UGANDA MARTYRS SECONDARY SCHOOL NAMUGONGO
ANNUAL GEOGRAPHY SEMINAR, SATURDAY 12TH OCTOBER, 2024
SEMINAR QUESTIONS

P250/1

1. Study the 1:50000 EAST AFRICA (UGANDA), KAMPALA map extract, sheet 71/1, Edition 3-U.S.D and answer the questions that follow.

(a) Determine the;

i) the bearing of Buzigo Secondary trigonometrical station grid reference 570285 from Mutungo trigonometrical station (other) grid reference 602351.

ii) trend of the boundary between grid reference 503450 and grid refence 566450.

iii) the direction of flow of river Nyanje rade.

(b) i) Measure the distance by air of the bound surface road from Kibuye round about (GR 524328) to Entebbe (GR 508276)

ii) Calculate the Detour index of the bound surface road from Kibuye round about (GR 524328) to Entebbe (GR 508276).

(c) i) Draw a relief section along Easting 57 between Northings 28 and 35 and on it mark and name;

- Two hills
- Broad valley
- Plantation
- Nakivubo channel
- Two transport routes

ii) Calculate;

- Amplitude
- Horizontal equivalent
- Vertical exaggeration of the relief section.

(d) Considering the area West of Eastings 60; Identify the settlement patterns.

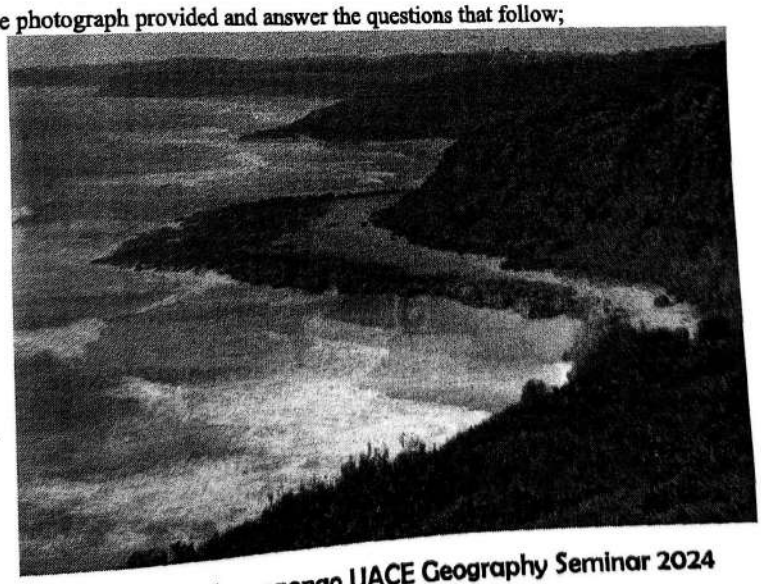
(e) i) Explain the relationship/influence between settlement and communication.

ii) With evidence from a map extract, what makes Kampala a desired destination?

* Reduce the area between Eastings 54 and 67 and Northings 28 and 40 by 50%. Draw a sketch map of the area and on it mark and name;

- Relief features
- Vegetation types
- Railway line
- District boundary

2. Study the photograph provided and answer the questions that follow;



(a) Draw a landscape sketch of the area shown on the photograph and on it mark and name;
i) Any two forms of wave movement
ii) Major drainage feature
iii) Raised cliff, New cliff, Bays and Headlands.
iv) Raised wave cut platform
v) One vegetation type

(b) Account for the formation of;
i) Raised cliff
ii) Headlands and Bays

(c) i) Of what value is the drainage feature to the people living in the area?
ii) What challenges are likely to be faced by the people living in the area shown on the photograph?

(d) Giving reasons for your answer, suggest an area in East Africa where this photograph could have been taken.

3. Examine the influence of earth movements in the formation of relief landforms in East Africa.

4. (a) Distinguish between sedimentary and Metamorphic rocks.
(b) Account for the formation of Sedimentary rocks in East Africa.

5. To what extent has nature of rocks influenced chemical weathering in East Africa?

6. (a) Distinguish between valley widening and valley deepening.
(b) Explain the formation of the features that characterise the torrent stage of the river in East Africa.

7. Examine the influence of glacial erosional processes in the formation of glacial landforms in the mountains of East Africa.

8. To what extent have human activities been responsible for savanna climate in East Africa?

9. To what extent have air masses been responsible for humidity variation in East Africa?

10. (a) Examine the influence of climate on distribution of natural forest vegetation in East Africa.
(b) Explain the values of Natural forests in the economy of **One** East Africa country.

11. (a) Describe the characteristics of Savanna vegetation in East Africa
(b) Explain measures that are being taken to conserve savanna vegetation in East Africa.

12. (a) Distinguish between Zonal and Azonal soils
(b) Account for the formation of zonal soils in East Africa.

13. Examine the processes of formation of Soil types in humid areas of East Africa.

14. To what extent are physical factors responsible for extensive soil erosion in highland areas of East Africa?

P250/2

1. Study table 1 below, showing urban population for selected countries of Africa in 2019.

COUNTRY	URBAN CENTRE	POPULATION (000s)
Morocco	Casablanca	4,370
Zambia	Lusaka	1,747
Dem. Rep of Congo	Kinshasa	11,580
Kenya	Nairobi	4,556
Angola	Luanda	2,572
EGYPT	Cairo	20,485
Sudan	Khartoum	5,678
Central A. Rep	Bangui	622
Nigeria	Lagos	13,904
Niger	Niamey	1,252
Ethiopia	Addis Ababa	3,384

(a) With the help of the Graduated range of symbols as a statistical method, represent the information in the table on the base map provided.

(b) State the demerits of using the method in (b) above.

(c) Name the Country with the:
i) least urban population.
ii) highest urban population.

(d) Account for the development of Urbanization in the Country named in c(ii) above.

* Study the table below showing Rainfall and Temperature for station Z and answer the questions that follow.

Months	J	F	M	A	M	J	J	A	S	O	N	D
Temp °C	-18	-15	-7	4	12	17	20	18	12	6	-5	-15
R/fall mm	19	15	23	36	60	84	72	75	51	30	21	19

(a) Draw a rainfall bar graph combined with a temperature curve to show the information in the table.

(b) State the merits of the method.

(c) i) Describe the climate shown in the table and by the method given in (a) above.
ii) Name the type of Climate described in c(ii) above.

(d) i) Identify one country with such a type of climate as named in (1)(ii) above.
ii) Examine the influence of climate on human activities in the climatic region named in (c)(ii) above.

3. To what extent has technology contributed to the development of Horticulture in either Netherlands or Kenya?

4. (a) Define the term population density.
(b) Explain the factors contributing the varying population densities in either Nigeria or China.

5. (a) Describe the process of oil mining.
(b) Examine the basis of oil mining in either Libya or United States of America.

6. To what extent has Industrial inertia contributed to the development of manufacturing industries in either Republic of South Africa or Germany?

7. Assess the contribution of tourism to the development of either Republic of South Africa or State of California (USA).

8. (a) Define the term forestry.
(b) Describe the causes and shortcomings of deforestation in either Brazil or Democratic Republic of Congo.

9. (a) Distinguish between renewable natural resources and non-renewable natural resources.
(b) Outline the steps being taken to ensure sustainable utilization of the renewable and non-renewable resources in Africa.

10. (a) Define the term trading bloc.
(b) Explain the factors influencing development of trade among countries of Africa.

P250/3

1. For any fieldwork study carried out as a group or an individual;
   (a) (i) State the topic of study.
   (ii) Outline the objectives of the study.
   (b) Describe how you collected information from the field study.
   (c) Draw an annotated sketch map/land scape sketch map/line transect or transverse.
   (d) How did you organise your fieldwork study/What activities did you carry out before going for the field work study?
   (e) Outline the merits/advantages of using the various fieldwork techniques during your study.
   (f) Explain the challenges /problems/obstacles/limitations you encountered/ faced during data collection.
   (g) What conclusions did you draw from the study/To what extent was your fieldwork geographical /How did the fieldwork help you in understanding the geography of the area?
   (h) How did you conclude/processed your filed work/what activities did you carry out as a follow-up of your field work study?
   (i) What recommendations did you give to the people in the area of study?
   (j) What geographical skills did you get from the field study?

2. (a) Account for the formation of relief features resulting from faulting in Uganda.
   (b) Assess the values of relief features resulting from faulting in Uganda.

3. Examine the causes and effects of landslides in Uganda.

4. (a) Account for the rapid expansion of the agricultural sector in Uganda.
   (b) Assess the rapid expansion of the agricultural sector on the environment in Uganda.

5. (a) Account for the rapid destruction of wetlands in Uganda.
   (b) Outline measures being taken to restore wetlands in Uganda.

6. Assess the contribution of eco-tourism to the development of Uganda.

7. (a) Examine the factors that have favoured the development of afforestation in Uganda.
   (b) Explain the challenges faced in the promotion of afforestation in Uganda.

8. (a) Account for the rapid population increase in Uganda.
   (b) Explain the problems resulting from rapid population increase in Uganda.

9. (a) Describe the state of the industrial sector in Uganda.
   (b) To what extent has water led to the development of the industrial sector in Uganda?

10. Assess the contribution of the transport sector to the development of Uganda.

11. Study the table below showing total fish catch from selected water bodies in Uganda.

Fishing grounds	Fish catch (tones)	
	2005	2009
L. Victoria	43,500	34,600
L. Kyoga and L. Kwania	28,000	26,000
L. Albert	19,950	15,800
L. Edward	10000	8,540
L. George	5,000	4,200
L. Bisinia	1,954	1,000

   (a) Draw a comparative bar graph to portray the information in the table above.
   (b) Calculate the percentage change for;
   (i) L. Victoria (ii) L. Albert (iii) L. George
   (c) Account for the variations in the volume of total fish catch from the fishing grounds shown on the table above.

END

1. Study the 1:50000 EAST AFRICA (UGANDA), KAMPALA map extract, sheet 71/1, Edition 3-U.S.D and answer the questions that follow.

(a) Determine the;

(i) • The bearing of Buziga trigonometrical station from Mutungo other trigonometrical station is 205°.

ii) • The trend of the boundary is 090° – 270° **OR** East – West.

iii) • River Nyanje rade flows from the south to the North.

Evidences:-

- It flows from a high altitude of 3900ft to a low altitude of 3800ft.
- Tributaries join river Nyanje rade at acute angles facing the North.
- Presence of seasonal swamps in the North.

(b) (i) • The distance by air of the bound surface road is 5.4km.

ii) • the Detour index of the bound surface road from Kibuye round about (GR 524328) to Entebbe (GR 508276).

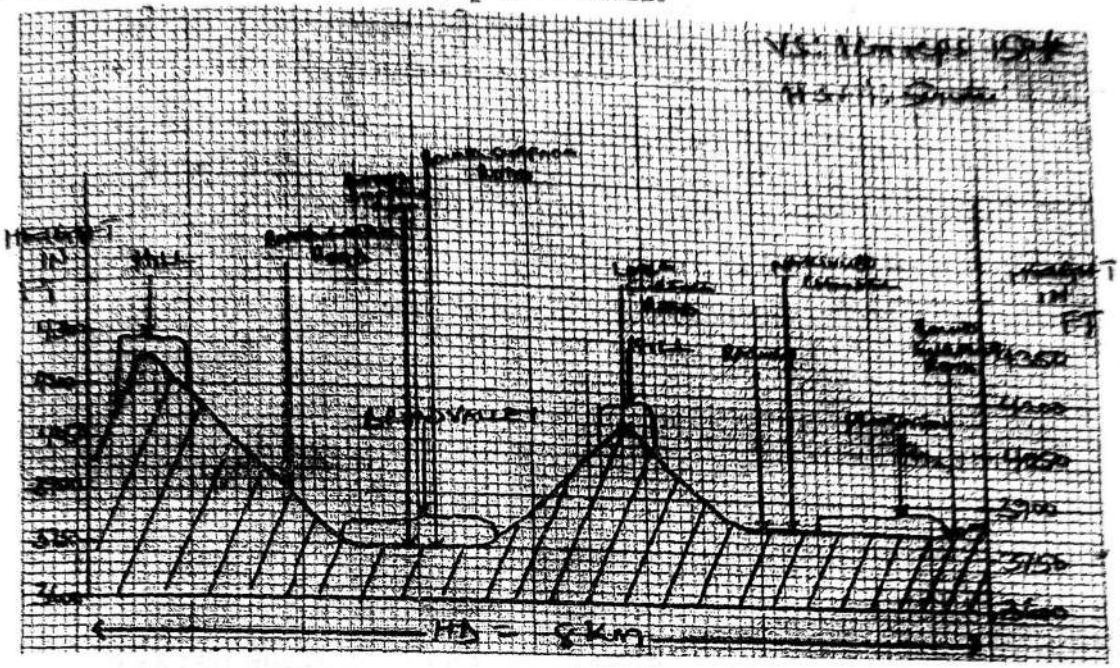
$$\text{Detour index} = \frac{\text{Actual distance of the road} - \text{straight line distance}}{\text{Actual distance of the road}} \times 100$$

$$DI = \frac{5.6\text{km} - 5.4\text{km}}{5.6\text{km}} \times 100$$

$$DI = 3.57\%$$

$$DI \cong 3.6\%$$

(c) i) **A relief section of Kampala along Easting 57 between Northings 28 and 35 showing two hills, broad valley, plantation, Nakivubo channel and transport routes.**



ii) • **Amplitude** = Highest point – lowest point

A = 4250ft – 3750ft

A = 500ft

• **Horizontal equivalent**

VE = 1sq = 1km

VE = 1sq = 2cm

VE = 1cm = $^1/_2$km

VE = 16cm x $^1/_2$km

VE = 8km

• **Vertical exaggeration**

$$VE = \frac{VS}{HS} = \frac{1}{150ft \times 30} \div \frac{1}{50,000}$$

$$\frac{1}{4500} \times \frac{50000}{1}$$

VE = 11.1 times

(d) **Settlement patterns west of easting 60 include;**

- Linear settlement pattern along the bound surface road from Entebbe to Kampala.
- Nucleated / clustered settlement patterns around Kibuye, Namirembe, Rubaga, etc.
- Planned / grid settlement pattern at Mengo, central business district.

(e) i) **Relationship between settlement and communication.**

- Settlements are found along bound surface roads e.g. Kampala – Entebbe Road because of easy accessibility.
- Settlement is found along loose surface roads e.g. Salaama-Kibuye road because of easy accessibility.
- Settlements are found along railway lines e.g. Wabigalo-Portbell because of easy movements.
- Settlements are found around road junctions e.g. Kibuye, Ndeeba because of easy movement.
- Settlements are found along main tracks / motorable tracks e.g. Bukoto to Kumamboga because of easy accessibility.
- Some settlements are found along footpaths e.g. Lukuli – Kansanga because of easy accessibility.
- Settlements are found around airstrips e.g. South of Naguru hill because of easy movement.
- Areas without communication lines are avoided by settlements e.g. in south east because they are inaccessible.

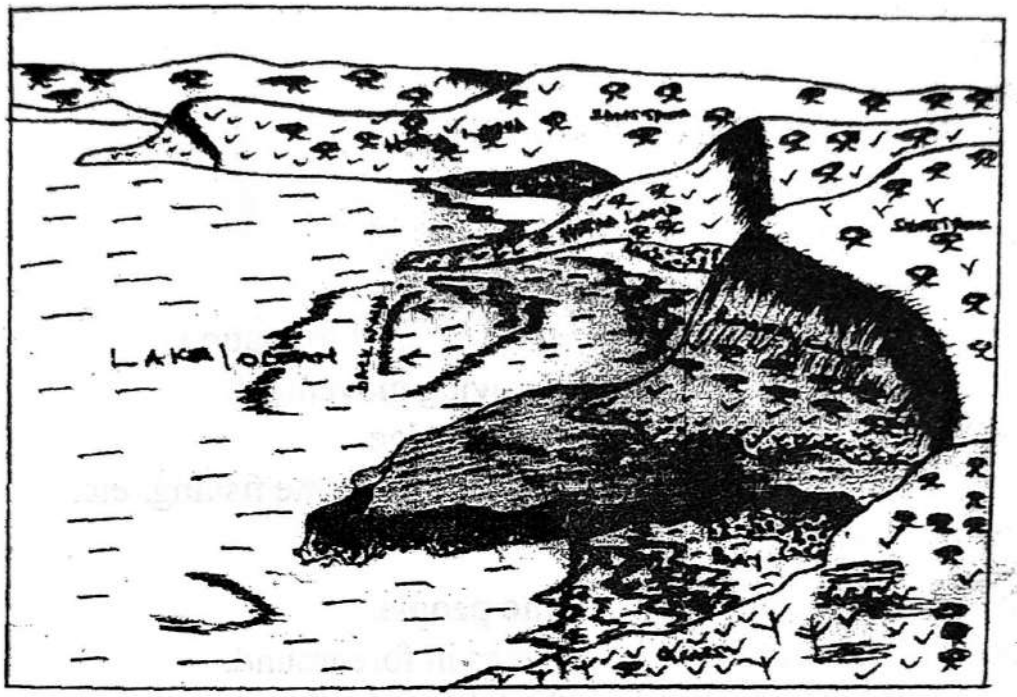
ii) **What makes Kampala a desired destination include;**

- Existence of employment opportunities in the central business district, industries like breweries and coffee factory in Luzira.
- Proximity to Lake Victoria which is a source of water evidenced by Gaba pumping station.
- Existence of recreational centres e.g. Golf course, Lugogo sports field for relaxation.
- Many tourist attractions e.g. Mutesa's tombs at Kasubi, Museum at Kitante.
- Existence of accommodation facilities e.g. Hotel at Kiswa, president's lodge at Makindye.
- Presence of educational institutions e.g. university college at

Wandegeya, schools at Bulange, Nsambya and Kibuli.

- Existence of security services e.g. Wandegeya police station, police lines at Nsambya.
- Existence of a variety of communication lines e.g. bound surface roads in the central business district, Air strip south of Naguru and railway line from Wabigalo to Portbell for easy movement.

2.a) A LANDSCAPE SKETCH OF THE AREA SHOWN ON THE PHOTOGRAPH SHOWING FORMS OF WAVE MOVEMENT RAISED CLIFF, NEW CLIFF, WATER BODY, HEADLAND, BAY AND VEGETATION TYPES. -



b) Account for the formation of;

(i) Bays and Headlands.

- A bay is an extension of the sea into land.
- Headland is a piece of land projecting / protruding into the sea.
- Formed by wave erosion due to abrasion and hydraulic action.
- Formed along coastlines with alternate soft and hard rocks.
- Soft rocks are easily eroded by abrasion because they are less resistant. This results into the extension of the sea into land hence a bay.
- Hard rocks resist wave erosion by abrasion hence protrudes into the sea to form a headland.

- *Illustration.*

(ii) Raised cliff.

- This is a steep rock face overlooking the sea but now above the zone of wave action.
- Formed by a fall in sea level or emergence of the coastline.
- A cliff forms when a notch is widened and enlarged by abrasion due to back wall recession.
- This leads to exposure of a steep slope facing the sea called a cliff.
- Due to a fall in sea level, the cliff is exposed above the zone of wave action hence a raised cliff.
- *Illustration.*

c) (i) Value of the drainage feature to the people.

The drainage feature is a lake / ocean.

- Source of water for domestic and industrial use.
- Tourist attraction hence earning of foreign exchange.
- Encourage fishing hence a source of food.
- Modifies the climate of the area through rainfall formation.
- Encourage water transport hence improving movement.
- Study and research hence widening knowledge.
- Used for recreational activities e.g. swimming, game fishing, etc.

Note: Value is for only positive importances.

(ii) Likely challenges to be faced by the people.

- Waterborne diseases because of the lakes in foreground.
- Drowning / water accidents due to the lake in the foreground.
- Dangerous aquatic animals because of the lake in the foreground.
- Coldness because of the lake in the foreground.
- Destructive floods because of the lake in the foreground.
- Landslide because of the steep cliff in the middle ground.

d) Areas include;

- Entebbe
- Mweya
- Gaba
- Jinja
- Mombasa
- Kasenyi

- Dar-es-salaam.

Reason:-

- Presence of the lake / ocean with bays, headlands, cliffs, wave cut platforms.

3. **Examine the influence of earth movements in the formation of relief landforms in East Africa.**

   Candidates are expected to;

   * Define earth movements.
   * Give the origins of the earth movements.
   * Describe the resultant landforms.

Earth movements refer to crustal disturbances associated with vertical and lateral movements occurring on a large or small scale.

- They originate from the interior mainly in the mantle.
- Due to heating by radioactivity, geophysical and geochemical reactions.
- This causes melting or nearly melting of mantle rocks resulting into the convective currents.
- Convective currents move vertically leading to an uplift or sinking of the earth's crust hence up and down warping and tilting.
- Convective curents move laterally / horizontally leading to tension and compression forces hence faulting and folding.

The resultant landforms are classified according to the processes as follows;

Faulting; is the fracturing and displacement of the rock strata relative to one another.

This has resulted into the formation of the following landforms;

- **Rift valley.** Is an elongated trough bordered by infacing faults scarps more or less parallel to one another.
- The rift has two major arms i.e. the eastern and western arm.

Formation of the rift valley by tension forces.

- Radioactivity, geophysical and geochemical reactions resulted into the divergent connective currents which spread in the interior producing the tension forces in the earth's crust.

- The tension forces pulled apart in the opposite direction from a central point within the earth's crust forming the normal fault lines hence displacement of the rock strata.
- As a result, the side blocks were pulled apart; the central block was lowered / sunk under its own weight to form a depression with gentle slopes called a rift valley.
- The slopes were modified by erosion and mass wasting.
- This explains the formation of the eastern arm of the east African rift valley.

Illustration.

Formation of a rift valley by compression forces.

- Radioactivity and geochemical reactions resulted into the convergent convective currents which produced the compression forces.
- The compression forces moved / pushed in the same direction and acted on the earth's crust.
- This resulted into the reversed faultiness.
- The side blocks were forced to override / uplifted above the central block that remained stable at a lower level forming a rift valley.
- The edges were later reduced to form a smooth escarpment.
- The theory is more applicable to the western arm of the East African rift valley.

Illustration.

- **Block mountain.**

Is an upland bordered by faults scarps on one or more sides.

Formation of a block mountain by tension forces;

- Divergent convective currents produced the tension forces.
- The rocks of the earth's crust were subjected to the tension forces.
- Pressure from the tension forces pulled the land mass apar leading to the development of normal fault lines on either sides of the central block.
- Continuous tension of the landmass pulled apart the side blocks causing them to sink.

- The middle block was left to form a block mountain.

Illustration.

Formation of Block Mountains by compression forces;

- Convergent convective currents produced the compression forces.
- The compression forces pushed the rocks of the earth's crust from either sides leading to reversed fault lines.
- Continuous pressure from the compression forces resulted into uplift / up thrust of the central block leaving the side blocks stable.
- The uplifted central block formed a block mountain separated from the surrounding land by fault scarps.
- Examples include; Mountain Rwenzori, Mountains Usambara and Uluguru, Ufipa, Pare, Mahenge, Ndoto, Nyiru, Mathews range.

- **Tilt block landscape;**

- Is a landscape composed of angular ridges and depressions formed by a series of tilted fault scarps and fault blocks.
- Tension / compression forces caused the formation of fault lines.
- This divided the earth's crust into several blocks.
- The blocks either sink or rose.
- The middle block was uplifted higher than sides.
- The middle blocks were tilted / bent in one direction hence a tilt block landscape.
- Examples include the Aberdare ranges in Kenya and Kichwamba in Uganda.

Illustration.

- **Fault scarp / Escarpment;**

- Is a steep side / slope where land falls from a higher level along a fault line.
- It is formed by vertical earth movements along fault lines which involves an uplift / up thrust and down throw / sinking along a fault line.
- They are prominent features along the edges of East African Mountains.
- Examples include; Butiaba, Kichwamba, Kyambura, Nandi, Mau, Keiyo, Manyara, etc.

Illustration.

- **Graben hollow;**
  - Is a narrow depression between parallel fault lines formed at a floor of the rift valley due to secondary / multiple faulting.
  - Radioactivity, geophysical and geochemical reactions resulted into two divergent convective currents.
  - They spread within the earth's crust resulting into the formation of tension forces.
  - The tension forces pulled apart the block of land from a central point hence development of normal faultiness.
  - The central block was sunk under its own weight to form a rift valley.
  - Secondary / Further / Multiple faulting took place at the floor of the rift valley to create a depression called a graben.
  - Examples include; L. Nakuru, L. Naivahsa, L. Magadi, L. Eyasi, L. Natron.
  - Note: One can use the compression forces theory and differential uplift.
  - *Illustration.*
- **Fault guided valleys.**
  - These are faulted valleys / depressions along a single fault line.
  - The displacement of rocks along a fault line caused the rocks to crushed and later easily removed by erosion and weathering leaving behind a depression called a fault guided valley.
  - Examples include; R. Aswa in Northern Uganda, Kerio valley in Kenya.

  Illustration.
- **Warping.**

  It is either up warping (uplift) or down warping (sinking) of the rocks of the earth's crust.
  - Warping is responsible for the formation of down warped basins and up warped plateaus / raised watersheds.
  - Before warping, rivers Kagera, Kafu, Katonga, Rwizi were from the East to the west draining into the Congo basin.
  - Rivers like Nzoia in western Kenya were also flowing eastwards.
  - During the Pleistocene period, there was uplift of western Uganda

and western Kenya hence the raised watershed / up warped plateaus.

- Central and south eastern Uganda experienced down warping creating basins or depressions.
- Examples of basins include L.Victoira, L. Kyoga, L. Mburo, L. Opeta, L. Wamala, etc.
- Examples of up warped plateaus include; the Banyaruguru hills.

Illustration.

- **Folding;**

- This is the bending of the earth's crust due to the action of the compression forces.
- Folding was responsible for the formation of the anticlines and synclines.
- Compression forces acted on the young sedimentary rocks.
- Instead of the rocks breaking, they bent to form up folds called anticlines and down folds called synclines.
- Examples are found in the Buganda – Tooro, rock system, Nyanza Kavirondo rock system and Ankole-Karagwe rock system.

Illustration.

4. a) Distinguish between sedimentary and metamorphic rocks.

Candidates are expected to;

*** Define rocks.**

- **Sedimentary rocks** as rocks composed of deposited minerals and rock fragments produced by mechanical and chemical weathering of the former rock masses or by organic action.
  - They are formed by agents such as wind, ice, running water and ocean waves.
  - They are characterised by; contain fossils, have layers, they have bedding planes, they are horizontal, gently dipping and steeply sloping.
  - Major processes of formation include; weathering erosion, transportation, deposition, accumulation, stratification, compression, compaction, consolidation and cementation.
  - Major categories are mechanically formed, organically formed and chemically formed sedimentary rocks.
  - They are found on the shores of L. Victoria, Nyakasura, L. Katwe,

East African Coast, etc.
- Examples include limestone, sandstone, clay stone, coal, rock salt, Duricursts, etc.

WHILE;

- Metamorphic rocks are changed rocks.
- Changed from the former Igneous and Sedimentary rocks.
- The change is due to heat, pressure and a combination of heat and pressure.
- Major categories are thermal, dynamic and thermal-dynamic metamorphism.
- Examples include; Quartzite, marble, schists, graphite, slate and gneiss.
- The characteristics are; more compact, harder than the original rocks, laminated into thin layers.

b) **Account for the formation of sedimentary rocks in East Africa.**

Candidates are expected to;

* Define sedimentary rocks.
* Give characteristics.
* Give process of formation.
* Describe the three types of sedimentary rocks.
* Illustration.

- **These are rocks composed of deposited minerals and rock fragments produced by mechanical and chemical weathering of the former rock masses or by organic action.**
  - The weathered materials are transported by erosional agents such as wind, ice, running water and ocean waves.
  - These are later deposited in strata on their dry lands, in valleys, lakes, rivers, seas and oceans.
  - The layers are separated by bedding planes of cementing materials.
  - The layers can horizontal, gently dipping and steeply sloping.
- **The characteristics include,**
  - They contain fossils (remains of dead plants and animals).
  - They occur in layers (stratified).
  - They are separated by bedding planes of cementing materials.

- The strata are horizontal, gently dipping or steeply sloping.
- They do not contain crystals.

- **The process of formation involves;**
  - Weathering of the igneous rocks.
  - Erosion and transportation of the eroded materials.
  - Deposition of the sediments by agents such as wind, ice, running water and ocean waves.
  - Accumulation of the laid down sediments.
  - Stratification of the laid down materials.
  - Compression of the stratified materials by the overlying weight.
  - Compaction the layers / strata.
  - Consolidation of the materials.
  - Cementation of the laid down material by silicurious, calcareous and ferruginous materials.
  - Transformation of the sediments laid down to form the sedimentary rocks.

- **Sedimentary rocks are formed in three main ways:**

Mechanically or physically formed sedimentary rocks;

- These are rocks formed from the drying and consolidation of rock textures deposited by various agents.
- These textures from varied rock types depend on the agent(s) of erosion, transportation and deposition.
- Rivers erode, transport and deposit alluvial or lacustrine deposits in the lower valleys of rivers / at the sea. Examples include; silt, alluvium, clay, gravel. Found in the lower valleys of R. Rwizi, Semiliki, Nzoia, Nyando, etc.
- Ice / glaciers erode and deposit materials called moraines, Tills, resorted clays, etc. they are found in the Nyamwamba, Mubuku and Bujuku valleys on Mt. Rwenzori.
- Wind also erodes and deposits materials known as loess, sand sheets and sand dunes. These are found in Karamoja, Northern Kenya and central Tanzania.
- Waves also erode and deposit materials known as marine deposits such as clay, shingle, gravel and pebbles. They are found along the shores of L. Victoria and the East African

coast.

- After consolidation and cementation, the resultant rocks include sandstone, claystone, mudstone, Grit, Boulder-clay, Conglomerates, shale and gravel.

- **Organically formed sedimentary rocks.**
  - These are formed from the remains of once living plants and animals (fossils).
  - Coral polyps are minute organisms within the sea. When they die, their skeletons are deposited at the sea bed.
  - They accumulate; they are compressed, compacted, consolidated and cemented to form the limestone rocks.
  - They are found at Tiwi, Kilifi, Mtwara and Tanga.
  - Plant accumulation during the carboniferous period resulted into the compressing and consolidation of the segments of the plant remains to form coal of different types i.e. lignite, brown coal and peat.
  - They are found in the Ruhuhu valley of Tanzania.
  - Accumulation of ferruginous materials to the formation of Iron ore and Iron stone.
  - Other examples include; petroleum, chalk and natural gas.

- **Chemically formed sedimentary rocks are formed due to evaporation and or precipit ation of rocks.**
  - Rock salt, dolomite and soda ash from L. Katwe, and Magadi were formed due to continued deposition and accumulation of salt crystals as a result of evaporation and precipitation due to hot temperatures.
  - Laterites / duri crusts are formed due to leaching and oxidation. The insoluble ores of Iron and aluminium are deposited on the surface or just below the surface, such oxides are dried up and harden to form a hard pan called the laterites.
  - They are found on the flat-topped hills of the Buganda landscape.
  - Stalactites and stalagmites are formed when calcium is deposited either at the roof or floor of the underground cave. Calcium dries and hardens at the roof to form the stalactites and at the

floor to form the stalagmites.
- Found in Nyakasura and the East African Coast.
- Other examples include; potash, Nitrates and gypsum.

5. To what extent has the nature of rocks influenced the occurrence of chemical weathering in East Africa?

Candidates are expected to;

* Define chemical weathering, give the conditions and give areas where it is experienced.
* Describe the chemical weathering processes.
* Take a stand.
* Bring out the role of the nature of rocks.
* Bring out other factors.
* Conclude with a judgement.

- **Chemical weathering** refers to the rotting / decay / decomposition of the rock strata insitu at or near the earth's surface.
  - It occurs due to heavy / adequate rainfall and high humidity that provides water.
  - Hot temperatures accelerate the rate of chemical reactions.
  - It involves changes in the chemical composition of rocks i.e. new compounds are formed.
  - Occurs in humid areas e.g. L. Victoria basin, along the East African coast and wind ward slopes of highlands in East Africa.

It occurs through;

- **Solution;** soluble rocks like limestone, rocks salt that get dissolved in water and are carried away leaving cracks, joints and hollows.
  - Common in limestone rocks at Nyakasura, Tororo and East African coast, rock salt at Katwe.
- **Carbonation;** rainwater from the atmosphere reacts with carbon dioxide to form the weak carbonic acids.
  - The carbonic acids react with the rocks to produce new compounds.
  - E.g. Calcium carbonate reacts with the carbonic acids to produce calcium bi-carbonate.
  - Found in Nyakasura, Tororo and the East African Coast.

- **Hydration;** Some minerals absorb water and expand hence produce new compounds. They then decompose to form new rocks.
  - E.g. Calcium sulphate absorbs water and changes to gypsum.
  - This is common in Bundibugyo and the East African Coast.
- **Hydrolysis;** Involves exchange of ions.
  - They hydrogen ions combine with the metal ions giving rise to new compounds e.g. clay, potassium carbonate, potassium hydroxide, etc.
  - Common in the broad valleys of Buganda landscape.
- **Oxidation;** When oxygen reacts with minerals particularly Iron and aluminium, oxidation occurs.
  - The structures are changed to laterites and benxites.
  - E.g. Basalt which is black / green is oxidised to red.
  - Common on the flat-topped hills of Buganda landscape.
- **Reduction;** is the removal oxygen and addition of hydrogen to a substance.
  - E.g. the ferric hydrates are reduced Iron and the sulphates to hydrogen sulphide.
  - Common in the broad valleys of Buganda landscape.
- **Chelation;** Involves base exchange between plants which causes changes from either sides.
  - Plants extract minerals from the rocks, as well release water into the rocks which causes in chemical composition
  - This is common in Budongo, Mabira, etc.
- **Spheroidal;** Is the swelling and expansion of the outer shells of the rock by water penetration.
  - This causes the rocks to peel off and loosen.

Nature of rocks influences chemical weathering in the following ways.

- **Mineral composition of rocks;**
  - Rocks like calcium carbonate react with carbonic acids to produce new compounds e.g. calcium hydrogen carbonate hence carbonation.

- Rocks like felspars which when mixed with water decompose to produce other mineral compounds e.g. Potassium hydroxide, potassium carbonate e.g. hydrolysis.
- Rocks react with oxygen in the presence of water to produce oxides in the process of oxidation.
- Rocks like rock salt and limestone are dissolved in water and are carried away in the process of solution.
- Rocks like mica and calcium sulphate absorb water, expand causing a change in structure hence hydration.

- **Jointings of rocks.**
  - Jointed rocks / cracks like limestone increase surface area for chemical reactions hence solution, hydration and hydrolysis.
  - Permeability of the rocks;
  - Permeable rocks like limestone allow water to penetrate and weather the rocks through carbonation, hydration and hydrolysis.

Other factors includes;

- **Climate**
- Rainfall provides water needed for chemical weathering processes i.e. heavy (Equatorial), Moderate (Savanna). Such humid conditions encourage chemical weathering since water is used as a medium of chemical reactions hence solution, hydration and carbonation.
- Temperature; Hot temperatures of over 20oC increase the rate of chemical reactions thus processes like carbonation and hydration.
- Carbonation also occurs under cold conditions.

- **Relief;**
- Chemical weathering is more dominant on gentle slopes and lowlands as water accumulates and sinks hence carbonation and solution.
- Steep slopes experience high rates of erosion hence expose fresh rocks to further chemical weathering.

- **Drainage;**
- Leaching occurs on flatlands because of poor drainage. This encourages oxidation.
- Poorly drained areas like flood plains, chemical weathering

occurs in form of processes like hydration, hydrolysis, reduction and solution.

- **Living organisms.**
- Man's influence.
- Industrialisation increases acidity in rain water hence carbonation.
- Dumping of industrial / agricultural wastes on land, in water directly react with the environment hence carbonation.
- Mining / Quarrying, road construction expose the underlying rocks hence carbonation, hydration and hydrolysis.
- Irrigation avails water hence chemical weathering through solution, hydration and hydrolysis.

- **Vegetation**
- A dense vegetation cover dumps the leaflitter which decays to form humus which is mixed with water to form the humic acids hence rock decomposition.
- Plant roots release mineral substances / water into the rocks while extracting other mineral substances hence chelation.

- **Other living organisms.**
- Secrete acids decompose the rocks from the waste e.g. uric acids from the soil living organisms are used to decompose rocks.
- Holes dug by burrowing animals like squirrels, moles, rabbits help water and air to sink and chemically weather the rocks through hydration, oxidation and hydrolysis.

- **Time**
- It takes time for rocks to undergo chemical weathering hence solution, carbonation and hydration.
- Conclude with a judgement.

6.a) Distinguish between valley widening and valley deepening.

- **Valley deepening is when the river erodes its bed and this increases on the river depth.**
  - It is caused vertical erosion that attacks the river bed.
  - This is commonly experienced in the youthful stage.
  - Evidence of valley deepening is seen in V-shaped valleys and gorges.

WHILE;

- **Valley widening is when the river erodes its sides / banks/ walls across the bed. This increases on the width.**
  - **Valley widening** is caused by lateral erosion and river meandering.
  - This is common in the middle and lower stages of the river.
  - Evidence of valley widening is seen with river cliffs, braided channel and U-shaped valley.

b) Explain the formation of the features that characterise the torrent stage of the river in East Africa.

Candidates are expected to;

* Describe the characteristics of the torrent / youthful stage.
* Identify and describe the features.

- **Torrent / youthful / upper / juvenile stage of the river is the stage where the river source is found.**
  - It is the stage where the river makes its first appearance.
  - It is the highest point of the river.

This stage is characterised by;

- A river flows at a steep gradient.
- The river is very fast or there is turbulent flow of the river.
- The volume of water is small due to a short course and few tributaries.
- The river increases its length through headward erosion.
- Erosion is directed to the bed i.e. vertical erosion.
- Valley sides are deep and steep.

The major features in this stage include;

- **V-Shaped valley.**
  - Is a deep and narrow valley where vertical erosion through hydraulic action undercuts its bed faster than the sides.
  - E.g's are R. Mobuku, R. Nyamwamba on Mt. Rwenzori and R. Tana on Mt. Kenya.
  - *Illustration.*

- **Potholes;**
  - These are circular depressions cut on the bed of the river.
  - They are formed by fast flowing water loaded with sand, gravel and pebbles and it swirls.
  - It is formed when the river bed is uneven or fairly soft.
  - The materials carried by the river will cut on a circular depression on the river bed which gradually deepen to form potholes.

Conditions for formation includes;
- Relatively soft rocks on the channel bed.
- Rocks with cracks and joints.
- High river velocity.
- High river energy.
- Presence of abrassional materials such as gravel, sand and pebbles.
- Examples include; R. Manafwa on Mt. Elgon, R. Mubuku on Mt. Rwenzori.
- *Illustration.*

- **Interlocking spurs;**
  - These are resistant obstacles / rocks around which the river winds in the youthful stage.
  - Interlocking spurs form in areas of alternate soft and hard rocks.
  - As hard rocks resist erosion, the river erode the soft rocks and bends are gradually emphasised.
  - Spurs do alternate on the opposite sides of the river banks and seen overlock /overlap into each other to form interlocking spurs.
  - Examples are found in the Nyamwamba valley in Kasese, Kisoro, Bundibugyo, etc.
  - *Illustration.*

- **Water falls.**
  - Is a sharp break in the rivers' course where the river water flows from a high level to low level.
  - Water falls are formed when a resistant rock layer lies across the river bed.

- After which are soft and less resistant rocks that can easily be eroded.
- There is undercutting / down cutting of the soft rocks to create a sharp break / steep gradient at the channel bed of the river.
- The river water then flows from a high level to a low level along the sharp break hence a waterfall.
- Examples include; Murchison falls, Karuma falls, Pangani falls, Kindaruma falls, etc.
- *Illustration.*

- **Plunge pool**
  - Is a broad, circular, shallow depression at the base of the waterfall forming a pool of seemingly settled waters due to progressive drilling and grinding of the valley floor.

Conditions for formation include;
- Large volume of water.
- Steep gradient
- Great erosive energy due to velocity.
- Hard rocks overlying soft rocks.
- Presence of abrassional materials such as gravel, pebbles and sand.

The process of formation involves;
- Erosion of the underlying soft rocks to produce a waterfall.
- Potholes are produced at the base of the waterfall due to the hydraulic force of the falling water over the soft rocks.
- Undercutting, scouring action, caritation, erosion, drilling and swirling collectively enlarge and widen the pothole to form a plunge pool.
- Examples are found on Murchison falls, Sezibwa falls, Nyakasura falls, etc.

- **Rapids**
  - Turbulent flow of water in a river channel.
  - Develops where the gradient of the river channel increases without sudden break of slope.
  - Soft rocks are easily eroded or removed and slope dips

downstream.

- Hard sections of rocks remain protruding hence an irregular bed of a river.
- The river therefore flows at moderate rate or gently over it forming rapids.

OR

- Presence of boulder deposits may make the channel bed irregular forming rapids.
- Examples are found on R. Nyamwamba, R. Kilombero, R. Nile, R. Semiliki, R. Tana and R. Mubuku, etc.

Illustration.

- **Gorge**

- Is an elongated steep sided narrow river-valley with the depth of the valley greater than the width.
- Gorges are formed when waterfalls are retreating/ receding.
- When a band of hard rock lie across the river bed.
- The river grades itself above the hard rocks and concentrates its attack on the soft rocks on the lower side.
- The falling water undercuts the hard rocks causing the waterfall to recede upstream hence a gorge.
- Examples include the Kyambura gorge, Mitano gorge, great Ruaha gorge, etc.
- Illustration.

7. Describe the influence of glacial erosional processes in the formation of glacial landforms in the mountains of East Africa.

Candidates are expected to;

* Describe the glacial erosional processes.
* Identify the mountains.
* Identify and describe the resultant landforms.

The glacial erosional processes include;

- **Plucking i.e. glaciers tear away the rocks as they move down slope.**

- Effective in jointed rocks where there is removal of the loose rock materials on the valley sides.

- This leads to widening of the glacial valley.

- **Abrasion i.e.** grinding process in which rock materials like pebbles and boulders mixed in the glacier are used as; the grinding tool to remove the loose rock particles at the bottom and sides of the glacial valley.
- Abrasion deepens, polishes and undercuts the glacial valley.
- In East Africa, glaciation is common on mountains Rwenzori, Kenya and Kilimanjaro that are found above 4700m above sea level hence result into the following landforms.

- **Cirque / Corrie / corm.**
- Is a semi-circular steep sided rock basin cut into the sides of the glaciated mountain.
- It starts formation as a pre-glaciated hollow periodically worked on by frost shattering leading to backwall recession on the sides of the depression.
- Plucking and abrasion helped to deepen and widen the depression.
- Examples include; lac du Speke, lac du Catherine on Mt. Rwenzori, Teleki on mountain Kenya.
  Illustration.

- **An Arete.**
- Is a narrow steep sided rock ridge separating two cirques.
- It results from backwall recession of two adjacent cirques leading to the formation of a sharp knife ridge called a cirque.
- Eg's include; Speke, Grant and Margherita on Mt. Rwenzori, Nelion on Mt. Kenya.
- *Illustration.*

- **Pyramidal peak.**
- Is a focal point of many Aretes.
- It is formed by backwall recession of two or more cirques from all sides of the glacial mountain.
- Plucking and abrasion help in the formation of the pyramidal peak.
- It is later sharpened by frost shattering.

- Examples include; Margherita peak on Mt. Stanley, Speke, Baker and grant on Rwenzori ranges, Kibo and Mawenzi on Mt. Kilimanjaro.

  Illustration.

- **Glacial troughs / U-shaped valleys.**
  - Broad, flat bottomed steep sided U-shaped valley.
  - Formed when a river is filled with glaciers.
  - Plucking and abrasion help to deepen and widen the former V-shaped valley by vertical and lateral erosion. This forms a U-shaped valley.
  - Examples include; Bujuku, Mubuku, Nyamwamba on Mt. Rwenzori.

    Illustration.

- **Hanging valleys.**
  - These are tributary valleys above the main valley that descend into the main valley.
  - They are formed when the tributary valley is occupied by a small volume of glacier compared to the main valley.
  - The main valley is over deepened by plucking and abrasion leaving the tributary at a higher level.
  - These tributary valleys form hanging valleys.
  - Examples are found in Mubuku and Bujuku valleys on Mt. Rwenzori.

    Illustration.

- **Rock steps.**
  - These are rock projections in a U-shaped valley.
  - Formed due to variation in rock resistance.
  - Hard rocks resist erosion leading to rock projections in the glacial valley hence rock steps.
  - Found in the gorges valley of Mt. Kenya.
  - Illustration.

- **Rock basins.**
  - These are circular depressions in a U-shaped valley.
  - Formed due to unequal power of erosion, varying thickness of

- **Trough ends**
  - A steep rock wall forming an abrupt end on the glaciated valley above which lies several cirques.
  - Abrasion and plucking processes of the glacier deepen and widen the U-shaped valley.
  - Several glaciers converge, much larger and thicker glacier is formed.
  - The extra-weight of the ice enables the glaciers to carryout greater downward erosion hence deepening the valley to form an abrupt end.
  - Examples are in the Mubuku valley on Mt. Rwenzori.
  - Illustration.

- **Rock benches;**
  - These are terrace-like features lying above the walls of the U-shaped valley.
  - They are formed when glaciers do not occupy the entire valley.
  - Examples are found in the gorge's valley on Mt. Kenya.

- **Straitations**
  - Scratches at the floor of the U-shaped valley.
  - Formed by abrasion where materials that are being carried by glaciers scratch themselves on the wall and floor of the U-shaped valley.

8. To what extent have human activities been responsible for savanna climate in East Africa?

Climate is the average weather conditions of a place studied and recorded over a long period of time. This is in terms of weather elements like humidity, rainfall, cloud cover, temperature, pressure and wind.

- Savanna climate covers the largest part of East Africa. It covers most of Northern Uganda, some parts of Central and Western Uganda, most of Western Tanzania, and some parts of Central Tanzania and the rift valley area of Kenya.

Savanna climate has the following characteristics:

- Moderate rainfall ranging between 750mm to 1000mm extending to 1270mm near the equator to 500mm towards the desert margins.
- Rainfall is seasonal with one rainy season and one dry season. This rainfall depends on the movement of the inter tropical convergence zone (ITCZ).
- Rainfall is convectional and an afternoon phemomena.
- Rainfall is mainly received between November to March in the Southern parts of East Africa and May to September in the Northern parts of East Africa.
- There is high humidity during the wet season and low humidity during the dry season.
- There is dense cloud cover during the wet season and clear skies during the dry season.
- In savanna climate regions there are hot temperatures ranging between 20°C and 27° C.
- Day temperatures reach 35°C and night temperatures reach 15°C
- The annual temperature range is moderate between 6°Cand 9°C

Role of human activities.

- **Deforestation.**
  - Cutting of trees for timber, fuel, poles etc, has led to reduced evapotranspiration leading\to reduced rainfall resulting into savanna climate. The cutting of trees also increases temperature to hot temperatures typical of savanna climate.

- **Overstocking and overgrazing**
  - The overstocking and overgrazing by nomadic pastoralists like Karamajong, Turkana, Masai, and Bahima has led to deterioration of vegetation leading to reduced evapotranspiration leading to reduced rainfall and increase in temperatures to levels of savanna climate.

- **Swamp reclamation**
  - Swamp reclamation like in Kigezi, lake Kyoga and Lake Victoria basins has led to reduced evaporation and evapotranspiration leading to decrease in rainfall and increase in temperatures to levels of savanna climate.

- **Bush burning**

- Bush Burning done by nomadic pastoralists to allow growth of pasture has destroyed the vegetation cover leading to reduced evapotranspiration leading to decrease in rainfall and increase in temperatures to levels of savanna climate.

- **Sinking of boreholes**

- This leads to drying of trees because their roots cannot reach the water table leading to decrease in rainfall and increase in temperature to levels of savanna climate.

- **Industrialisation**

- There has been increased levels of industrialization worldwide in general and East Africa in particular. This has led to increased release of gases like carbon monoxide, CFCs into the atmosphere which has led to hot temperatures typical of savanna climate.

Role of physical factors:-

- **Latitude**

- East Africa is located within the tropics between 4 ° N of the equator and 12° S of the Equator. This has led to hot temperatures of 23°c to 29°c which are typical of savanna climate.

- **Altitude**

- Many areas of East Africa lie at low altitude of below 1500 meters above sea level. Such areas include Northern and Central Uganda, western parts of Uganda with in the rift valley, western Tanzania and rift valley areas of Kenya.

- The low altitude has led to hot temperatures and moderate rainfall typical of savanna climate.

- **Relief**

- Many parts of East Africa are low lying without mountains and highlands to act as cooling agents like Northern and Central Uganda, Western and Central Tanzania and rift valley areas. This has led to hot temperatures and moderate rainfall typical of savanna climate.

- **Limited water bodies**

- Areas of East Africa like Central Tanzania, Ankole-Masaka dry

corridor, Northern Uganda have limited water bodies inform of lakes, rivers and swamps to recharge winds that move across the areas thus leading to moderate rainfall and hot temperatures typical of savannah climate.

- **Vegetation cover**

- The vegetation cover in Western and Southern Tanzania is mainly savanna woodland, in Northern Uganda, rift valley areas of Uganda, Nakasongola is mainly dominated by grassland. These vegetation types release moderate humidity through evapotranspiration resulting into moderate rainfall typical of savanna climate.

- **Continentality**

- Continentality or distance from the sea is responsible for savanna climate in East Africa. Areas like Central, Western, and Northern Uganda are far in the interior. The winds from the ocean/sea reach these areas when they have lost most of the moisture leading to tropical continental/savanna climate.

- **Air masses (wind system)**

- Air masses that visit East Africa namely **South East trade winds, North East trade winds,** and **Westerlies** have contributed to savanna climate.

- **South East** Winds originate from the Indian ocean where they pick water vapour which they transport and deposit on the East African coast as rainfall. As they penetrate the interior of Tanzania, they lose moisture resulting into moderate rainfall of 500-1000mm thus Savanna climate.

- The **Westerly winds** that originate from the Atlantic Ocean and Congo forest deposit moisture on the wind ward side of the western highlands leaving the leeward side relatively dry. This explains why the western rift valley and Ankole Masaka corridor experience moderate rainfall and hot temperatures typical of savanna climate.

9: To what extent have airmasses been responsible for humidity variation in East Africa?

Humidity is the amount of water vapor in the atmosphere.

- This varies from place to place depending on numerous factors.

because of limited evaporation and evapotranspiration. Consequently, there is high humidity at the East African coast where there are hot temperatures and low humidity in Bundibugyo and Kapchorwa where there are cold temperatures.

- **Altitude**
  - There is high humidity at lower altitude and low humidity at high altitude. High humidity at low altitude is because of being near sources of water vapor which are water bodies and vegetation. It is also because water vapour molecules have weight and are pulled by gravity to lower altitudes. As a result, East African coastal areas at low altitude have high humidity while upper slopes of Rwenzori, Kilimanjaro, Kenya, and Elgon have low humidity.

- **Water bodies**
  - Lakes, rivers and swamps are sources of water vapour. As a result areas with water bodies like lake Victoria basin, Lake Kyoga basin, around lakes Albert, Edward and George and the East African coast near Indian ocean have high humidity because of high evaporation from these water bodies.
  - Areas with limited water bodies like Northern Kenya, Central Tanzania and North Eastern Uganda have low humidity.

- **Vegetation cover**
  - Areas with dense vegetation cover in form of forests like Mabira, Kalangala, Imaramagambo, Kibale, Kalinzu, Itwara, Bugoma, and Budongo have high humidity because of high evapotranspiration, water vapor goes to atmosphere leading to high humidity.
  - Areas with scanty vegetation like the semi-arid and arid areas of Northern Kenya, Turkana land, and central Tanzania, Ankole Masaka dry corridor have low humidity because of limited evapotranspiration.

- **Man's activities.**
  - Afforestation and reafforestation in some areas like Muko and Mafuga in Kigezi and Lendu in west Nile have increased

One of the factors is wind system or air masses.

- East Africa is affected by numerous air masses that contribute to humidity variation. They include South East Trade winds, North East Trade winds and westerlies.

Role of air masses:-

- **The South East trade winds** originate from the Indian ocean where they collect a lot of water vapor leading to high humidity of around 80% on the East African coast and on islands of Zanzibar, Pemba.
  - When they travel in interior, they go losing water vapour which result into low humidity in Central Tanzania.
  - When they reach Lake Victoria, they pick a lot of water vapour leading to high humidity of around 80% on northern and north eastern shores of Lake Victoria.

- **The North East trade winds** originate from the Arabian desert thus have little water vapour.
  - They pass via the Red sea where they collect little water vapour. When they reach the Ethiopian highlands, they deposit moisture in form of rain.
  - When it descends the Ethiopian highlands, it has lost most of the moisture leading to low humidity in north Eastern Uganda, North Western and Northern Kenya.
  - **The Westerlies** originate from the Atlantic Ocean and Congo forest where they pick a lot of water vapour leading to high humidity in some parts of Kigezi highlands, Bundibugyo, in Western Uganda.
  - When they climb the western highlands, the moisture is deposited in form of rain and as they descend, on the leeward side there is low humidity in areas like Kasese, Lake Albert flats and Ankole Masaka dry corridor.

Role of other factors:-

- **Temperature**
  - High temperatures lead to high humidity because they encourage evaporation and evapotranspiration.
  - On the other hand, low temperatures lead to low humidity

humidity in the surrounding area because of high evapotranspiration from the forests.

- Cutting trees for timber and wood fuel, overgrazing, shifting cultivators and swamp reclamation has led to reduced evaporation and evapotranspiration in affected areas leading to low humidity.

- **Seasonal weather changes / ITCZ**
  - East Africa lies astride the equator with fairly hot temperatures throughout the year leading to high evaporation and evapotranspiration that lead to high humidity.
  - However, humidity variations may depend on seasonal variations. At the equator high humidity is experienced around September and March when the sun is overhead.
  - In northern parts of East Africa high humidity is experienced around April – May when the sun is overhead and in the southern parts of East Africa high humidity is experienced around October – November when the sun is overhead leading to high evaporation rates.
  - The fairly hot temperatures experienced almost throughout the year in East Africa result into low pressure/doldrums and East Africa being a zone of convergence of winds that bring humidity from their sources resulting into most of East Africa having high humidity throughout the year.

10.a) Examine the influence of climate on distribution of natural forest vegetation in East Africa.

- **Natural forest** vegetation is tree cover that grows over a wide area as a result of physical factors like climate, soils and drainage

There are numerous types of natural forest vegetation in East Africa distributed in different areas. They include:

- **Tropical rain forest (equatorial forest)** found in hot and wet area like forests of Mabira, Kalangala islands, Budongo, Bugoma, Kibaale, Imaramagambo, Itwara, Kalinzi, in Uganda and Kakamega in Kenya.

- **Mangrove forests** are found on the East African coastal lowland

areas and broad river valleys of Rufiiji and Ruvuma.

- **Temperate forests** found on high mountains at an altitude of 2500-3000 meters above sea level like on mountains like Kilimanjaro, Kenya, Rwenzori, and Elgon.
- **Bamboo forests** found at an altitude of 3000m -3500 meters above sea level on high mountains of East Africa.
- Climate influences the growth of natural forest vegetation in East Africa in the following ways:

On East African coastal lowlands and broad river valleys of Rufigi and Ruvuma there is heavy rainfall of 1000-2000mm, hot temperatures of 24°c to 30°c and high humidity of around 80% which lead to growth of Mangrove Forest. Under the above climatic conditions there is growth of mangrove forest with the following characteristics:

- Dense cover of trees that appear in pure stands.
- Trees are evergreen because they grow under these climatic conditions there is too much water/poor drainage.
- Trees have broad leaves that assist in getting rid of excess water through evapotranspiration.
- Trees have short stumy trunks in low tidal waters.
- Trees have aerial /stilt roots to support the stout trunks and keep them growing above the water levels and also assist in respiration.
- Mangrove forests grow as belt of various species that grow parallel to the shore.
- Have grey leathery foliage that appear to float on water.
- Trees are hardwood trees that take long to mature.
- Trees are of medium height 8-15 meters due to ample supply of sunlight.
- Trees have dense bushy stands because of hot and wet conditions and ample supply of nutrients.

Where there is heavy rainfall of 1500 – 2250mm, rainfall is throughout the year, high humidity of around 80% and abundant sunshine there is growth of tropical rainforest with the following characteristics:

- Tall trees which reach the height of 50 metres

- Trees have dense canopies that prevent sunlight from reaching the forest floor.
- Trees are in layers 30m – 50m, 15m-30m and 8m-15m because of growth at intervals.
- There is little or no undergrowth because of thick canopy that prevents sunlight from reaching the forest floor.
- Trees are ever green because of rainfall throughout the year.
- Trees have broad leaves to allow more evapotranspiration to remove excess water due to heavy rainfall.
- Trees are in mixed stands of mahogany, mvule, rosewood, ebony, ironwood, and palms due to hot and wet climate.
- Trees have buttress roots to support huge and tall trees that grow due to heavy rainfall.
- There are climbing plants such as lianas that climb in search of sunlight using huge trees for support.
- Trees have straight and big trunks due to ample supply of water as a result of heavy rainfall.
- Trees are hardwood trees like Mahogany, ebony, ironwood, red heart, and sapele that take long to mature under hot and wet conditions.

On high mountains at an altitude of 2500 - 3000 meters above sea level there are cool and w et conditions with moderate rainfall of 800-1200mm, relatively cool conditions of 15°-21°c and moderate humidity of 50% - 60% leading to growth of temperate forests with following characteristics:

- Trees are evergreen because of adequate rainfall which is distributed throughout the year and cool temperatures.
- Trees have small leaves with wax to protect them from the cool temperatures.
- There is growth of trees like podocap, camphor, and cedar that are adopted to relatively cool conditions.
- Trees are cone shaped
- Trees are of medium height of 10-20metres.
- There is growth of softwood tree species which take short time to mature.

On high mountains at an altitude of 3000-3500 metres above sea level there are climatic conditions of moderate rainfall of 600 – 800mm, cool temperatures of 8° - 14°c and humidity of around 40% leading to growth of bamboo forest with the following characteristics:

- Single layer of trees adopted to cool conditions
- Trees are reed like in appearance.
- Bamboo trees are 8-12 metres tall and 3-4 centimetres thick.
- Trees have hollow stems and are segmented.
- Bamboo trees have prop roots
- Bamboo trees have tough and pointed leaves to reduce on evapotranspiration.
- Trees are evergreen because of cool temperatures
- Bamboo trees are quick maturing taking 8-20 years
- Trees flower at 7-15 years and do it simultaneously

b) Explain the value of natural forests in the economy of ONE East African country.

Uganda;

- Source of timber for building and construction
- Source of poles i.e building poles, electric poles for electricity transmission, telecommunication poles.
- Source of wood fuel in form of charcoal and firewood for domestic and industrial use.
- Increase rainfall through evapotranspiration that support crop cultivation.
- Moderate temperatures by absorbing gases carbon-dioxide and carbon-monoxide thus reducing global warming.
- Source of herbal medicine that cures diseases.
- Promote tourism like forest walks etc, earning foreign exchange used to develop infrastructure like roads.
- Provide habitat of wild animals and birds hence wildlife conservation that attracts tourists.
- Food gathering like jackfruit and hunting providing food to the surrounding communities for their health.
- Research and education giving knowledge to people.

- Filming and photography advertising different areas.
- Are water catchment areas being sources of rivers that provide water for domestic and other uses examples river Manafwa, Sipi, Sironko from Mt. Elgon forest.
- Control soil erosion and landslides by binding soil particles together e.g Mt, Elgon Forest, Echuya forest etc.

11.(a) Describe the characteristics of savannah vegetation in East Africa.

Savannah vegetation is a type of vegetation found between tropical rainforest and desert vegetation. It is of three types mainly;

- **Savannah woodland** found in areas that receive moderate rainfall of 750-1000mm, hot temperatures of 24O - 29°C, and moderate humidity of 50-60%. It is found in western and southern Tanzania and isolated areas in northern Uganda and western rift valley area

- **Savannah grassland** found in areas that receive moderate rainfall of 500-750mm, hot temperatures of 24O - 29°C, and moderate humidity of 40-50%. Such areas include Northern Uganda, Western rift valley in Uganda, Nyika plains in Kenya, and around Bukoba in Tanzania

- **Dry savannah** (dry bush, thicket and scrub) in areas with low and unreliable rainfall of 300- 500mm, hot temperatures of over 27°c, low humidity of less than 30%. Such areas include; Turkana land in Kenya, Karamoja, Ankole-Masaka dry corridor in Uganda and most parts of Central Tanzania

Savannah vegetation of East Africa has the following characteristics.

- Growth of trees which are umbrella shaped to reduce on loss of moisture
- Trees are deciduous, shedding leaves during the dry season because the dry season is prominent
- Trees have thick barks to reduce on loss of water due to hot conditions
- Trees have small leaves to reduce on evapotranspiration
- Trees have swollen trunks to store water due to prominent dry season

- Trees have long tap roots that go deep underground in search for water
- Trees have waxy barks and leaves to reduce on evapotranspiration
- The dominant tree species are acacia, baobab, and cacti adapted to low rainfall and hot temperatures in some areas
- Trees and grass are fire and drought resistant as these phenomena are common.
- Where rainfall increases to between 750-1200mm towards rainforest, there is savannah woodland with the following characteristics.
- There is more or less continuous cover of trees
- Trees are of moderate height 8-16 meters
- There is dense cover of grass, bushes and shrubs.

Where rainfall is moderate 500-700mm, there is growth of savannah grassland with the following characteristics.

- Tall grass of 1m but in some areas 2-4 meters
- Elephant and spear grass are common.
- Grass dries becomes brown during dry season which is prominent while it is green during wet season
- There are short trees of height 5-10 meters

Where rainfall decreases on desert margins to 300-500mm, there is dry savannah with the following characteristics

- Short grass of less than 1m.
- Grass dries becomes porched and brown during dry season.
- There are scattered stunted trees with woody stems.
- Trees are very short with less than 6 meters.
- There is growth of xerophytic plants like cacti and euphobia.

(b) Explain measures that are being taken to conserve savannah vegetation in East Africa

- There is formation of various organizations like NEMA, NFA, UWA by government policy
- and action plans on sustainable use and conservation of the environment implemented by these organizations
- There is formulation and enacting laws on conservation of natural vegetation

- Afforestation which is planting trees where they have never existed and reforestation which is planting trees where they have ever existed and were cut is being done to reduce cutting trees in woodlands
- There is continuous gazetting of national parks and forest reserves to preserve woodlands, grasslands and dry savannah vegetation
- There are ongoing rural and urban electrification programs to reduce cutting trees in woodland and grasslands to get wood fuel in form of charcoal and firewood
- There is development and provision of alternative sources of energy like solar, biogas for cooking, lighting and for industrial use in running machines
- Energy saving stoves are being introduced and used to reduce on cutting trees in woodlands for fuel
- Alternative sources of building materials like bricks, metallic poles are being provided and encouraged other than use of pole and grass
- Agro forestry is being carried out by different communities so that planted trees are alternatives of woodlands in provision of wood fuel and building materials
- Communities are being advised to practice rotational grazing to ensure natural growth of savannah vegetation
- Reducing stock in ranches, national parks/ game parks, hunting grounds through selective killing of animals to reduce pressure on the land
- Mass education, educating and sensitizing the masses/communities to participate in programs like tree planting and also stop destruction of environment/ savannah vegetation
- Research is being carried out by various bodies like NEMA, UFA, UWA on nature conservation to ensure growth of different vegetation types

12. a) Distinguish between zonal and azonal soils.

Zonal soils

- Zonal soils are mature soils with well-developed soil profiles
- They are soils resulting from mainly climatic factors which contribute to a number of soil formation processes.
- They develop under prolonged action of climate working hand in

hand with vegetation.

- They are well drained soils.
- They develop on gentle slopes and well drained lowland.

They are divided into two namely;

- **Pedalfers** which are rich in iron and aluminium with low calcium carbonate content due to leaching.
- **Pedocals** that develop under conditions of low rainfall and have high calcium carbonate content with limited iron and aluminium compounds.

The type of zonal soils depends on climatic zones as below;

- . Under hot and wet climate there is development of latosols due to leaching of silica while iron and aluminium compounds are deposited in top layers of the soil profile.
- . In humid sub-tropical areas there are grey, brown soils or brown earth like where there are deciduous or coniferous forests, which are soils rich in organic matter.
- . In areas of seasonal rainfall there are prairie soils or chernozems which are black soils rich in organic matter.
- . In tropical areas that experience seasonal rainfall there is formation of black earth soils.
- . In semi desert areas there are chestnut or brown soils
- In desert areas there are sierozems or red desert soils which are soils with limited organic matter.
- In very cold or cold areas there are tundra and arctic soils.

WHILE;

Azonal soils.

- Are young soils with immature soil profiles. They have not been exposed to soil formation processes long enough to develop mature soils.
- Being young soils, they show characteristics of parent rock material.
- They are not associated with specific climate or vegetation zones.
- They are derived from unconsolidated materials like alluvium, sand, and volcanic ash.
- There are two groups namely lithosols and regosols

There are numerous examples of azonal soils namely: -

- Scree soils on mountain slopes
- Volcanic soils such as volcanic ash and cinder lava and pumice due to volcanicity.
- Windblown soils such as loess and sand dunes.
- Mud flat soils or marine clays due to wave deposition
- Till, out wash sand soils, and boulder clay due to deposition by glaciers.
- Alluvial and clay soils deposited by running water and rivers.

b) Account for the formation of zonal soils in East Africa.

- Climate
- In hot and wet areas that experience hot temperatures and heavy rainfall there is leaching of silica while iron and aluminium accumulate in top layers of the soil profile leading to formation of reddish-brown soils known as laterites formed in areas like Buganda.
- In tropical areas that receive moderate and seasonal rainfall there is formation of black earth soils rich in humus as a result of humification.
- In semi desert areas there is formation of chestnut soils which are light coloured soils with limited humus due to limited vegetation cover.
- In desert areas there is formation of sierozems or red desert soils which are soils characterized by encrustation of calcium carbonate on the surface. There is also accumulation of salts in top layers of the soil profile.

- **Parent rock**
  - Mineral composition can influence formation of zonal soils
  - Where rocks have high calcium carbonate content there is formation of pedocals when calcium carbonate is brought upwards from B to A horizon under hot temoperatures.
  - Where there is iron and aluminium there is formation of pedalfers. Silica is leached while iron and aluminium are deposited on the surface to form laterites
  - The permeability of rock influences formation of zonal soils.

When rocks are permeable there is leaching, eluviation and illuviation leading to formation of mature zonal soils.

- **Relief**
  - Gentle slopes and lowlands encourage percolation of water leading to leaching, eluviation, and illuviation leading to mature zonal soils. Gentle slopes allow development of well drained soils.

- **Drainage**
  - Zonal soils form under conditions of good drainage. In such well drained conditions water percolates leading to leaching, eluviation and illuviation leading to development of mature zonal soils.

- **Biotic factors**
  - In hot and wet areas, the dense/thick vegetation cover lead to high acidity produced by the decay of tropical litter leading to humification and leaching that lead to deep mature zonal soils.
  - Where there is forest and savanna vegetation the vegetation hold soil particles together encouraging infiltration of water leading to leaching, eluviation, illuviation and chemical weathering that result into mature zonal soils like laterites.
  - Man's activities like digging and ploughing which loosens the soil and encourage infiltration of water, irrigation farming etc
  - encourage leaching, eluviation and illuviation leading to formation of mature zonal soils.

- **Time**
  - Zonal soils are mature soils and consequently develop over a long period of time. They develop over a long period of action of climate in collaboration with vegetation types.

Q13: Examine the processes of formation of soil types in humid areas of east Africa

Approach

* Define soil
* Describe the types of soil in east Africa
* Describe processes of formation of soil types in humid areas.

Soil is a thin layer of the earth's crust composed of mineral rock particles, air and water found in spaces between mineral rock particles, decomposing organic matter or humus and living organisms like bacteria, fungi, worms and protozoa

There are three major types of soil in humid areas namely zonal, azonal and intrazonal;

- **Zonal soils**
  - Are mature soils with well-developed soil profiles
  - They are soils resulting from mainly climatic factors. They develop under prolonged action of climate working hand in hand with vegetation types
  - They are well drained soils
  - They develop on gentle slopes and well drained lowland.

The zonal soils are divided into two;

- **Pedalfers** which are rich in iron and aluminium with low calcium carbonate content due to leaching
- **Pedocals** that develop under conditions of low rainfall and have high calcium carbonate content with limited iron and aluminium compounds

The type of zonal soils depends on the humid area;

Under hot and wet climate, there's development of latosols due to leaching of silica while iron and aluminium compounds are deposited in top layers of the soil profile

- **Azonal soils**
- In some humid areas, there are azonal soils which are young soils with immature soil profiles
- being young soils, they show characteristics of the parent rock material
- They are derived from unconsolidated materials like alluvium, sand and volcanic ash
- **They are in two groups namely lithosols and regosols**
- The examples of azonal soils in humid areas include;
- Mudflat soils or marine clays in humid coast areas of east Africa like east African coast due to wave action

- Alluvial and clay soils deposited in humid areas by running water and rivers like in river valleys of Rufiji, Ruvuma, and valleys of Kigezi and Kenya highlands
- Till, outwash sand soils and boulder clay soils due to glacial deposition in humid areas affected by glaciation
- Volcanic soils such as volcanic ash and cinder, lava and pumice due to volcanicity in humid volcanic areas like Mt Elgon slopes, slopes of Mt Kilimanjaro, slopes of Mt Kenya, and Kisoro lava plateau

- **Intrazonal soils**
- These are soils that occur under specific conditions of the parent rock or where drainage exerts strong influence like in lowlands and broad river valleys
- Examples of intrazonal soils in humid areas include;
- Peat soils which are hydromorphic soils in humid poorly drained areas like those of Lake Victoria and lake Kyoga basins and East African coast where saturated conditions lead to partial decomposition of organic matter forming peat soils
- Calcerous (calcimorphic soils) which are soils formed in humid areas where there's limestone parent rock like east African coast and Nyakasura area. Examples include rendzina and terra rossa. Rendzina are dark colored soils with a surface horizon of friable, almost granular loam soil lying on a sub soil containing limestone or chalk fragments that rest on the solid rock

Processes of formation of soil types in humid areas.

- **Weathering**
- This is the decomposition or disintegration of the rock at or near the earth's surface in situ
- It may be physical weathering which is the disintegration or breakdown of rocks into small soil particles which occurs in humid areas as a result of biotic factors like action of roots of plants in places with dense vegetation like mabira or due to activities of man like in Lake Victoria basin leading to formation of deep zonal soils
- It may be chemical weathering that involves decomposition or decay or rotting of rocks at or near surface in situ

- It occurs under conditions of heavy rainfall and hot temperatures
- Leads to formation of soils like laterites
- Occurs in humid areas like Lake Victoria basin

- **Leaching**
- This is the removal of mineral constituents of the soil vertically in solution form in the soil profile
- Some of the removed constituents are clays, sesquioxides, of iron and aluminium and humic acids from decomposing organic matter
- Occurs in hot and wet areas where there is heavy rainfall resulting into leaching of silica while there is deposition of iron and aluminium compounds in top layers of the soil profile due to hot temperatures to form duricrust
- It leads to formation of lateritic soils
- Occurs in Lake Victoria basin

- **Elluviation**
- Involves movement of soil particles in solution or suspension vertically and laterally within the soil profile from A to B horizon
- Occurs in humid areas under hot and wet conditions where there is heavy rainfall and hot temperatures
- It leads to formation of deep mature zonal soils
- Occurs in humid areas like Lake Victoria basin and the East African coast

- **Illuviation**
- This involves deposition and accumulation of leached and eluviated substances in B horizon of soil profile
- The materials deposited include clay particles, organic matter and soluble materials leached and eluviated from A horizon of the soil profile
- Occurs in humid conditions under conditions of heavy rainfall
- Result into formation of deep mature zonal soils
- Occurs in humid areas like Lake Victoria basin and East African coast

- **Humification**
- Involves decomposition of dead plants and animals to form humus
- Common in hot and wet areas (humid areas) with dense vegetation

cover in form of forests where there are living organisms like bacteria, worms, fungi and protozoa

- Leads to formation of humus in top layers of the soil profile or dark humus rich soils
- Common where there are dense forests like Kalangala islands, Lake Victoria basin like Mabira Forest, forests of Budongo, Bugoma, Itwara, Kalinzu

- **Mineralization**
- Is a process that occurs in humid areas where decomposition goes further than humification. The organic residues or humus further breaks into mineral substances like carbon dioxide, silica, water, nitrogen etc which are utilized for plant growth
- It occurs in hot and wet conditions particularly areas with dense vegetation where there is a lot of humus
- It results into formation of loam soils which are rich in humus
- This process is common in hot and humid areas like Lake Victoria basin

- **Gleization**
- This is a soil formation process that involves partial decomposition of organic matter as a result of water saturated / logged conditions that inhibit activities of living organisms
- Occurs in lowlands and valleys where there is poor drainage
- The partial decomposition leads to formation of peat soils
- Occurs in Lake Victoria basin where there are swamps like Nabajjuzi swamp near Masaka town, lake kyoga basin and in peri glacial areas on high mountains like Rwenzori, Kilimanjaro and Kenya

14: To what extent are physical factors responsible for extensive soil erosion in east Africa?

* Define soil erosion
* Identify areas where there is soil erosion
* Describe different types of soil erosion
* Explain the role of physical factors in extensive soil erosion.
* Explain the role of other factors in extensive soil erosion
* Give a conclusion.

Soil erosion is the removal or washing away of top thin layer of the soil by agents like wind, running water etc transported and deposited in another place.

Soil erosion is common in many areas of East Africa especially highland areas like Kigezi highlands, Rwenzori highlands, and the slopes of Mt. Elgon in Uganda, Kenya highlands in Kenya, slopes of Mt. Kilimanjaro, Usambara, and Uluguru highlands, Southern Tanzania highlands, and Kondoa region in Tanzania and dry areas like Ankole-Masaka corridor, Karamoja, Turkanaland, Machakos, and Central Tanzania.

There are numerous types of soil erosion in East Africa.

- **Soil splash erosion**
- Due to impact of raindrops on soil i.e due to rainfall.
- Raindrops dislodge the soil particles and scatter them in different directions.
- Occurs on any surface which is bare.

- **Sheet erosion**
- Involves slow uniform removal of thin surface layer of the top soil.
- Occurs on gentle slopes
- Occurs over a wide area.

- **Rill erosion**
- Involves uneven removal of surface soil in form of small channels known as rills.
- It occurs as a result of heavy rainfall where precipitation exceeds infiltration.
- Occurs on gentle and steep slopes eg in Kigezi highlands, Kenya highlands, southern Tanzania highlands, and the slopes of Mt. Elgon.

- **Gully erosion**
- Type of erosion where soil is carried in large channels
- Occurs as a result of heavy rainfall
- Common on steep slopes
- There is formation of large channels deeply incised creating irregular landscape difficult to work on during cultivation.

- Occurs in Kigezi highlands, Kapchorwa, Bundibugyo etc.

- **Wind erosion (Deflation)**
- Erosion where the wind blows and detaches soil particles.
- May be by traction where large particles are dragged on the surface.
- May be by saltation where particles are carried when bouncing on surface.
- May be by suspension when silt and fine particles are blown by wind and held aloft the wind by the turbulence of the wind.
- Occurs in dry areas like Ankole- Masaka dry corridor, Turkana land, Northern Kenya, Karamoja and central Tanzania.
- Result into dust storms.

Candidates should explain the role of the physical factors.

- **Climate**

  Heavy rainfall
- Heavy torrential rainfall of high intensity lead to erosion.
- It washes away the top soil downslope.
- Lead to sheet, rill, and gully erosion.
- Occurs in Kigezi highlands, slopes of Mt. Elgon, Kenya highlands and Southern Tanzania highlands.

- **Strong winds.**
- Presence of strong winds in areas of low and unreliable rainfall lead to erosion.
- Low and unreliable rainfall lead to bare patches and when there are strong winds there is wind erosion e.g. Ankole- Masaka dry corridor, Karamoja, Northern Kenya.

- **Relief**
- Gentle slopes of highlands of Kigezi, Kenya highlands encourages run off and soil erosion.
- It encourages sheet erosion
- Steep slopes of highlands like Bundibugyo, Kigezi, Kapchorwa, encourage run off and erosion.
- It leads to rill and gully erosion.

- **Nature of soil**
- Volcanic ash/ soils tend to be porous and unstable offering little resistance to agents of erosion like water and wind.
- When they absorb water, they are easily taken downslope in form of sheet erosion e.g volcanic areas of Kisoro, and Mt. Elgon area.
- **Biotic factors**
- Harvest ants and termites in semi-arid areas encourage soil erosion.
- They eat up grass and trees leaving soil bare resulting into soil splash and wind erosion. Eg. Ankole – Masaka corridor, Nakasongola, Central Tanzania, Northern and North western Kenya.
- **Scanty or limited vegetation cover.**
- Leaves soil bare open to direct impact of rain drops on the soil
- This leads to soil splash erosion and wind erosion.
- Common in semi-arid and arid areas as a result of long drought. Such areas include Chalbi Desert in Northern Kenya (Machakos area)

Role of other factors.

- **Deforestation**
- Excessive cutting of trees for timber, firewood, building materials, agriculture and settlement.
- Soil lose the roots that bind the soil particles together.
- Result into sheet, rill and gully erosion.
- When trees are cut, there is direct impact of rain drops on soil leading to soil splash erosion.
- Cutting of trees has taken place in Kigezi where part of Echuya forest has been cut and Mt. Elgon area where part of Mt. Elgon Forest has been cut.
- **Burning**
- Burning is done by shifting cultivators to clear land and nomadic pastoralists during dry season so as to allow the growth of fresh pastures when it rains.
- Leaves the soil bare
- Leads to wind erosion
- Example in Turkana land, Masai land, Karamoja etc.

- **Overstocking and overgrazing**
- Overstocking is keeping more animals more than the carrying capacity of an area leading to overgrazing and overgrazing may occur due to lack of controlled grazing.
- Overgrazing leaves land bare open to direct impact of raindrops on soil, runoff and wind.
- This leads to soil splash erosion and wind erosion.
- Occurs in areas like Ankole-Masaka corridor, Karamoja, Turkana land, and Masai Land.

- **Monoculture**
- This is cultivation of same crop year after year in an area.
- Leads to loss of soil fertility, crops which grow are weak, their roots don't bind soil particles together and branches do not effectively cover the soil
- Leads to sheet and rill erosion
- Because branches do not effectively cover the soil, there is soil splash erosion
- Monoculture is practiced at Kasaku tea estate in Buikwe, Nakigalala tea estate in Wakiso, Igara tea estate in Bushenyi

- **Up and down ploughing**
- Farmers plough up and down hill slopes
- Exposes the whole cultivated area
- Leads to sheet, rill and gully erosion. Up and down ploughing provide man-made channels encouraging gully erosion
- Common in Kigezi highlands

- **Over cultivation and over cropping**
- Over cultivation which is common in densely populated areas like Kigezi involves cultivation of the same plot year after year while over cropping is the cultivation of different crops on the same plot year after year
- This leads to loss of soil fertility
- Crops which grow are weak, their roots cannot bind soil particles together and branches cannot effectively cover the soil
- Leads to sheet, rill, soil splash and gulley erosion

- **Mining**
- Open cast mining destroys the vegetation cover
- Soil is left bare leading to soil splash and sheet erosion
- e.g copper mining at Kilembe, diamond mining at Mwadui in Tanzania

- **Construction**
- Construction of roads, railways and settlements
- Destroys the vegetation cover making soil exposed to direct impact of raindrops
- Leads to soil splash erosion
- Construction of roads in hilly areas of Kigezi, Kapchorwa, Bundibugyo create drainage channels that encourage gully erosion

- **Planting non-cover crops**
- Planting non cover crops like maize, millet, simsim exposes the soil to erosion
- It leads to direct impact of raindrops on soil
- Leads to soil splash erosion

In this question, candidates should give **evaluation.**

NOTE:

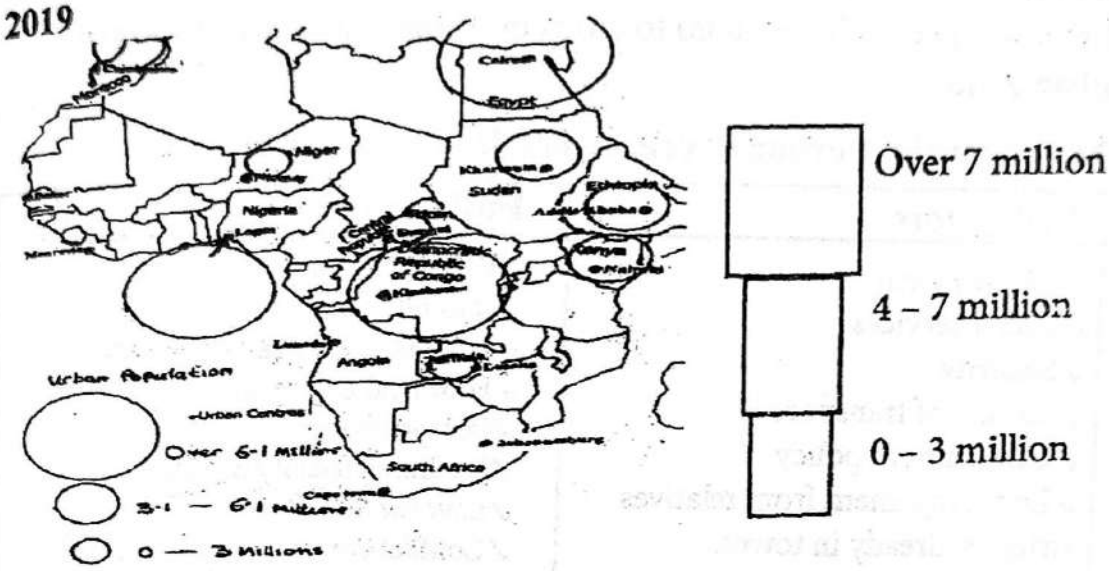
In discussion of causes;

* Describe the cause
* Where is it a cause
* How does it cause erosion?
* Causes which type

P250/2:

1. a) With the help of the Graduated range of symbols as a statistical method, represent the information in the table on the base map provided.

GRADUATED RANGE OF SYMBOLS SHOWING URBAN POPULATION FOR SELECTED COUNTRIES OF AFRICA IN 2019



Develop a scale with ranges. The scale should accommodate the lowest value of Bangui i.e. 622,000 people and the highest i.e. Cairo with 20,485,000 people.

N.B:

There is freedom of choice as long as you are correct and consistent with the facts in the table.

Use of either circles or squares is relevant as long as the show progressive increase in the range of values.

All cities in the same range should be given the symbol of the same size.

(b) State the demerits of using the method in (b) above.

- Takes time to draw/time consuming
- Can appear congested
- Takes space

- Finding the scale can be difficult.

(c) (i) least urban population.

- Central African Republic

(ii) highest urban population

- Egypt

(d) The reasons for development of urbanization in Egypt are

N.B. Mark pull and Push factors

i.e. Factors in towns that attract people and conditions in villages that make people leave to go to cities contributing to the process of urbanization.

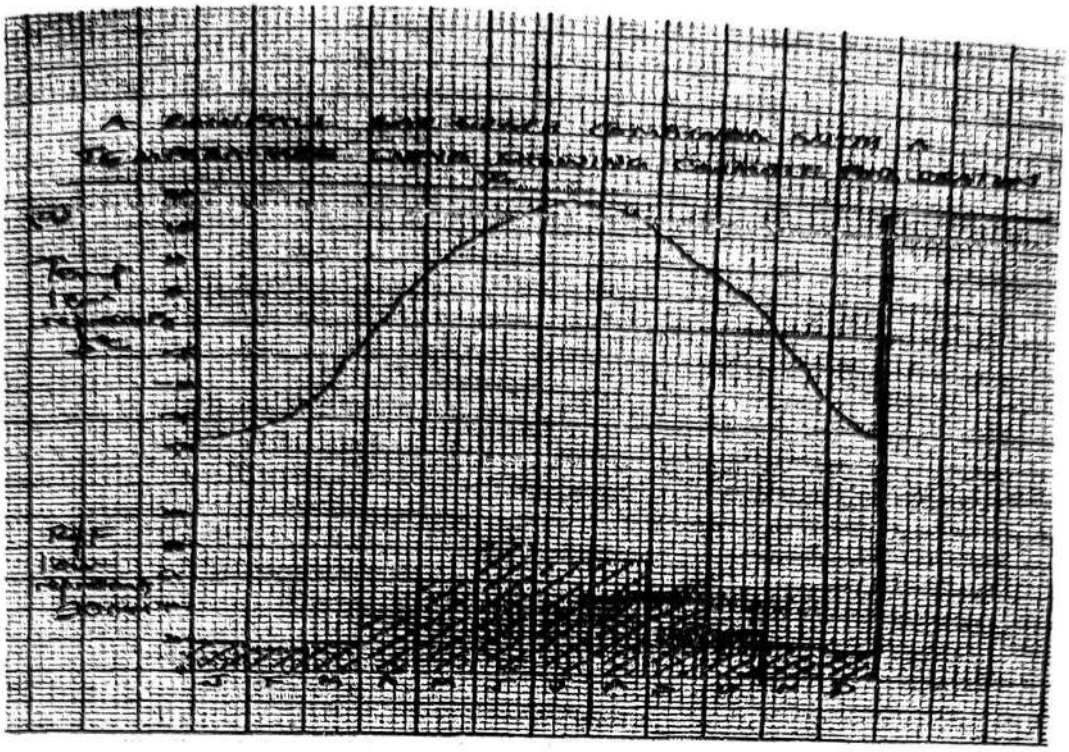
Do not consider urban development/Development of a city.

Pull factors	Push factors
✓Employment ✓Social services ✓Security ✓Variety of transport ✓Government policy ✓Encouragement from relatives /friends already in towns.	✓Population pressure in rural areas. ✓Instability ✓Evasion of cultural obligations ✓Poor land tenure system ✓Poor transport ✓Declining fertility of the land ✓Love for adventure ✓Conflicts/disagreements/poor habits

Study the table below showing Rainfall and Temperature for station Z and answer the questions that follow.

Months	J	F	M	A	M	J	J	A	S	O	N	D
Temp °C	-18	-15	-7	4	12	17	20	18	12	6	-5	-15
R/fall mm	19	15	23	36	60	84	72	75	51	30	21	19

Draw a rainfall bar graph combined with a temperature curve to show the information in the table.



Merits of the method

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

(c) (i) Describing the Climate.

√ The coolest month is January.
√ The hottest month is January.
√ A big annual temperature range of 38OC.
√ Experiences cold winters and warm summers.
√ The wettest month is June.
√ The driest month is February.
√ The climate is wet throughout the year.
√ Most rain falls in summer/single maxima.
√ Precipitation in winter falls in form of snow.

(ii) Name the type of Climate described in c(ii) above.

√ It is a Cool temperate/cold temperate climate.

(d) (i) Example of countries from the Northern hemisphere e.g.

√ Norway, Sweden, USA, Canada, Germany.

(ii) The climate has influence on the following human activities.

√ Agriculture
√ Fishing
√ Water transport
√ Tourism
√ Power generation
√ Population distribution
√ Manufacturing of agricultural, forest products etc.
√ Forest exploitation (Lumbering)

3. To what extent has technology contributed to the development of Horticulture in either Netherlands or Kenya?

One should clearly explain the contribution of technology to the development of Horticulture in either Netherlands or Kenya and also explain other factors.

Horticulture is a commercial intensive type of farming which uses a small area, scientific methods of farming e.g. irrigation, application of fertilizers, high yielding variety of crops to include vegetables, fruits and flowers etc.

A good answer should mention some types of fruits and vegetables.

Areas of Kenya where horticulture is being done include; Lake shores of Lake Victoria/Kisumu, Kenya Highlands, Mombasa etc.

Areas in Netherlands include, Ysell lake polder region, Friesland, Delta region, Amsterdam etc. The factors for the development of horticulture are more or less similar.

√ **Role of technology**
√ Use of glass houses/green houses and the related infrastructure.
√ Used in preparation of land/ land reclamation/polder formation.
√ Applied in planting.
√ Applied in harvesting.
√ Used in processing and preservation.
√ Applied in transport.
√ Applied in creation of genetically modified crop varieties.

Other factors.

- √ Limited land hence intensive cultivation.
- √ Water supply.
- √ Gently sloping land.
- √ Fertile soils.
- √ Favourable climatic conditions.
- √ Improved crop breeds.
- √ Capital.
- √ Labour force.
- √ Favourable government policies.
- √ Research
- √ Available market.
- √ Political stability.
- √ Power supply.
- √ Degree of specialization.
- √ Role of co-operatives

4.(a) Define the term population density.

Population density refers to the average number of people per square unit area e.g. per square kilometer.

Calculation $\frac{\textit{No of People}}{\textit{Area in Km}^2}$

Population density ranges from sparse e.g. 10 persons and below in sqkm, moderate up to 100 persons and high density i.e. over 100 persons per km^2.

Examples of areas with high population densities include; Nile delta, Eastern China, Coastal Nigeria, Kenya High lands, Towns etc. Sparsely populated areas include deserts, forested areas, mountainous regions etc.

(b) Explain the factors contributing the varying population densities in either Nigeria or China.

Population distribution in Nigeria.

Nigeria has varying population densities i.e. High densities in cities like Lagos, Warri, Port Hacourt with over 1,000 persons per km^2, moderate

densities in the middle belt e.g. Jos plateau between 500 – 1000 persons and sparsely populated parts in the Sahel/Northern belt and areas with tropical rain forests in the South.

Population distribution in China.

Areas of high density include cities like Hong Kong, Gwanzhou, Shangai, Beijing/generally most parts of the Eastern plains of China etc. Moderate population is in Central China in parts of central China. Western China is the most sparsely populated area e.g. provinces of Tibet and Xinjiang covered by Tibet mountains.

The factors influencing population distribution are more or less similar. Physical Factors

√ Variations in the level of soil fertility.
√ Variations in climate.
√ Variations in drainage i.e.
√ Variations in water supply
√ Variations in altitude/relief
√ Variations in vegetation endowment
√ Variations in effect of natural disasters.
√ Variations in influence of pests and diseases.

Human Factors:-

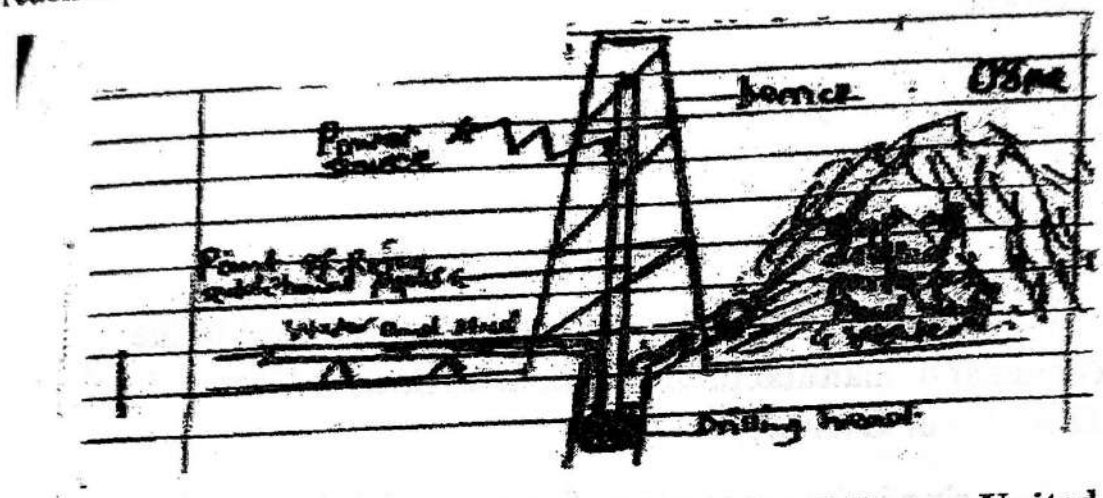
√ Variations in availability of employment opportunities e.g. industry/trade etc.
√ Variations in the level of political stability.
√ Level of accessibility.
√ Level of urban development/distribution of social services.
√ Ethenic background e.g. Ibo/Yoruba Vs Fulani (South Vs North) Pure Chinese in the East Vs the inferior Chinese in the West.
√ Traditional way of life in both e.g. Nomadism in Nigeria and Western China Vs settled agricultural practices in Eastern China and Southern Nigeria.

5.(a) Describe the process of oil mining.

√ Oil is extracted by the oil drilling method.
√ A metal structure called a Derrick is installed above an oil well.
√ The Derrick holds a drilling pipe which is power driven.

- √ The drilling head/bit made out of diamond is fixed on the drilling pipe.
- √ More pipes are added as depth increases.
- √ Water and mud are added to enhance lubrication, scouring action, cooling the head and later flushing out particles as shown below.

Oil is pumped out or comes out under pressure once the well is reached.



(b) **Examine the basis of oil mining in either Libya or United States of America.**

Libya:
The mining Regions are in the North Western and North Eastern part of the country. Mining centres include; Zelten, Amal, Dahra, Gialo, Es Sador, Nafoora, Sarir e.t.c. Major refining centres for oil include Tripoli, Benghaz, Tobruk, Zelten etc.

United States of America:
Major areas include Coast of California/Gulf of California, Great lakes region/Shores of Lake Michigan, Huron, Erie, Appalachian Mountains, Central plains/Gulf of Mexico etc. Mining centres: San Franscisco, San Jos, Los Angeles, San Diego, San Bernardino, Hermosillo, Cuyama, New Orleans, Houston, Memphis, Dallas Chicago, Indianapolis, Columbus, Hesburgh, Toledo etc.

The basis for oil mining is more or less similar. Natural conditions.

- √ Large deposits of oil.

√ High grade i.e limited Sulphur/carbon gases.
√ Nearness to the surface.
√ Water supply.

Social economic factors.

- Technology used in exploitation extraction etc.
- Capital.
- Transport.
- Power supply.
- Market.
- Government policy.
- Labour force.
- Political climate.
- Research.

6. To what extent has Industrial inertia contributed to the development of manufacturing industries in either Republic of South Africa or Germany?

Manufacturing is the processing of raw materials into semi – or finished products. Raw materials could be agricultural e.g. wheat, minerals e.g. Iron, forest products e.g. timber and water plus water resources e.g. fish.

Manufacturing industries are in the category of Heavy industries e.g. processing of minerals, motor vehicles etc. and light industries e.g. processing of agricultural products, making of electronics etc.

Industrial inertia is when more industries are getting attracted where others are already existing (to enjoy economies of scale) or industries failing to change to new locations even when the locational advantages are no longer very favourable.

Witwatersrand

Is the largest industrial conurbation in the republic of South Africa. It is found in Transvaal and Orange free state. Also known as the Rand. The largest in Africa. The industrial towns include Pretoria, Johannesburg, Springs, Bloemfontem, Sasolburg, Germiston, Kinross, Middleburg, Witbank, Vereeniging, Klerksdorp, Rustenburg etc.

Besides the Rand other industrial towns include; Cape town, Durban, Kimberly, Port Elizabeth, etc.

The types of industries found on the Rand include:

- Iron and steel works.
- Leather works
- Food/drinks/ Tobacco
- Vehicle assembly
- Paper/pulp/wood products
- Heavy engineering/Machinery and spare parts.
- Railway equipment
- Electronics etc.

The Rhur region

Is the largest industrial conurbation in Germany and Western Europe. It is part of the Rhine basin to include rivers like the Rhine, Rhur, Lipper, Emscher etc.

Industrial towns include;

Leverkusen, Cologue, Hagen, Dortmund, Bochum, Dinsburg, Oberhansen, Dusseldorf, Solingen, Essen, Remscheld etc.

Besides the Ruhr, Germany has industries elsewhere e.g. in Hanover, Frankfurt, Munich, Ludwig, Shafen, etc

The types of industries include;

- Iron and steel works.
- Heavy engineering.
- Manufacture of chemicals.
- Food processing.
- Motor vehicles.
- Slip building etc.

The role of industrial inertia.

- A large body of skilled workers is already in place.
- Variety of transport means already in place.
- Power sources already available.
- Cost of dismantling the existing industries and setting up at new locations is costly.
- Some industries are producers of raw materials which new

industries take advantage of etc.

Complementary factors include;

- Capital
- Research
- Market
- Water supply
- Technology
- Raw materials
- Land/Relief
- Political stability
- Power supply
- Good policy
- Transport connections etc.

7. Assess the contribution of tourism to the development of either Republic of South Africa or State of California (USA).

One should clearly explain the positive and negative contribution of tourism to the development of either Republic of South Africa or State of California (U.S.A).

A precise introduction is necessary.

Tourism is the movement of people within a country and abroad to places of interest for leisure, research etc.

The tourist centres in the republic of South Africa include;

Pretoria, Johannesburg, Cape town, Kimberly, Durban, Port Elizabeth, Robben Islands, East London, Soweto etc.

The tourist resources in the Republic include;

- Varied Relief e.g. Drakensburg with glacial scenery and Mountain climbing. Table mountains/Karoos, Coastal relief i.e. beaches, cliffs etc. Desert landscape (Kalahari).
- Drainage features e.g. Atlantic and Indian Ocean, River Orange/ Vaal, River Olifontis and Berg and associated scenery/sports.
- Variations in climate e.g. Kalahari Desert, Mediterranean and warm temperatures.
- Variety of vegetation e.g. temperate forests, temperate

grasslands (veld) dry steppe/Savanah grasslands etc.

- Wild games i.e. Animals and birds in National parks like Krugers, Mapungubwe, Addo Elephant N.P, Bontebok, West coast, Karoos, Imfolozi etc.
- Antiquities e.g. Rock painting, Forts, Robben Islands, Museums etc.
- Cultural diversity of Tswana, Zulu, Xhosa, British, Dutch etc. and the associated characteristic features.

The tourist resources in California:

Relief. Coastal landscape, glaciated mountains like Sierra Nevada and Coastal ranges, desert landscape in the south e.t.c.

Drainage. The Pacific Ocean, Rivers Sacramento and San Joaquim.

Vegetation. Temperate coniferous forest, Mediterranean/ wild flowers/ montane, fruit Ranches. e.t.c.

Wild game. Desert ostriches, sea birds, wolves, deers, snow leopards and variety of national parks like Kings Canyon, Redwood, Lassen volcanic, Joshua tree, Death Valley etc.

Antiquities. Museums, Art galleries, forts like Alcatraz Island (once a prison) etc.

Cultural diversity. British Negroes, Latin Americans, French, Indians etc.

The contributions are similar.

Positive contributions

- Conservation of tourist assets.
- Making use of unproductive land.
- Economic diversification.
- Employment opportunities.
- Agricultural development.
- Development of hotel industry.
- Foreign exchange earnings.
- Development of art and craft industries.
- Urban development.
- Local revenue.
- International relations.

- Education and research.
- Development of transport routes.
- Provision of social services.

Negative contributions.

- Undesirable social habits.
- Congestion and destruction of sites arising out of stampede.
- Encourages poaching.
- Constructions change natural landscape.
- Associated with pollution.
- Associated with political instability.
- Encourages profit repatriation.
- Undermines development of other sectors.
- Regional imbalance.
- Urban related problems.
- Displacements of people to establish infrastructures related to tourism.

8.(a) Define the term forestry.

Forestry is the science of planting and taking care of forests. It also involves managing forests that are growing for timber production. Forestry therefore handles forest plantations e.g. of Eucalyptus, pines, Cyprus or any other planted by man as in Swaziland.

It also takes care of natural forests e.g. tropical/equatorial rain forests in countries like D.R.C, Brazil, Mediterranean forests in California, Morocco etc. and temperate coniferous forests in USA, Canada, Scandinavian countries like Sweden and Norway etc. which are sources of timber.

(b) Describe the causes and shortcomings of deforestation in either Brazil or Democratic Republic of Congo.

Deforestation is massive destruction of forests. A forest is a composition of trees that have grown close together/high density growth of trees.

Brazil:

- Has tropical/equatorial rain forests.
- The forests are found in the River Amazon basin.

- Some of the characteristics include, long gestation period, bulky timber, broad leaves, hardwood etc.
- Examples of tree species are Ironwood, log wood, Teak, Mahogany, Green heart etc.
- Milling centres include Belem, Brasillia, Manuas, Belo Horizonte, Montes claros, Maringa, Campo grande etc.

Democratic Republic of Congo.

- Has tropical rain forests.
- Forests grow in the river Congo/Zaire basin.
- Characteristics similar to Brazil.
- Major tree species are also similar/Accept local names like Okoume, Azobe, Ozigo etc.
- Milling centres include, Kisangani, Kinshasha, Likasi, Kananga, Kolwezi Kole, kikwit, kasongo, Lubumbashi, kibombo, Mbuji mayi, Kazunga etc.

The causes and Shortcomings of deforestation are similar.

Causes.

- Demand for firewood and charcoal.
- Extraction of minerals in forested areas.
- Demand for land for settlement and agriculture.
- Construction of transport routes.
- Poor farming methods e.g. shifting cultivation.
- Demand for timber as a raw material.
- Wild animals.
- Fires.
- Expansion of urban centres.
- Poor government policies of unrestricted control/flushing out rebels.
- Technological advancement.

Short comings.

- Climatic change/Desertification.
- Increased soil erosion.
- Displacement of communities.
- Energy crisis
- Loss of revenue
- Increasing pollution/global warming.

- Siltation of river channels and eventual floods.
- Lowering of the water table.

9. (a) Distinguish between renewable natural resources and non-renewable natural resources.

Renewable natural resources are resources created by God and exploited by man. The resources can be used without getting depleted/ exhausted/can be replaced as they are being used.

They include;

- Vegetation types like forests.
- Animals and birds both domestic and wild.
- Water/Drainage features.
- Soils
- Weather resources like fish etc.

While Non-renewable natural resources are a creation of God. These resources get depleted in the process of being used. They can even be extinct. Examples include;

- Minerals like Iron, Coal etc.
- Rocks of the crust of the earth like Quartz, Granite lost through quarrying.
- Clay and sand etc.

(b) Outline the steps being taken to ensure sustainable utilization of the renewable and non-renewable resources in Africa.

Steps being taken to ensure sustainable utilization in Africa.

- Accept what has been done and what is being done (ONLY). Avoid should/must/will.
- Restrictive measures to control forest exploitation.
- Aforestation.
- Reaforestation.
- Creation of forest reserves.
- Sensitisation.
- Use of alternative sources of energy.
- Research into fast growing species of trees e.t.c.
- Treatment of wastes.
- Re-cycling.

- Restocking.
- Fish farming
- Regulating hunting.
- Patrolling.
- Soil conservation measures.
- Restriction of fishing seasons.
- Control of population growth.
- Pressure groups like green belt in Kenya.
- Government intervention e.g. NEMA in Uganda.
- Regional co-operation of matters of environmental protection.

10. (a) Define the term Trading Bloc

This is a group of countries in a special economic alliance. The members of the trading bloc agree on terms and conditions under which international trade among them has to be conducted.

The objective of the trading bloc is to increase economic efficiency, standards of living of the member countries through import and export trade.

Examples of trading blocs;

- European Union. Includes most of the countries of western Europe e.g. Britain, France, Germany etc. (E.U)
- ASEAC – Association of Souter East Asian countries e.g. south Korea, Japan, China, etc.
- ECOWAS – Economic Community OF West Africa states e.g. Nigeria, Liberia, Ghana, etc.
- COMESA – Common Market for East and Southern African States

(b) Explain the factors influencing development of trade among countries of Africa.

The factors include;

- Developed transport systems
- Political stability
- Similar political ideologies
- Fair money exchange rates
- Use of common currency e.g. in the West African Economic and Monetary Union (WEMOA) to include Mali, Benin, Burkina Faso, etc.
- Variations in climate and related products

- Use of similar language
- Political cooperation among the leaders
- Ns in technology
- Similar cultural values
- Absence of trade restrictions
- Economic intergration/presence of trading blocs.

P250/3: GEOGRAPHY

1. For any fieldwork study carried out as a group or an individual;

(a) i) State the topic of study.

- Candidates are expected to state the topic of study clearly showing **WHAT** was studied and **WHERE** the study took place. The topic should bear a geographical relationship.

ii) Outline the objectives of the study.

Candidates are expected to identify the objectives of the study which should be;

- Related to the topic of study
- Specific, measurable, achievable and time bound.

NB: Accepted phrases include;	**Non acceptable phrases include;**
➢ To find out	✓ To know
➢ To identify	✓ To understand
➢ To establish	✓ To learn
➢ To examine	✓ To appreciate
	✓ To see

(b) Describe how you collected information from the field study.

Candidates are expected to describe methods used and should;

- Identify and define the method
- Describe the method with the help of a tool.
- Give information obtained with illustrations/evidence /examples.

<u>N.B:</u> Definitions should not be in past tense.

(c) Draw an annotated sketch map/land scape sketch map/line

transect or transverse.
Candidates are expected to draw an annotated sketch map/landscape sketch /line transect.

For a sketch map it should have;
- Title
- Frame /boundary
- Key/labelling
- Physical features
- Human features

N.B: Features on a landscape sketch should be presented in form of **pictures.**

The land scape sketch should have;
- A title
- Frame
- Direction
- Key/labelling
- Physical features
- Human features

NB: Features on a sketch map should be presented inform of symbols.

For a line transect, it should have;
- A title which should bear the direction e.g. from Bendegere hill in the north of Lake Victoria to the south……
- Frame/boundary
- Direction
- Key/labelling
- Shading
- Direction on the horizontal axis

N.B: Features should be presented using symbols for prominent features and arrows for linear features.

(d) How did you organise your fieldwork study/What activities did you carry out before going for the field work study?
Candidates are expected to come up with the fieldwork preparations / activities which include;
- Pilot study

- Topic of study
- Objectives
- Methods
- Tools
- Literature review
- Permission
- Formation of groups
- Briefing
- Departure

N.B: Candidates should present these activities using the following guidelines;

- The order of the activities especially the first five should be followed
- They should be presented in past tense
- The activities should be explained.

e) Candidates should outline the merits of using the various field methods in data collection i.e.

Merits should be in PAST TENSE with some form of explanation e.g.

While using observation;

- I got quick information since the eye directly saw geographical features of the area of study.
- It helped me to interpret and analyse information on the spot thus time saving
- It enabled me to make comparisons in the field.
- It was cheap since no costs were involved etc.

While using interviewing

- It helped me to get hidden information like historical back ground
- It was participatory since it involved face to face dialogue
- It was cheap since it involved no costs
- It was flexible because questions were modified in the field.

(f) Explain the challenges /problems/obstacles/limitations you encountered/ faced during data collection.

Candidates are expected to bring out the problems faced during data

collection which include;

- Speedy respondents
- Abrupt weather changes e.g. rainfall, fog, mist, etc
- Hostile respondents
- Language barrier
- Concealing /hiding of information
- Inadequate tools
- Inaccessibility
- Physical obstacles e.g. hills, forests, mountains
- Obsolete equipment
- Some areas were out of bounds

NB: Problems must be stated in the past tense.

- The problems faced can be attacked to the method or not
- No information missed no mark at all.

(f) What conclusions did you draw from the study/To what extent was your fieldwork geographical /How did the fieldwork help you in understanding the geography of the area?

Candidates are expected to bring out the geographical relationships i.e.

- Physical to physical relationship
- Physical to human relationship
- Human to human relationship

NB: The relationship should be identified.

- A candidate should **bring out the place names of the features and their directions.**
- The accountability should be brought out using **connecting** words such as favoured, promoted, encouraged, led to, because of and the reasons for the relationship should be brought out such as fertile soils, favourable climate, nature of relief and processes such as deforestation, erosion, etc.

(g) How did you conclude/processed your filed work/what activities did you carry out as a follow-up of your field work study?

Candidates should come up with the follow up activities such as;

- We assembled in class and discussed data collected
- We presented data and discussed data collected

- We presented data and compared it with each other
- There was data analysis
- We polished up sketches, tables and diagrams
- We drew conclusions
- We made recommendations
- We wrote a report
- The report was cross examined by the teacher
- There was dissemination of the report to the various stake holders

NB: Activities should be described in past tense with some form of explanation.

- The order of activities does not matter
- Mere statements of activities not in past tense no mark at all.

(h) What recommendations did you give to the people in the area of study? Recommendations are suggestions given to the area of study in order to solve the problems identified. e.g.

- Restoration of degraded areas by filling of pits
- Wearing of protective gears e.g. in mining
- Setting rules and regulations by management to regulate activities e.g. fishing, mining, industry
- Acquisition of funds from SACCOS and commercial banks to improve on their businesses
- Deployment of security personnel to reduce on high crime rates, etc.

NB: Recommendations should be stated in past tense, with identification of a problem, with explanations and place names.

(i) What geographical skills did you get from the field study?

Candidates are expected to bring out skills acquired from the field work study as;

- Observation skills
- Interviewing skills
- Recording skills
- Application of questionnaire skills
- Measuring skills
- Map orientation skills
- Literature review skills
- Sketching/drawing skills

- Sampling skills

NB: Candidates are expected to state the skills in past tense with an explanation of how the skills were gained.

2.(a) Account for the formation of relief features resulting from faulting in Uganda.

- Candidates are expected to define faulting as the process of breaking up or fracturing of the rocks of the earth crust that eventually leads to displacement of large blocks of land.

This is caused due to geo-chemical reactions and radioactivity in the mantle that produce conventional currents leading to development of very strong tension and compression forces.

It is these forces that pull or push the rocks of the earth's crust creating either normal or reversed faults and displacement of large blocks of land hence causing faulting.
Definition 01mark, process 01mark, forces 01mark

Faulting has resulted into development of various relief features in Uganda which include;

(i) **Rift valley** is an elongated depression or tough bounded by two in facing fault scarps.

According to tensional theory or tensional forces which pulled the crust apart leading to normal faults.
As the forces constructed to pull, the central block was forced to sink/ subside under its own weight which left a depression known as the western arm of the rift valley.

Later the rift valley was subjected to denudation processes like weathering and mass wasting hence forming its present appearance.

OR. Compressional theory or compressional forces which pushed the earth crust inwards from opposite directions leading to the formation of reversed faults.
This forced the side blocks to override the middle block hence creating a depression called western arm of the rift valley. Which was later subjected to denudation processes like erosion, weathering and mass

wasting to form present appearance.

Diagram

(ii) Block mountain which is an upland bounded by two or more fault scarps.

According to tensional theory or tensional forces pulled the earth crust apart leading to formation of normal faults which divided into three blocks.

Continued pulling caused sinking or subsidence of the side blocks leaving the central block stable and high above the side blocks to form block mountain or horst such as Mt. Rwenzori The mountain as later subjected to a denudation process like erosion, weathering and mass wasting to form the present appearance.

OR. According to compressional theory or compressional forces which pushed the crust inwards from opposite sides, this led to reversed faults, continued pushing by compressional forces led the middle block to rise/uplifted while the two side blocks remained stable hence the uplifted middle block formed a block mountain or horst e.g. mtn. Rwenzori, later the mountain was subjected to denudational forces like erosion, weathering and mass wasting hence forming the present shape.

Diagram

(iii) Graben hollow is a depression formed on the floor of the rift valley.

According to tensional theory/tensional forces which pulled the crust apart to form normal faults and this forced the middle block to sink down hence forming a rift valley.

Secondary faulting occurred on the floor of the rift valley creating secondary normal faults.

This caused formation of a secondary depression called a graben hollow e.g. albert, graben, George graben and Edward graben hollows which were later subjected to denudational processes like weathering, erosion to form the present shape or appearance.

OR. According to compressional theory or compressional forces which pushed the crust from either side leading to formation of reversed faults. The side blocks over ride/uplifted the middle block to create a

rift valley. Secondary faulting occurred on the floor of the rift valley creating secondary reversed faults forming graben hollow e.g. Albert graben, George graben hollow and Edward graben hollow. These graben hollows were later subjected to denudational processes such as erosion, weathering and mass wasting to form its present shape or appearance.

Diagram

(iv) Fault scarp/fault escarpment/scarp/escarpment is a steep slope along a single fault line.

According to tensional theory/tensional forces pulled the earth crust apart forming normal faults. One block was displaced downwards which left a steep slope to form fault scarps e.g. Butiaba scarp, Kichwamba scarp, Kyambura escarpment.
The scarp formed was subjected to denudational processes such as weathering, erosion and mass wasting to form as present shape/ appearance.

OR. According to compressional theory or compressional forces pushed the crust to form reversed faults. One of the blocks of the crust was consequently displaced upwards to form a steep slope known as fault scarp e.g. Kyambura, Butiaba and Kichwamba scarps. The scarp formed was subjected to denudational processes e.g. mass wasting, erosion weathering to form its present shape.

Diagram

(v)Fault guided valley is a narrow or wide valley that developed along a fault line. During faulting either tension or compressional forces a single fault line was created on the crust. The rocks along the fault line shattered and the weakened rocks were easily removed by denudational forces of weathering and erosion leading to the development of the valley called fault guided valley e.g. Aswa valley.
NB: The process of formation must be clearly brought out highlighting those words.
Land form or relief
Processes of formation
Examples
Appearance/shape

(b) Assess the values of relief features resulting from faulting in Uganda.

Candidates are expected to bring out the values of relief features resulting from faulting in Uganda.

Positives:

- Promotion of tourism e.g. mt. Rwenzori, Butyaba escarpment
- Promotion of wildlife conservation e.g. Queen Elizabeth National Park.
- Range lands for grazing animals e.g. Ntoroko, Buliisa.
- Formation of orographic rainfall e.g. Mt. Rwenzori
- Sources of rivers e.g. river Mubuku, river Nyamwamba on mt. Rwenzori
- Promoted lumbering activities on mt. Rwenzori

Negatives:

- Steep escarpments limit construction e.g. transport routes e.g. mt. Rwenzori
- Soil erosion e.g. Butyaba scarp
- Habitat for dangerous wild animals e.g. Queen Elizabeth National Park
- Pests and diseases
- Low rainfall on lee-ward side for mountain e.g. Ntoroko, Buliisa
- Hiding places for wrong doers e.g. ADF rebels on mt. Rwenzori

NB: Points must be explained and illustrated with fault relief features only.

3. Examine the causes and effects of landslides in Uganda.

Candidates are expected to define the term landslides as <u>sudden rapid or very fast movement</u> of weathered rock material downslope under the influence of gravity. Candidates should then identify the areas that are affected by landslides e.g. Mbale, Kasese,Kisoro, Kabale, Bundibugyo, Sironko, Bulambuli, Bududa, etc.

NB: Mere identification of areas affected by landslides = 03 marks

Identification of affected areas on a sketch map = 05 marks

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

- Climatic conditions e.g. heavy rainfall
- Nature of rock materials
- Nature of the slope
- Nature of the soils
- Earth quakes
- Living organisms e.g. rodents
- Mining and 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 weaken rocks/landscape 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 agricultural 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

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

4. (a) Account for the rapid expansion of the agricultural sector in Uganda.

Candidates should bring out the current state of agriculture such as;

- Scientific methods of farming are used or modern farming methods are applied
- Agriculture has shifted from subsistence farming to commercial farming
- Agricultural sector is still the most dominant employing over 82% of Uganda's population
- There is still dependence on natural conditions by small scale farmers
- Large scale plantations are mainly owned by foreign companies.

Candidates are expected to bring out the different farming or agricultural systems in Uganda which include;

- Intensive banana – coffee system e.g. Mukono, Masaka, Jinja
- Pastoral and animal crop farming system e.g. Kotido, Moroto, Abim
- Montane farming system e.g. Kabale, Mbale
- Animal cropping and cattle, Teso farming system e.g. Kumi, Soroti
- Animal cropping and cattle West Nile farming system e.g. Arua, Nebbi, Moyo

NB: Candidates are expected to draw a sketch map of Uganda showing agricultural systems.

Candidates are expected to bring out the causes of rapid increase in agricultural sector such as;

- Increased levels of technology like irrigation, use of tractors
- Improved transport and communication
- Improved government policy of attaching investors and providing subsides to agricultural products
- Improved market for agricultural crops
- Improved skilled labour
- Increased research
- Improved political stability
- Increased power supply
- Increased use of scientific methods of farming
- Improved crop variation and animal species
- Increased urbanisation

NB: Candidates should use the word "increased/improved/modern to get marks. No physical factors.

Points must be explained and illustrated with crop and place name.

OR. Animal and place name or agricultural system and place name.

(b)Assess the rapid expansion of the agricultural sector on the environment in Uganda.

Candidates are expected to bring out the impact of agricultural sector expansion on the physical environment in Uganda i.e. both are positive and negative impacts.

Positives:

- Source of food
- Source of employment to local people
- Source of foreign exchange
- Source of raw materials for industries
- Source of government revenue
- Source of income to people
- Promoted the diversification of the economy
- Promotion of international relationship with other counties
- Acquisition of skills by local people
- Study purpose/research/education/tourism
- Infrastructure development
- Town development
- Source of market for other sectors like agro chemical industries

Negatives:

- Profit repatriation
- Increased school dropout
- Division of labour
- Encroachment on marginal lands such as swamps
- Soil exhaustion
- Price fluctuation
- Severe soil erosion
- Displacement of people

Points must be explained and illustrated with crop and place name

OR. Animal and place name

Agricultural system and place name

5.(a) Account for the rapid destruction of wetlands in Uganda.

Candidates are expected to define wetlands as areas which are permanently or seasonally flooded by water and where plants and animals have become adopted to such flooding.

Candidates are expected to bring out the types of wetlands in Uganda

such as;

- Lacustrine swamps located around the shores of lakes e.g. around Lake Victoria, around lake Kyoga.
- River line wetlands e.g. along River Nile, along River Kafu, along River Katonga
- Open valley wetlands /valley floor wetlands e.g. Lumbuye swamp, Naigombwa swamp, Sezibwa swamp, Koga swamp, Kiva swamp.

NB:

Candidates are expected to draw a sketch map of Uganda showing types of wetlands.

Candidates are expected to describe the causes of wetland destruction in Uganda which may include;

- Increased agricultural practices such as growing of rice e.g. Kibimba swamp
- Increased industrial establishment and expansion e.g. Nalukolongo swamp, Masese swamp, Walugoga swamp
- Need to control pests and disease e.g. Nabajuzi wetland, Walugogo wetland
- Increases bush burning or fire outbreaks caused by hunters or lightening e.g. Katonga wetland, Awoja wetland, Tirinyi swamp
- Increasing mining e.g. sand and clay at Kajansi wetland, Lutembe wetland, Lwera swamp
- Increased settlement and urban expansion lead to encroachment of wetlands e.g. Walugogo swamp, Nabajuzi swamp, Sezibwa swamp
- Increasing livestock rearing leads to destruction of wetland vegetation e.g. Semliki wetlands, Awoja wetland, Koga wetland, Kiruruma wetland, Walugogo swamp, Namatala swamp along Mbale – Iganga – Jinja road
- Increased deforestation, cutting down of tree swamps e.g. Namatala swamp, Lubigi swamp
- Political interference where politicians have given out swamps to their supporters hence leading to massive destruction e.g. Doho swamp, Lubigi swamp.
- Weak government policy /conflicting government policy competition
- Construction e.g. sports and recreation grow in wetlands e.g. Wankulukuku wetlands, Nakivubo wetlands
- Low levels of research e.g. the existing acreage of swam cover like Namatala wetland

- Limited supply of skilled labour i.e. Environmental conservationists in wetlands like Lubigi and Busega swamp

Points must be explained and illustrated with names of wetlands

(b) Outline measures being taken to restore wetlands in Uganda.

Candidates should bring out the steps being taken to conserve wetlands in Uganda which include;

- Gazetting wetland areas
- Sensitisation of the local people about importance of protecting wetlands
- Evicting wetland encroachers e.g. Lubigi swamp
- Diversification of the economy by encouraging rural people to get involved in other alternative means of survival
- Promoting of family planning to reduce population pressure on wetlands
- Encouraging use of alternative building materials such as iron sheets
- Encouraging growing of upland rice to discourage wetland destruction e.g. Wakiso
- More research is being carried out
- Encouraging use of alternative materials for art and craft such as use of polythene bags

Points must be explained, illustrated with names of wetlands and correct use of tense

6. Assess the contribution of Eco-tourism to the development of Uganda.

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

Or

Define 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
- Wildlife reserves e.g. Kashoya – Kitomo, Mpanga, mt. Rwenzori
- Community wetlands e.g. Bigodi wetland sanctuary – Magombe swamp
- Sanctuaries such as Ngamba, Ziwa, Otze
- Lakes and rivers e.g. L.Victoria, L. Kyoga, R. Nile. R. Katonga

Draw a sketch map of Uganda showing the identification of Ecotourism sites.

Candidates are expected to come up with both positive and negative importance of ecotourism 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 wetland.
- Preservation of culture and historical sites for future use e.g. Kasubi tombs, Nyero rock paintings.
- Source of foreign exchange grom 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 relationships 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 utilisation of the resources that would be idle
- Development of urban centres/areas with associated advantages
- Has led to development of research and education

Candidates are expected to bring out negative importance or contribution of eco-tourism sites in Uganda.

- Has led to conflicts with people living around the ecotourism 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 wildlife 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 wildlife
- Profit repatriation by foreigners who own some of the tourist 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

NB: Points should be explained and illustrated with names of eco-tourism sites /areas.

7.(a) Examine the factors that have favoured the development of afforestation in Uganda.

Candidates are expected to define the term afforestation as the growing of trees where they have ever existed.

Candidates are expected to identify areas in Uganda where afforestation is taking place i.e. planted forests e.g.

- Muko in Rubanda
- Mafuga in Kanungu
- Lendu in Zombo
- Katogo in Nakasongola
- Kateera in Kiboga
- Agwata in Dokolo
- Bugamba in Mbarara
- Oruha in Kyenjojo
- Abera in Lira
- Kusyoha – Kitomi in Rubirizi

Candidates are expected to draw a map of Uganda showing planted forests.

Candidates are expected to come up with factors that have favoured the development of afforestation in Uganda as;

- Climate in terms of heavy rainfall and hot temperatures which favour growth of planted forests e.g. Mafuga in Kanungu.
- Fertile soils which are well drained and deep that support plant life

e.g. Muko in Rubanda

- Biotic factors where areas with low incidences of pests and diseases have made it possible to establish planted forests e.g. Lendu in Zombo
- Drainage areas that are well drained have favoured establishment of planted forests e.g. Mafuga in Kanungu
- Relief areas that are gently sloping and low land areas have led to easy establishment of planted forests e.g. Katugo in Nakasongola.
- Favoured government policies encouraging afforestation through NEMA, UWA and many others e.g. Muko in Kabale.
- Presence of market for forest products such as poles and timber for the construction industries e.g. Lendu in Zombo
- Presence of extensive land for the establishment of planted forests e.g. Katugo in Nakasongola
- Political stability which has enabled people to plant tress without being disrupted e.g. Oruha in Kyenjojo
- Availability of capital to buy equipment and seedlings needed for the establishment of planted forests e.g. Kateera in Hoima
- Improved technology such as the use of modern machines used to clear land for establishment of planted forests e.g. Katugo in Nakasongola
- Improved research in afforestation such as the use of improved seedlings which have a short gestation period e.g. eucalyptus from south Africa
- Improved transport and communication networks linking to areas where planted forests are established e.g. Muko in Rubanda.

(b) Explain the challenges faced in the promotion of afforestation in Uganda.

Candidates are expected to bring out the challenges faced in the promotion of afforestation in Uganda

- Limited technology related to agro- forestry and afforestation
- Limited capital to set up planted forests
- Limited market for products from planted forests
- Inadequate research in afforestation
- Rugged relief which makes it difficult to access some areas e.g. Kigezi highlands i.e. Kabale, Kisoro
- Unfavourable government policies
- Uncontrolled fires which destroy planted forests e.g. aphids in Mafuga

- Competition with other land uses such as agriculture, settlement limiting land available for establishment of planted forests.
- Insecurity in some areas where planted forests would have been established
- Land tenure system/land ownership where land is individually owned limiting establishment of planted forests
- Corruption and embezzlement of funds set aside for afforestation programmes
- Profit repatriation where some of the planted forests are owned by foreigners
- Natural hazards such as floods, landslides which destroy many planted forests

NB: Points should be well explained and illustrated with names of planted forests.

8.(a) Account for the rapid population increase in Uganda.

Candidates should bring out the current status of Uganda's population as;

- Uganda has been increasing rapidly over years
- Uganda's annual population growth rate is 3.2%
- Uganda's population is 45.9 million people

Candidates should mention areas of rapid population increase in Uganda

- Eastern Uganda in areas of Mbale, Jinja, Iganga
- Northern Uganda in areas of Gulu, Arua
- Central Uganda in areas of Kampala, Mukono, Wakiso
- Western Uganda in areas of Mbarara, Kabale, Bushenyi

NB. Candidates are expected to explain the causes of rapid population increase in Uganda.

- Increase in number of birth rates
- Polygamy
- Early marriage
- Religious beliefs
- Limited use of family planning methods
- Improved nutrition and increased food production
- Low status of women, many are very poor, illiterate, lacking economic roles
- Low levels of education

- Low incomes/poverty
- Cultural values attached to culture e source of wealth, prestige, labour, security
- High fertility rates of women and men
- Imbalance in sex ratio. There are more women than men
- Political stability
- Improved medical services
- Preferred sex of children by parents

N.B: Well explained and illustrated with areas /place names with rapid population increase.

(b) Explain the problems resulting from rapid population increase in Uganda.

Candidates should explain the problems resulting from rapid population increase in Uganda which may include;

- Land shortage leading to land fragmentation
- High dependence rate due to many young population leading to poverty
- Strain on government expenditure
- Growth of slums in towns with poor housing estates leading to poor sanitation
- Strain on existing social services such as schools, hospitals
- Destruction of vegetation cover to create room for settlement and agriculture
- Over exploitation of resources such as minerals, water, forests leading to depletion
- High rates of unemployment
- Increase in number of street children or juvenile delinquency e.g. Kampala
- Increased rural urban migration
- Increased food shortage e.g. Kabale
- Increased poverty and poor standards of living e.g. Kabale, Jinja
- High costs of living in urban centres due to high demand for foods and services e.g. Kampala, Mukono
- Increased spread of diseases due to congestion and poor hygiene
- Over crowding and congestion of people in urban centres e.g. Kampala city, Jinja city
- Growth of urban centres with associated problems like high crime

rates, robbery, prostitution e.g. Iganga, Mbale
- Encroachment on marginal lands like swamps

Points must be explained and illustrated with areas of rapid population increase

9.(a) Describe the state of the industrial sector in Uganda.

Candidates are expected to bring out the state of industrial sector in Uganda such as;

- The industrial sector is steadily growing
- Most industries in Uganda are owned by foreigners
- Most of the industries are food processing
- Industrial sector comprises of mainly light industries
- Most industries use improved technology in processing packing and loading
- More industrial parks have been established
- There is increase in recycling of waste products to obtain raw materials e.g. plastic bottles, scrap
- Mainly agro based industries
- Most industrial products are consumed locally.

Candidates should identify the industrial sectors in Uganda such as;

- Kampala, food processing industries, Uganda breweries, steel rolling industry, foam industries,
- Jinja; steel rolling industry, BIDCO industry, paper factor, tiptop bread factory, crocodile tool factory, Nile breweries factory, African textile mill, foam industry, food processing.
- Mbarara; century bottling company, GBK dairy factory, Nile breweries, Mbarara steel industry
- Tororo; Tororo cement factory, food processing industry, Simba cement factory, food processing
- Soroti, Soroti fruit factory, Soroti food processing factory.
- A sketch map of Uganda showing the location of manufacturing industry and industrial centres.

(b) To what extent has water led to the development of the industrial sector in Uganda?

Candidates should explain how water led to development of industries in Uganda such as;

- Cooling machines during processing of raw materials

- Washing machines
- Cleaning machines
- Generate power supply of HEP
- Used in mixing chemicals
- Drinking water for industrial work
- Raw materials for soda industry at Namanve and beer industry at Nile breweries and Luzira Uganda breweries

Candidates should bring out other factors that have led to the development of industrial sector as;

- Constant power supply such as HEP, solar power
- Vast land
- Ready market
- Adequate capital
- Favourable political stability
- Super government policy
- Skilled labour
- Abundant raw materials
- Improved anxillary services such as banks, insurances
- Entrepreneur initiative
- Effective transport

Points must be well explained and illustrated with place, name and industry.

10. Assess the contribution of the transport sector to the development of Uganda.

Candidates are expected to give the current status of the transport sector in Uganda e.g.

- Road transport is the dominant mode of transport in Uganda
- There is rehabilitation of major transport routes and facilities e.g. roads, airport, railway lines etc.
- The transport sector has been liberalized
- Water transport is the cheapest mode of transport.
- Water transport services are provided by a government and private firms.
- Air transport is currently very expensive therefore most Ugandans cannot afford to use it.
- The airline industry is majorly dominated by foreign companies like British airways due to absence of a national career.

Candidates are expected to identify the modes of transport in Uganda with examples of transport routes e.g.

- Road transport e.g. Kampala – Masaka, Mbarara road
- Water transport e.g. port Bell to Kalangala Island on L, Victoria.

- Air transport e.g. from Entebbe international airport to Jinja airstrip
- Railway transport e.g. the Eastern route i.e. Malaba- Tororo – Kampala

A sketch map of Uganda showing transport routes.

Candidates should explain and illustrate with names of transport routes the positive and negative contribution of the transport sector to the development of Uganda e.g.

Positive:

- Promotes internal and external trade e.g. railway line from Malaba-Jinja
- Promotes international relationship with other countries e.g. Rwanda i.e. Mbarara-Kabale-Katuna road which connects to Rwanda.
- Helps in labour mobility from one area to another e.g. from Nakiwogo –Ssese on Lake Victoria, Kampala – Jinja road.
- Promotes the development of the industrial sector through Easy transportation of raw materials and finished products e.g. Tororo -Jinja- Kampala railway line.
- The transport sector encourages the easy spread of ideas (innovations e.g. Kampala, Masaka road
- Leads to the development of urban centers e.g. Lugazi town because of Kampala- Jinja road.
- Promotes the development of agriculture through the feeder roads and railway lines.
- Transport helps in the exploitation of natural resources such as minerals, forests and fisheries resources.
- Leads to the promotion of education/tourism/research e.g. students visit Entebbe international airport.
- The transport sector generates internal revenue from the transport users.
- Promotes economic diversification.

Negatives:-

- Leads to destruction of vegetation cover e.g. swamps and forest
- It is associated with accidents leading to loss of lives.
- Promotes the easy spread of diseases especially along major highways.
- The transport sector has promoted pollution
- The construction and rehabilitation of transport routes leads to displacement of people.