction of docks.

- ✓ The small tidal range makes the port operational all times.
- ✓ The favourable hot climate creates ice-free conditions-enhancing navigation throughout.
- ✓ The port lies on the coastal plain which is a low lying flat land hence easy to construct all forms of infrastructure.
- ✓ The productive hinterland to include Democratic republic of Congo, Rwanda, Uganda, Kenya, Tanzania, e.t.c.
- ✓ The influence of historical factors i.e. early trade between Arabs and Portuguese and the interior took place at Mombasa island.
- ✓ Mombasa is linked with the hinterland with railway and road systems.
- ✓ Government involvement into development of the port e.g. construction of more docks along the harbours.
- ✓ Technological advancement in loading, offloading, storage, clearing of goods, e.t.c.
- ✓ The presence of skilled labour force e.g. in clearance of goods, verification.
- ✓ Presence of power which influences application of technology, provision of light, e.t.c.
- ✓ Presence of funds.
- ✓ Political stability ensures security.
- ✓ Research has improved verification and clearing of goods.

6. To what extent has the presence of industrial inputs influenced the distribution of manufacturing industries in the republic of South Africa?

* *The answer should give clear explanation of the influence of industrial inputs on the distribution of manufacturing industries in the republic of South Africa and go ahead to explain other complementary factors.*

Introduction:
Manufacturing involves processing of raw materials / industrial inputs into semi or finished products.

The republic of South Africa has the following types of industries:-

- ✓ Oil refineries.
- ✓ Engineering.
- ✓ Manufacture of chemicals.
- ✓ Assembling of vehicles.
- ✓ Manufacture of railway equipments.
- ✓ Pulp, paper and wood products.
- ✓ Manufacture of chemicals.
- ✓ Food and drinks.
- ✓ Iron and steel products.
- ✓ Jewelry.
- ✓ Textiles.
- ✓ Leather products, etc.
- ✓ Examples of industrial towns are Pretoria, Middleburg, Johannesburg, Bloemfontein, Durban, Cape Town, Port Elizabeth, East London, Springs Mósselbay, e.t.c.

- ✓ The presence of oil refineries in the coastal towns like Durban, Port Elizabeth has led to establishment of petro-chemical / chemical industries as oil is a major industrial input.
- ✓ The production of sugarcane as a raw material has influenced distribution of sugar refineries in Natal province (Durban).production of fruits in the Cape province has influenced distribution of food and drinks to be processed in Cape Town.
- ✓ Presence of Iron and Manganese has led to establishment of iron and steel industries, engineering, motor vehicle assembling and railway equipment in Pretoria.
- ✓ Fish canning is common at the Coastal towns.
- ✓ Meat processing, maize milling, wheat processing at Port Elizabeth, Cape Town, Paarl, e.t.c.
- ✓ Manufacture of paper and wood products in Johannesburg near soft wood producing forests.
- ✓ The presence of Gold on the Rand and Diamonds in Kimberly has influenced establishment of processing and Jewelry industries.
- ✓ Industries that import and use heavy industrial inputs are widely spread in the coastal towns e.g. ship building, oil refining as they import iron and steel plus oil respectively.

Other factors:-

- ✓ Large market for the manufactured products.
- ✓ A large body of skilled labour force.
- ✓ Capital for industrial development.
- ✓ Efficient means of transport.
- ✓ Energy sources like coal, nuclear and oil.
- ✓ Industrial inertia.
- ✓ Government policies e.g. on foreign investments.
- ✓ Availability of land with conducive relief.
- ✓ Presence of water.
- ✓ Political stability which ensures investment.

7. To what extent have human factors contributed to the problems facing commercial forest exploitation in Democratic republic of Congo?

Introduction:

Commercial forest exploitation involves extracting forest products like timber for business purposes.

Democratic republic of Congo has tropical rainforests and the largest area of the forests is found in the river Congo basin. The types of trees include Iron wood, Green heart, Mahogany, Log wood, e.t.c. among the characteristics of these forests are; trees have buttress roots, they are very tall, have huge stems, umbrella shaped canopies and broad leaves.

Both human and physical conditions contribute to the problems facing commercial forest exploitation in D.R.C.

Human factors:-

- ✓ Political instability due to many rebel movements hiding in the forests.
- ✓ Shortage of labour due to small population densities.
- ✓ The problem of accidents during harvesting and transportation of logs.
- ✓ The existence of hostile tribes like the Mai-Mai and pygmies.
- ✓ The destruction of forests in some parts by shifting cultivators and firewood reducing timber supply.
- ✓ Profit repatriation where exploitation is being managed by foreigners.
- ✓ Limited market because of limited products and competition with countries that produce soft wood timber.
- ✓ Problems associated with transport in a rainy and soggy terrain.
- ✓ Limited distribution of power supply hence long distances to milling centres.
- ✓ The limited technology used in harvesting and transportation of timber.
- ✓ Limited research to create variety of commercial products.

Physical factors:-

- ✓ Tree grow in impure stands and cutting has to be selective.
- ✓ Harsh climatic conditions especially due to heavy rains causing floods and makes transport routes impassable.
- ✓ Hard wood timber making harvesting costly.
- ✓ The trees have buttress roots hence difficult to cut at ground.
- ✓ The logs produced are huge and heavy hence difficult to transport / float down stream. The long gestation period limits regular supply of some commercial species..
- ✓ The forested areas have pests, diseases and wild animals.
- ✓ The presence of rapids and falls create problems of transport of labour and cause log jams in the plunge pools.
- ✓ The lianas affect movement within the forest and felling of trees.
- ✓ The steep areas of the basin frustrate development of transport routes.

8. To what extent have physical conditions contributed to the development of fishing in Sweden?

Introduction:

Fishing is the extraction of fish and other sea foods from water bodies.
The fishing grounds for Sweden include; Baltic Sea, North Sea and Atlantic Ocean.
The types of fish species caught include; Cods, Herrings, Brishing, Capelin, Sardines, Mackerels, e.t.c.

Methods used to catch the fish in Sweden include: Drifting, Long lining, Purse seining and Trawling. Some of the fishing ports for Sweden include; Goteborg, Helsingburg, Malmo, Norrkoping, Sundsvall, Harnosand, e.t.c.

The physical conditions include:

- ✓ The influence of the warm North Atlantic and cold Labrador currents.
- ✓ The indented coastline.
- ✓ The offshore islands.
- ✓ The shallow continental shelf.
- ✓ The variety of valuable fish species.
- ✓ Adequate plankton.
- ✓ The extensive coastline.
- ✓ Presence of forests.
- ✓ The large / extensive fishing grounds / extensive coastline.
- ✓ Limited productivity / limited arable land.
- ✓ The influence of climate.

Write a transitional statement e.g.

- ✓ Besides the physical conditions fishing in Sweden is enhanced by the following human factors.

The human factors:

- ✓ Efficient methods of fishing.
- ✓ Efficient preservation and storage.
- ✓ Large internal and foreign market.
- ✓ Abundant supply of labour.
- ✓ Availability of funds / capital.
- ✓ The favourable government policy.
- ✓ The role of cooperatives.
- ✓ Efficient means of transport.
- ✓ The long sea faring tradition.
- ✓ Innovations through research in breeding / restocking / creation of products.
- ✓ Political stability.

9. Examine the importance of fuel and power production to the development of either Nigeria or USA.

A candidate should define fuel and power (either independently or combined)
Locate the country
Give forms or types of fuel and power and their location where necessary
Examine both the positive and negative importance of fuel and power
Conclude.

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The physical conditions include;

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Locate the country
Give forms or types of fuel and power and their location where necessary
Examine both the positive and negative importance of fuel and power
Conclude.

Introduction

Fuel and Power refers to sources of usable energy that are (can be) used to do work.

Either Nigeria: Located in West Africa. The forms of fuel include Coal from Enugu; Oil and Natural gas from the Niger Delta, Biomass from Sokoto, and forms of energy such as Hydro electricity from Kainji dam; Thermal from Lagos and Abia, Solar from Abuja, Sokoto and Ibadan; Wind from Endo, Adamawa, Niger Delta and Bayelsa

Or USA (The United States of America); Located in North America and she is one of the world's leading fuel and power consuming and producing nations. The forms of fuel include Coal from Wyoming, Virginia, Illinois; Oil and Natural gas from Texas, North Dakota, Gulf of Mexico; Biomass from Illinois, California; and forms of energy such as Hydro electricity from Niagara power plant-New York, Kentucky dam and Knoxville dam; Thermal and Solar from Nevada California and Hawaii; Wind energy from California, Iowa and Oklahoma, and Tidal energy from Alaska and Maine state.

The importance of fuel and power production to the development of either Nigeria or USA are more so the same;

Positively:

- ✓ Promoted industrial development
- ✓ Promoted international relations between countries
- ✓ Source of foreign exchange through fuel and power exports to the government.
- ✓ Source of employment opportunities such as engineers leading to improved standards of living.
- ✓ Urban growth with associated advantages (schools, roads, electricity, waterways).
- ✓ Source of government revenue through tax collection
- ✓ Growth of other sectors stimulated for example tourism, agriculture.
- ✓ Economic diversification (alternative source of income).
- ✓ Acquisition of labour skills.
- ✓ Reduction of government expenditure on imported fuel and power.
- ✓ It has promoted establishment of social services needed by people.
- ✓ Development of the tourism sector
- ✓ Development of the transport sector
- ✓ Promoted infrastructural development
- ✓ Promoted exploitation of resources such as minerals and forests
- ✓ etc

Negatively:

- ✓ Urban growth and related problems and evils such as prostitution, traffic jam, slum development overcrowding, high crime rates).

- ✓ Pollution by various forms of fuel and power during exploitation and utilization.
- ✓ Displacement of people with low compensation dues upon discovery and opening up fuel and power plants such as thermal and Nuclear.
- ✓ Fuel and power related accidents leading to loss of lives and property.
- ✓ Disfiguring of the scenic beauty during exploitation of fuel and power forms such as Coal, Oil, Nuclear and Hydro-electricity power.
- ✓ Deforestation with associated dangers for example drought, global warming, drop in water table while exploiting Biomass, Oil and Coal leading to shortage of water supply.
- ✓ Rural-urban migration depriving rural areas of useful labour for sectors like agriculture (Especially in Nigeria)
- ✓ Regional imbalance that is to say areas with fuel and power sources grow faster than these without. (Especially in Nigeria)
- ✓ Exhaustion of fuel and power sources due to over exploitation. For example, Biomass, Oil and Coal
- ✓ Insecurity has resulted in some major fuel centres due to unfair sharing of income. This has often scared away investors thereby affecting profit margins (Especially in Nigeria)
- ✓ Leads to profit repatriation (especially in Nigeria), etc.

10.a) Distinguish between a trading bloc and regional integration.

A trading bloc is a group of countries usually in a shared geographical region (same geographical location) that have come together with an aim of promoting trade among themselves so as to enhance development.

A trading bloc can have different levels of economic integration, such as preferential trade areas, free trade areas, customs unions, or common markets for member states to benefit from international trade.

A trading bloc mainly aims at removing/reducing trade barriers. Trading blocs include; European Union (EU), European Economic Area (EEA), Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC)

WHEREAS

Regional integration is the coming together or joining of individual states within a region into a larger whole so as to achieve peace, stability and wealth.

The degree of integration depends upon the willingness and commitment of independent sovereign states to share their sovereignty so as to benefit from international trade and political cooperation.

Regional integration can be in form of preferential trade areas, free trade areas, customs unions, or common markets. Among the aims of regional integration include; widening market for goods produced, promoting international relations, promoting investment and promoting economic growth.

The following are examples of Regional Integration: North American Free Trade Agreement (NAFTA), European Union (EU), Asian Pacific Economic Cooperation Forum (APEC) and Economic Community of West African States (ECOWAS).

b) The Advantages of regional economic integration include;

Candidate should use specific examples on each point while discussing.

- ✓ Enhances political cooperation and influence among member countries e.g COMESA NAFTA
- ✓ Increases market efficiency and trade opportunities with lower or no tariffs
- ✓ Improves employment prospects (Increases employment opportunities) and economi growth
- ✓ Leads to shared costs of public goods or large infrastructure projects
- ✓ Leads to cooperative policy making and reform
- ✓ Leads to trade creation effects
- ✓ Stimulates industrial establishment and expansion
- ✓ Leads to production of high-quality goods
- ✓ Increases volume of output leading to economic growth
- ✓ Leads to production of low-priced goods
- ✓ Encourages joint research at cheaper cost due to shared cost
- ✓ Increases bargaining power of member states on the world market
- ✓ In some regions, trade is eased due to use of the same currency
- ✓ Creates room for specialization among member states
- ✓ Leads to easy access to foreign resources or aid
- ✓ Increases resource utilization
- ✓ Widens consumer choices, etc.

The disadvantages include the following;

- ✓ Can lead to loss of national sovereignty due to compromising of national interests
- ✓ Leads to loss of government revenue
- ✓ Economic imbalances or can lead to unequal trade benefits mainly brought about by the free movement of goods. This makes the richer countries benefit more at the expense of the poor ones leaving the richer and the poor ones poorer.
- ✓ Leads to trade diversion
- ✓ Can lead to cultural changes
- ✓ Increases competition among member states
- ✓ Costs for participating countries
- ✓ Leads to trade diversion
- ✓ Can lead to surplus production of similar goods

- ✓ Can lead to quick resource depletion due to over utilization
- ✓ Can lead to uneven distribution of industries
- ✓ High costs in its establishment for example staffing
- ✓ Discourages self-sufficiency or self-reliance paving way for dependency
- ✓ Can lead to production and consumption of poor/low quality goods hence lowering standards of living.
- ✓ E.t.c.

PAPER 250/3

1. a) i) **Candidates should clearly;**
   - State the topic, bringing out what was studied and where the study took place.

   ii) Objectives of the study should be specific, measurable, achievable, realistic, researchable and time bound.
   - They should not also be a repetition of the topic of study.
   - Accept phrases like
   - To find out, to discover, to identify to suggest (only for solutions) etc.
   - Do not accept phrases like;
     To see
     To appreciate
     To know
     To understand, etc.

   b) **Candidates should draw a landscape sketch / panorama which should have**
   - Title.
   - Frame.
   - Labeling.
   - Direction (view point marked & named as view point).
   - Any 2 varied physical features with place names.
   - Any 2 varied landuse types with place names.

   c) **Candidates should then describe the relationship between relief and land use types in the area studied e.g.**
   - Hills Vs telecommunication mast
   - Gentle slopes Vs settlements
   - Gentle slopes Vs transport routes e.g. roads
   - Steep slopes Vs stone quarry
   - Flatlands
   - Lowlands etc

   Relief features should be varied.
   - The relationship should be stated using clear connecting words.
   - There should be evidence
   - There should be accountability
   - A relationship with clear connecting words, and evidence but no accountability.

- ❖ A relationship stated using clear connecting words without evidence but has accountability.

d) Candidates should bring out the follow up activities i.e

- ❖ Organizing data
- ❖ Analyzing data
- ❖ Sorting out data
- ❖ Data presentation
- ❖ Polishing sketches
- ❖ Making conclusions
- ❖ Making recommendations
- ❖ Writing a field work report
- ❖ Distribution of the report to different stakeholders

N.B:

- The activities should be stated in past tense form and explained briefly.
- Activities stated in present tense = No mark.
- Mere outline of the activity in past tense i.e without a brief explanation.

e) Candidates should describe the steps they took to collect data during the field work study i.e. they should describe the different methods of data collection that they use e.g.

- ❖ Observation
- ❖ Interviewing
- ❖ Recording / sketching
- ❖ Measurement
- ❖ Map orientation
- ❖ Sampling
- ❖ Questionnaire
- ❖ Analyzing existing information / literature review / documentary review
- ❖ Identification of the method.
- ❖ Definition and description of the method bringing out the tool used.
- ❖ Information obtained.

f) Candidates should bring out the significance of the field work study in form of geographical relationships i.e.

- ❖ Physical – physical
- ❖ Physical – Human
- ❖ Human – Human

N.B:

- The relationships should be stated using clear connecting words.

- They should have evidence in form of place names / direction.
- They should have accountability.

N.B:

- A relationship stated using clear connecting words with evidence but no accountability = 1mk
- A relationship stated with clear connecting words, and accountability but without evidence = No mark at all.
- A relationship stated without clear connecting words = No mark at all

g) **Candidates should bring out the challenges they faced while in the field which may include.**

- ❖ Inaccessibility
- ❖ Obstruction
- ❖ Language barrier
- ❖ Hostility of the people
- ❖ Speedy respondents
- ❖ Abrupt weather changes
- ❖ Noise pollution
- ❖ Inaccurate toolsetc.

N.B:

- Challenges should bring out the information missed = 3mks.
- No information missed = No mark at all.

2. **Candidates are expected to define the term landslides as;** sudden rapid or very fast movement of weathered rock materials down slope under the influence of gravity.

Candidates should then identify the areas affected by landslides e.g. Mbale, Kasese, Kisoro, Kabale, Bundibugyo, Sironko, Bulucheke, Bulambuli, Bududa, etc.

N.B:

- Mere identification of areas affected by landslides = 3mks.
- Identification of affected areas on a sketch map = 5mks

Candidates should then bring out causes of landslides in Uganda which may include:

- ❖ Climate conditions e.g. heavy rainfall.
- ❖ Nature of rock materials
- ❖ Nature of the slope
- ❖ Nature of soils

- Earth quakes
- Living organisms e.g. rodents
- Mining & quarrying
- Deforestation
- Over cultivation on steep slopes
- Building and construction e.g. roads, settlements etc.
- Over grazing in highland areas
- Moving of heavy vehicles which weakens rocks / land scape etc.

Candidates are then expected to bring out the effects of landslides e.g.

- Destruction of social infrastructure e.g. roads
- Displacement of people
- Landslides lead to flooding within the valleys
- Leads to soil infertility / loss of soil fertility hence low crop yields.
- Loss of lives
- Destruction of scenic beauty of the land.
- Leads to siltation of water bodies.
- Leads to destruction of crops and destruction of agric land.
- Destruction of vegetation cover
- Reduction / loss of water table.
- Increased government expenditure.

Positive effects may include

- Exposure of fresh rocks to weathering leading to soil formation.
- Leads to deposition of materials in the valleys creating / forming fertile soils.
- Tourism development.
- Leads to exposure of minerals.

N.B: Points should be well explained and illustrated with areas affected by landslides.

3. **Candidates should define deforestation as the clearing / destruction of forests or the massive / extensive felling of trees / forested land.**

Candidates should then identify the types of forests affected by deforestation with example e.g.

- Tropical low and forests e.g Mabira, Budongo, Bugoma, Kibale forests etc
- Tropical highland forests e.g Mt. Elgon, Mt. Rwenzori forests etc
- Riverine forests e.g along R. Katonga, R. Kafu, etc
- Planted forests e.g Lendu, Abera, Mafuga, Etc.
- Savanna wood land forest se.g Timu, Mt. Kei, Zulia, etc.

- Mere identification of any 3 types of forests with e.gs = 3mks
- Identification of forests on the sketch map = 5 mks
- Sketch map of Uganda showing forests affected by deforestation.

Candidates are expected to bring out the causes of deforestation which include;

- Need for land for settlement.
- Need for land for agric activities
- Construction of transport routes
- Establishment of industries
- Natural hazards such as landslides, flooding.
- Occurance of wild fires which destroy large forested areas.
- Destruction of forests by wild animals.
- Need for timber
- Need for wood fuel and charcoal.
- Security reasons
- Corruption e.g among the NFA officials.
- Unfavourable government policies of degazzeting some forests e.g Namanve, Mabira forests etc
- Modern technology e.g use of power driven saws.
- Mining and quarrying e.g destruction of Kitaka forest reserve, Busitema forests etc
- Expansion of urban centres
- Ignorance of the masses
- The need to control pests & diseases
- Pests and diseases which attack the trees etc.

Candidates are expected to come up with the measures being taken to conserve forests in Uganda e.g.

- Re-gazetting of forests is being done by NFA.
- The NFA & NEMA have been set up to oversee forestry activities.
- There is sensitization of the masses ... the importance of forests.
- People are being encouraged to use other forms of energy e.g solar, bio-gas, etc to reduce the use of wood fuel.
- Agro forestry is being promoted e.g. in Masaka, Mpigi etc.
- There is introduction of fast and quick maturing trees species to allow continuous supply.

- ❖ Afforestation & reafforestation are being encouraged.
- ❖ Regular patrols of the forested areas is being done.
- ❖ Encroachers are being evicted from the forests.
- ❖ Alternative materials like plastics, metallic poles are being emphasized to reduce timber extraction.
- ❖ Siliculture is being encouraged.

N.B: Points should be well explained and illustrated with examples of names of forests.

4. (a) Describe the state of the water transport in Uganda.

Status of water transport.

- ❖ Water transport is poorly developed mostly using muscle – powered canoes.
- ❖ There are few modern vessels e.g. steamers and ferries.
- ❖ Most of the water transport operations are done by private boat owners.
- ❖ Port facilities are poorly developed for loading and offloading.
- ❖ Water transport, transports considerably small number of cargo and passengers.
- ❖ Lake Victoria is the major lake used for water transport.

Draw a sketch map of Uganda showing the distribution of water routes.

(b) Factors limiting development of the water transport.

- ❖ Limited skilled labour e.g. captains, mechanics.
- ❖ Limited capital to buy modern vessels.
- ❖ Low levels of technology used e.g. muscle-powered canoes.
- ❖ Competition with other modes of transport which are flexible e.g. roads.
- ❖ Insecurities e.g. water pirates.
- ❖ Poorly developed port facilities.
- ❖ Existence of water falls and rapids.
- ❖ World animals e.g. hippos.
- ❖ Water weed i.e. water hyacinth.
- ❖ Floating islands i.e. surds.
- ❖ Swamps which hinder accessibility as well as steep escarpments.
- ❖ Seasonal fluctuations of water levels.
- ❖ Narrowness of water bodies e.g. rivers by vessels.
- ❖ Accidents caused by winds and waves.
- ❖ Existence of bedrocks in lakes.

Example – Water route + Water body and should be well explained.

5. **Candidates are expected to define irrigation farming as a form of farming where water is artificially applied to the field especially in areas which receive low and unreliable rainfall.**

Candidates can then bring up the major examples if irrigation farming schemes in Uganda for example.

- Mubuku irrigation scheme in Kasese.
- Kiige irrigation scheme in Kamuli
- Labori irrigation scheme in Serere
- Ongom irrigation scheme in Lira
- Atera irrigation scheme in Apac
- Agoro irrigation scheme in Kitgum
- Kibimba irrigation scheme in Bugiri
- Olweny irrigation scheme in Dokolo
- Doho irrigation scheme in Butaleja
- Kakira sugar plantation in Jinja
- Lugazi sugar plantation in Buikwe
- Zhong Rice scheme in Lukaya – Masaka.

N.B:

- Identification of the irrigation farms with a sketch map = 3mks.
- Identification with a sketch map = 5mks.

Candidates are expected to come up with the positive contributions of irrigation farming for example.

- Source of employment opportunities for example drivers, seeds, etc on Doho irrigation scheme in Butalejja.
- Training skills for example at Olweny in Dokolo, Kiige in Kamuli etc.
- Avails food to the people for example Kakira Sugar plantation in Jinja etc.
- It is a source of foreign exchange i.e. when goods are sold to outside countries for example Kibimba in Bugiri etc.
- Facilitates the growth of industries that process agricultural products for example Kakira Sugar plantation in Jinja etc.
- Reduces the risks of crop failure due to drought e.g. at Ongom irrigation scheme in Lira, Mubuku in Kasese etc.
- Creates market for irrigation equipment for example water pumps at Kiige irrigation scheme in Kamuli etc.
- Enables infrastructural development for example roads, schools, hospitals etc. at Kakira Sugar plantation in Jinja, Kibimba rice schemes in Bugiri etc.
- Urbanisation and related advantages of employment at Mubuku in Kasese.

- Promotes research / education / Tourism for example at Kakira Sugar plantation in Jinja. Mubuku in Kasese etc
- Source of revenue in taxes paid to the government for example Doho scheme in Butalejja etc.
- Promotes international relationship especially with countries where goods are sold e.g Kibimba rice scheme in Bugiri, Olweny in Dokolo etc.
- Enables the diversification of the economy e.g from tourism to agriculture by Mubuku scheme in Kasese.
- Makes use of land that would otherwise remain unutilized.

NOTE: **Candidates must explain and illustrate their points with the name of an irrigation scheme and place.**

Candidates can then bring up the negative contributions for example.

- Leads to displacement of people in the process of expanding of farms for example Kakira sugar plantation in Jinja.
- Encourage the cutting down of trees in the process of growing crops for example Doho scheme in Butalejja.
- Increases the risks of disease spread especially the people who work in flooded water of Bilharzia, mosquitoes causing e.g in Kibimba rice scheme in Bugiri.
- Encourage rural-urban migration for people intending to get jobs at Kakira sugar plantation in Jinja etc
- Specialisation in a particular crop in affected by price fluctuations on the world market for example Kibimba rice scheme in Bugiri etc.
- There is contamination f the water that is used by other people during the spraying of pests and diseases e.g. at Mubuku irrigation scheme in Kasese etc.
- Monoculture leads to soil deterioration for example at Doho scheme.
- Has led to profit repatriation e.g at Kakira sugar plantation in Jinja.
- Brings about urbanization and its problems e.g Kakira in Jinja.

N.B: **Points should be explained and illustrated with the names of irrigation schemes.**

6. **Account for the expansion of the mining sector in Uganda.**

Candidates are expected to come up with the current status.

- There is wide spread exploitation of sand and clay
- Large scale commercial mining is limited
- Mining in Uganda is lowly developed
- Vermiculite and gold are the leading mineral exports by value
- Most of the minerals are exported in raw form
- Most of the commercial mining is done by foreign companies

- A variety of minerals with commercial value have been discovered in recent years and processes to exploit are in advanced stages

Candidates are expected to identify mining areas and the mineral mined e.g.

- Kasese with; limestone, copper, salt, cobalt etc.
- Kaabong with; limestone, gold, copper
- Mbale with; vermiculite,sand
- Kabale with; wolfram, iron ore, gold
- Hoima with; oil, salt, sand
- Bushenyi (Kyamuhunga) with; gold
- Bundibugyo with; gypsum

Draw a sketch map of Uganda showing the distribution of minerals and mining areas.

Reasons / factors for the expansion / increased development of the mining sector / mining activities / mining industry.

- Discovery of new minerals e.g. oil in Buliisa.
- Introduction of modern technology e.g. copper mining in Kilembe at Kasese.
- Liberalization of the mining activities e.g. sand mining in Wakiso.
- Increased training of mining labour force e.g. oil mining in Buliisa.
- Introduction of mining courses at universities e.g. about oil mining at Buliisa.
- Increased mineral surveying / research/exploration e.g. gold in Mubende.
- Construction of mineral processing industries encouraged limestone in Tororo.
- Construction of new roads promoted vermiculite mining in Mbale.
- Improved political stability has promoted limestone mining in Kasese.
- Increased government support has promoted gold mining in Kaabong.
- Rehabilitation of mineral processing industries- clay and sand mining in Wakiso.
- Opening up of formerly closed mines e.g. copper mining at kilembe in kasese.
- Widening of mineral markets / increased market research e.g. limestone in Tororo.
- Increased capital investment promoted gold mining in Kaabong.
- Reduction in the smuggling of minerals e.g. Gold in Busia
- Increased power generation has promoted limestone mining in Kasese
- Attraction of foreigners/ companies into the mining sector e.g. vermiculite in Mbale
- Privatization of formerly inefficient state owned mines, promoted sand and clay mining at Kajjansi in Wakiso.
- Hiring of foreign expatriates to boast skills e.g. mining in Buliisa.

7. Candidates are expected to define the term ecotourism as a form. of travel that involves travelling to natural areas with objectives of learning, studying or participating in activities that seek to minimize negative impacts of tourism to the environment, at the same time protecting and empowering the local host communities on gaining social economic benefits.

OR;

Defined as a responsible travel to natural areas that conserve the environment, sustains the well-being of local people and involves interpretation and education.

Candidates are expected to identify areas of ecotourism as;

- National parks such as Kidepo, Bwindi, Mburo etc
- Wild life reserve such as Ajais, Toro, Kigezi, Kyambura,
- Forest reserves e.g. Kashoya – Kitomu Mpanga, Mt. Rwenzori.
- Community wetlands e.g. Bigodi, wetland sanctuary i.e. Magambe swamp
- Sanctuaries such as Ngamba, Ziwa, Otze
- Lakes and rivers e.g. L. Victoria, L. Kyoga, R. Nile, R. Katonga.

N.B:

- Identification of eco-tourism sites with their names = 3mks.
- Identification of eco-tourism sites with a sketch map = 5mks.

Candidates are expected to come up both positive and negative importance of eco-tourism in Uganda.

- Provision of employment opportunities to the local people such as game rangers, park wardens etc.
- Conservation of fauna and flora e.g. Lutembe bay, Nabugabo.
- Preservation of culture and historical sites for future use e.g. Kasubi tombs, Ngero rock paintings.
- Source of foreign exchange from tourists.
- Source of internal revenue to the government through taxing eco-tourism companies.
- Development of social and economic infrastructures by rehabilitating road construction connecting eco-tourism sites (tourism roads).
- Promotion of international relationship with countries where tourists come from.
- Advertisement of goods and services abroad in outside countries due to ecotourism sites.
- Diversification of the economy from relying on other sectors such as Agriculture.
- Promotion of art and craft industries / market for other sectors.
- Proper utilization of the resources that would be idle.
- Development of urban areas with associated advantages.
- Has led to development of research and education.

Candidates are expected to bring out negative importances contribution of ecotourism sites in Uganda.

- Has led to conflicts with people living around eco-tourism sites e.g Mt. Elgon.
- Destruction of lives and property by wild animals e.g Queen Elizabeth National Park.
- Spread of pests and diseases associated with wild animals.
- Cultural erosion by foreigners
- Pollution of water, air and land by both wild life and tourists.
- Destruction of vegetation cover by animals by overgrazing.
- Leads to insecurity created by tourists
- High maintenance costs of the eco-tourism sites.
- Smuggling of rare species of wild life.
- Profit repatriation by foreigners who own some of the tourists sites.
- Urbanisation and its associated problems such as prostitution.
- Promotes inflation in areas where eco-tourism sites are located due to expensive products.
- Promotion of regional imbalance.

N.B: Points should be explained and illustrated with names of ecotourism sites / areas.

8. Outline the challenges of developing the Energy sector in Uganda.

Current status:

- The sector is developing.
- There is increased use of solar energy especially in rural areas.
- There is rural electrification going on.
- There has been discovery of oil.
- Biomass is a very popular source of energy.

Candidates should identify the sources of energy e.g.

- H.E.P on rivers like Nile.
- Thermal /oil at Namanve.
- Biogas in Mbarara, Wakiso.
- Solar in Wakiso, Kampala e.t.c.
- Gas – imported.
- Wind energy e.g. in Moroto, Kotido, Kaabong.
- H.E.P is the major source for industries and urban population e.t.c.

Draw a sketch map of Uganda showing the distribution of energy sources

Candidates should explain the negative effects of the energy sector e.g:

- It has led to accidents.
- Displacement of people.
- Destruction of vegetation cover.
- Pollution of the environment.
- Urban related problems.
- Profit repatriation.
- It has led to competition with other sectors of the economy.
- Regional imbalance.
- High costs of production.

(b) Explain the measures being taken to access power and energy.

Candidates should come with the steps being taken to improve the energy sector in Uganda.

- Promoting rural electrification programme e.g. in Bundibugyo, Ssembabule.
- There is construction of new hydro-electric power stations e.g. Isimba hydro-electric power plant in Kayunga.
- Research is being carried out to develop other sources of energy.
- The energy sector is being liberalized/privatized e.g. Tronder power firm from Norway.
- There is diversification of the energy sources to supplement hydro-electric power e.g. use of solar energy in Kampala.
- Government is ensuring security in order to promote investment in the energy sector.
- There is sensitization on the sustainable use of energy resources.
- Modern technology is being imported to facilitate the generation and distribution of energy.
- Capital is being acquired from financial institutions.
- There is training of man power to facilitate the effective exploitation of energy resources in Uganda.
- There is fighting illegal connection.
- There is improvement of transport routes to facilitate the transportation of energy resources.
- Promotion of the use of prepaid meters by UMEME.

Account for **wetland degradation in Uganda.**

a(a) Define **wetland as an area which is seasonally** or permanently flooded by water and contains plants and animal communities adapted to such conditions.

Current status;

- There is increased reduction in total wetland cover.
- Most wetlands destroyed are urban based.
- All wetlands are managed under National Environmental Management (NEMA).
- Most wetlands are destroyed for agricultural practices.

Identify the categories of wetland e.g.

- Lacustrine / lakeshore wetlands e.g. Lutembe wetland, Masese wetland.
- Riverine wetlands along river valleys e.g. R. Katonga wetland, Mpologoma wetland.
- Open valley wetland e.g. Kiruruma wetland in Kabale.

A sketchmap showing wetlands affected by degradation/destruction

Give reasons for wetland degradation / destruction in Uganda.

- Need for land for establishing industries.
- Need for land for settlement /establishment of urban centres.
- Need for land for establishing farm lands.
- Need for establishment of transport routes such as road.
- Uncontrolled harvesting of papyrus reeds for art and crafts making.
- Deliberately destroyed to control pests and diseases.
- Excavation of sand and clay.
- Fires both wildfire and man-made fires.
- Need for timber and poles has led to destruction of tree swamps.
- Poor garbage disposal which limits growth due to materials that do not decompose.
- Climatic changes which causes lowering of water table.
- Insecurities such as flashing out rebels e.t.c.
- Need for fuel wood.

N.B: All should be illustrated with names of wetlands.

(b) Explain the effects of uncontrolled wetland utilization in Uganda.

- Exhaustion of underground water leading to lowering of the water table.
- Resulted into reduction of purifying effect leading to decline in water quality.

- Destruction of habitants for animals as well as loss of plant communities leading to loss of bio diversity.
- Flooding of previously wetland areas leading to destruction of man-made features and his property.
- Desertification due to reduced water vapour in the atmosphere due to lowering of the water table.
- Loss of raw materials for art and crafts making.
- Increased incidences of waterborne diseases due to flooding and open pits.
- Creation of badlands which become excessively hard and brittle.

N.B: **Must illustrate using names of wetlands.**

10.(a) Explain the effects of environmental degradation in Uganda.

Candidates are expected to define the term environmental degradation as the decline in the productive value of the available renewable and renewable resources.

Areas experiencing environmental degradation/degraded areas in Uganda include;

- Eroded areas e.g. Bududa, Mbale, Sironko, Kabale, Kisoro, Bundibugyo etc.
- Deforested areas e.g. Kyenjojo, Buikwe, Hoima etc.
- Over grazed areas e.g. Kotido, Moroto, Kiruhura, Nakasongola etc.
- Polluted areas e.g. Kampala, Jinja, Wakiso, Mbale, Gulu etc.
- Soil exhausted areas e.g. Kasaku, Kyamuhunga, Kyenjojo etc.
- Over fished areas e.g. L. Victoria, Lake Kyoga etc.
- Mined/quarried areas e.g. Kajjansi, Kamonkoli, Kilembe, Lwera etc.

Draw a sketch map of Uganda showing areas experiencing environmental degradation.

Candidates are expected to bring out the effects of Environmental degradation which include;

- It results into reduction in agricultural production leading to food shortage, and in extreme case, famine and loss of income e.g. in Masaka, Isingiro etc.
- Destruction of forests has resulted into shortage of wood fuel for domestic use e.g. in Tororo, Nakasongola etc.
- Environmental degradation leads to soil erosion/landslides which lead to formation of gullies, rills e.g. on the slopes of Mt. Elgon, Kabale highlands
- It has resulted into laterisation due to leaching e.g. in Wakiso, Mukono and Mpigi
- There is lowering of the water table and water quality thus drying of shallow wells e.g. in Kabale, Bushenyi, Palisa etc.

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- Environmental degradation leads to loss of agricultural land thus leading to severe famine e.g. in Kabale.
- There is loss of water catchment areas leading to the disappearance of streams and shallow wells e.g. in Mbale, Kabale etc.
- Environmental degradation leads to loss of bio- diversity i.e. the original flora and Fauna are transformed into secondary form or become extinct e.g. on the slope of Mt. Elgon in Mbale.
- There is disease outbreak due to drinking polluted water, living in a polluted environment, and failure to meet basic nutritional requirements e.g. in Nakasongola, Kampala, Masaka, Soroti etc.
- There is flooding especially in valleys due to increased water run-offs e.g. Kalerwe, Bwaise, and Nakivubo etc.
- Vibrations from mines/quarries destroy settlements, property and lives e.g. Tororo Girls' secondary school from limestone mining.
- Environmental degradation leads to siltation of water bodies leading to shallowness, pollution, flooding, death of aquatic life etc. e.g. along R. Manafa along L. Victoria etc.
- It leads to micro climatic changes which result into late and low rainfall e.g. Kabale, Mbale, Soroti and Palisa.

(b) **Candidates are expected to bring out measures being taken to control the problem of environmental degradation in Uganda. These may include;**

- Afforestation and re-afforestation which is the planting of trees is being done to control soil erosion e.g. Mubende, Ntungamo, Kabale etc.
- Paddocking and rotational grazing is being done to control overgrazing e.g. Kiruhura, Sembabule etc.
- Use of organic manure is being carried out to increase soil fertility e.g. Wakiso, Mukono etc.
- Using cut and fill method in mining/quarrying to cover the ditches/pits left by mining e.g. Kilembe mines.
- Treating of industrial toxic wastes before disposal is being done e.g. Uganda Breweries at Luzira.
- Terracing is being used on steep slopes to control the speed of water in order to control soil erosion e.g. Kabale, Kisoro, Rubanda etc.
- Eviction of encroachers on wetlands is being done by NEMA to restore wetlands e.g. Bushenyi, Kabale, Gaba, Lubigi etc.
- Laws/by –laws are being instituted to control bush burning, deforestation and wetland draining e.g. Rubanda, Wakiso, and Kotido etc.

- Environmental degradation leads to loss of agricultural land thus leading to severe famine e.g. in Kabale.
- There is loss of water catchment areas leading to the disappearance of streams and shallow wells e.g. in Mbale, Kabale etc.
- Environmental degradation leads to loss of bio- diversity i.e. the original flora and Fauna are transformed into secondary form or become extinct e.g. on the slope of Mt. Elgon in Mbale.
- There is disease outbreak due to drinking polluted water, living in a polluted environment, and failure to meet basic nutritional requirements e.g. in Nakasongola, Kampala, Masaka, Soroti etc.
- There is flooding especially in valleys due to increased water run-offs e.g. Kalerwe, Bwaise, and Nakivubo etc.
- Vibrations from mines/quarries destroy settlements, property and lives e.g. Tororo Girls' secondary school from limestone mining.
- Environmental degradation leads to siltation of water bodies leading to shallowness, pollution, flooding, death of aquatic life etc. e.g. along R. Manafa along L. Victoria etc.
- It leads to micro climatic changes which result into late and low rainfall e.g. Kabale, Mbale, Soroti and Palisa.

b) **Candidates are expected to bring out measures being taken to control the problem of environmental degradation in Uganda. These may include;**

- Afforestation and re-afforestation which is the planting of trees is being done to control soil erosion e.g. Mubende, Ntungamo, Kabale etc.
- Paddocking and rotational grazing is being done to control overgrazing e.g. Kiruhura, Sembabule etc.
- Use of organic manure is being carried out to increase soil fertility e.g. Wakiso, Mukono etc.
- Using cut and fill method in mining/quarrying to cover the ditches/pits left by mining e.g. Kilembe mines.
- Treating of industrial toxic wastes before disposal is being done e.g. Uganda Breweries at Luzira.
- Terracing is being used on steep slopes to control the speed of water in order to control soil erosion e.g. Kabale, Kisoro, Rubanda etc.
- Eviction of encroachers on wetlands is being done by NEMA to restore wetlands e.g. Bushenyi, Kabale, Gaba, Lubigi etc.
- Laws/by –laws are being instituted to control bush burning, deforestation and wetland draining e.g. Rubanda, Wakiso, and Kotido etc.

- Sensitization of masses is being done to create awareness for forest, swamp and land conservation e.g. Moroto, Kabale, Kiruhura etc.
- Recycling of wastes is being done to control pollution e.g. recycling of plastics in Kampala, Mbarara, and Jinja etc.
- Strip cropping is being done to control soil erosion. This involves cultivation a strip around the hill, leaving another strip with grass e.g. grass separating cultivated strips e.g. Kisoro.
- Contour ploughing is being done to control soil erosion. This involves cultivation along a contour in a hill separated by trenches to reduce the speed of water e.g. Kabale, Rubanda.
- Mulching is being to conserve soil moisture. This involves covering soil with plant material e.g. Wakiso, Mpigi etc.
- Crop rotation is being done to prevent soil exhaustion. It involves sub-dividing the plot and changing the crops grown in different crop seasonally e.g. Wakiso, Mukono etc.
- Intercropping is being done to maintain soil fertility where by different crops are grown in the same piece of land e.g. Mukono, Wakiso etc.
- Use of gabions is being done to control soil erosion. This involves use of wire mesh and stones or sacks and soil as barriers along water passages on slopes e.g. Kabale, Kisoro, Bundibugyo, Kapchwora etc.
- Sorting garbage before disposal is being done to prevent pollution and contamination of soil e.g. Kiteezi, Kampala, Mukono.
- Planting of cover crops is being done to control soil erosion. These include pumpkins which protect soils from direct exposure to rain drops e.g. Kabale, Kayunga etc.
- Diversification of energy resources to control deforestation is being e.g. Wakiso, Mbarara, and Hoima.
- There has been establishment of environment protection organizations like NEMA, UWA, UFA which aim at environment conservation.
- Population control measures are being practiced to control population growth.
- Gazetting forests and swamps is being done.

END