ACTION OF RIVERS

1. a)

- Birds foot delta.
- Estualine delta
- Aruate delta
- Cuspate delta

b)

- River must have a large load of sediments
- absence of filters like lakes or swamps in the river's course
- Rate of river deposition should be faster than rate of erosion by tides and waves.

2. a) (i) P- Deposition

Q- Erosion

(ii) R- Bluff/cliffs

(iii)

- In a stream, water flows in meandering motion.
- The motion sweeps the current to outer bank where lateral erosion/undercutting occurs and deposition occurs in the inner bank.
- This leads to formation and enlargement of a meander
- Subsequent cutting through the neck of the meander by the stream establishes a new channel
- The abandoned cut-off meander channel forms a crescent shaped lake-ox-bow lake

b)

- Gentle sloping/flat surface
- Has levees
- Has deltas/distributaries
- Has meanders
- Land is fertile-alluvial deposits
- Has mashes/swamps
- Has braided channels
- Presence of ox-bow lakes

3. a)
    - Increased discharge because of increased rainfall increases erosive activity of the river
    - A fall of sea level leads to river renewing its head ward erosion. Starting from the new base level.
    - Uplift of land causes a stream to increase its erosive power
    - Changing rock resistance from hard to soft along the river course reactivates rivers erosive power.

    b) X- Resistant rock

    Y- Plunge pool

    Z- Rock boulders/rock pebbles.

4.
- Some particles are carried in suspension because they are light and can be maintained within turbulence of water.
- Some load is dissolved in water and carried in solution.

- Some particles are heavy and are momentarily lifted by turbulence of the water and then dropped onto the river bed by **saltation process**.
- The heavy particles are rolled along the river bed through process known as **traction.**

5. i) Dedritic pattern resembles a tree trunk and its branches. The tributaries join the main river at acute angles.

   Trellis pattern comprises a main river with tributaries joining at right angles. The minor tributaries also join the main tributaries at right angles.

   ii) Trellis pattern comprises a main river with tributaries joining at right angles. The minor tributaries joining at right angles, the minor tributaries also join the main tributaries at right angles.

   iii) Central petal pattern comprises rivers which flow into a common inland basin or depression such as a lake or swamp.

6. a)

   - Gradient of the river channel which determine river energy.
   - The nature of bed rock whereby soft rocks would be more eroded.
   - Volume of the water which affects river ability to erode.

   b)

   (i) Define river rejuvenation

   Refers to the revival of rivers' erosive energy.

   (ii)

   - Incised meanders
   - River terraces
   - Knick points

- Rejuvenation gorges

7. a) River basin: The entire system of the river including tributaries and Distributaries

   b) Water shed: A boundary line separating neighbouring river basins. It's also called river divide.

   c) Catchment area: the entire area from which the river draws its water.

   d) river regime: this is the seasonal variation of the amount of water in the river channel or the variation of the quantity of water (discharge) passing down a stream.

8. a) Inland delta is formed at any part of the river course before it reaches its mouth e.g Niger delta in Mali and Okavango delta in Botswana, while an alluvial fan is deposit composed of silt, sand, gravel and boulders found at a point where a river enters a plain from high land e.g. Ewaso Narok fan on river Ewaso Narok in Kenya, kilombero alluvial fan in Tanzania and lumu alluvial fan in Uganda.

   b) Estuarine delta: develops at the mouth of a drowned river e.g Zambezi and volta river deltas

   An estuary is a mouth of the river which drains its water in the ocean in one complete channel e.g. river Zaire in democratic republic of Congo

   c) A bluff is a blunt, low embankment on the bank of the river as a result of recession of interlocking spurs due to lateral erosion.

A river cliff is an overhanging undercut river bluff (river bank) due to lateral erosion.

d) Levees and river banks

Levees are temporal raised river banks made of sand deposits on the flood plains between which a river flows. A river bank is an elevated land alongside a river which may either be vertical or sloping towards the river.

e) River valley and river channel

A river valley includes both the cross and long profile of a river including all the associated features from its source to its mouth, while a river channel is the narrow groove or furrow through which a river flows.

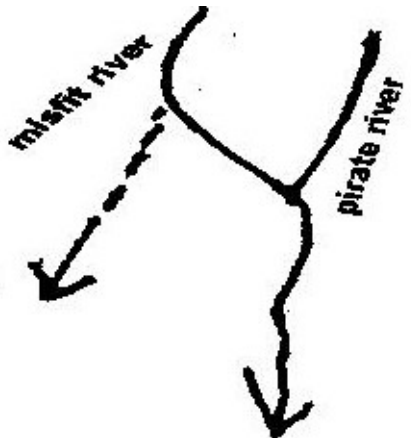
f) Paired terraces and unpaired terraces. Both are associated with river rejuvenation (renewed erosion of river to cut new channels). Paired terraces have valley levels on the opposite side with equal elevation while in the case of unpaired terraces benches on the opposite sides do not match.

g) Drainage pattern and drainage system. A drainage pattern is the layout or pattern made by the river and its tributaries on the landscape whilst a drainage system develops where rivers either flow in accordance or discordance to the existing rock structure and slope.

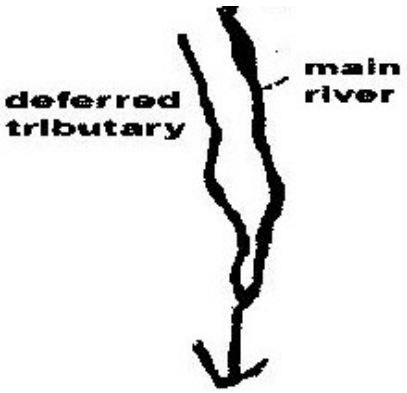
h) A misfit river and deferred river

A misfit river is one whose water has been pirated by another powerful river flowing adjacent and on a lower ground.

A misfit river is also referred to as an under fit or beheaded stream. A deferred river is a tributary that flow for long distances parallel to the main stream before joining it due to the presence of the levees.

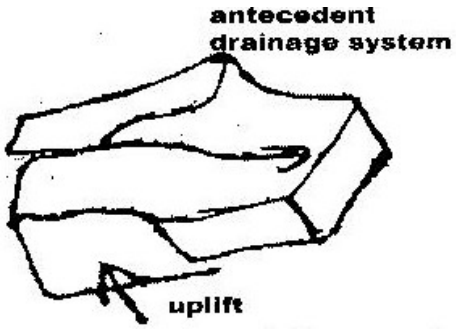


A misfit river and deferred river are shown in the diagram below.

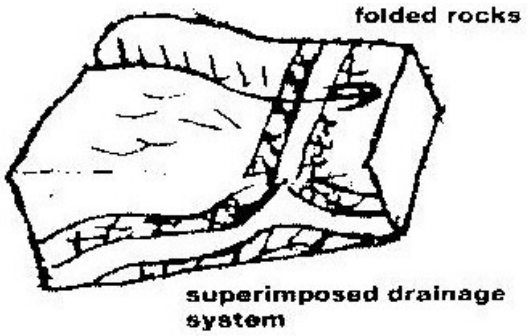


i) Antecedent drainage and superimposed drainage.

Antecedent drainage is a drainage system where a river maintains its course while the surrounding land is uplifted.



In superimposed drainage a river valley is developed on the former cover of rock which have been exposed and have a completely different structures



9.

- **Abrasion**

  This is the wearing down of river bed and sides by use of the load carried by the river. The load is hurled by water against the banks and dragged along the bed acting as a scouring tool.

- **Hydraulic action**

  High force moving water removes loose materials e.g. gravel. The water scoops out rock particles.

10. a)

- The river is in youth stage
- The main function of the river at this stage is erosion

- The main features of the river includes:
- Water fall
- Rapids
- Gorges
- Potholes
- Interlocking spurs

b) i) The river is in mature stage

ii)

- Main function of the river are erosion and deposition though lateral erosion is more dominant than vertical erosion.
- Main features of the river includes.
- Wider valleys with an open v-cross section
- Gentler river gradient, wider valley floor
- River bend begins to appear
- Concave banks standout as river cliff while
- Convex banks becomes slip off slopes
- Interlocking spurs changes to bluff due to gradual removal by lateral erosion

c) i) The river is in the old stage

ii)

- The main function of the river is deposition
- The main features of a river at this stage include;

- Meanders and ox-bow lakes , natural levees and deferred tributaries, Incises meanders and terraces, Braided channels, Flood plains, Deltas and tributaries, Very gentle gradient, Shallow broad and flat valley.

11.

- River provides water for irrigation this has enhanced food production of the local people in the areas where the river passes.
- River provides route ways e.g. the navigable rivers. This has facilitated easy transport and communication between any area served by the river
- River provides sand which is a building material. People can put up permanent structures and this has changed their lifestyles
- Rivers are sources of alluvial soil. These deposits of river soils form rich agricultural land e.g. along the Tana river valley. This has increased food production hence better living standards.
- Rivers form natural boundaries between communities, districts provinces or countries. Such boundaries have helped in settling disputes related to land at the borders
- During floods, rivers destroy properties and human life. This has led to migration of people to higher ground and inadequate development of physical infrastructures such as permanent housing, roads e.t.c.
- Rivers are tourist attraction features. The revenue earned through tourism where there are rivers is a source of income to the local inhabitants, and hence the revenue raises therir standard of living

- Rivers provide fishing ground. Fish which is a rich source of protein is used to supplement other food resources such as meat. This ensures a healthy population devoid of diseases such as kwashiorkor.
- Communication barrier some river form barrier between communities making communication difficult e.g communities making communication difficult e.g. communication between Lamu and Tana river district. The local therefore have to use alternative longer routes which is expensive and time consuming.
- Water borne diseases: In rivers where water is almost stationary many water borne diseases are a problem. These diseases may include river blindness, malaria and bilharzias. The treatment of this diseases is difficult and very expensive
- Rivers provide site for hydro-electric power generation. The lifestyle of locals in other benefits which comes along with power generation. This may include trade, urbanization; better road and communication network this has led to improved living standard.
- Rivers provides port facilities. The presence of ports also offers employment opportunities to peoples within the region.
- This has enhanced the living standard in the region e.g port of Mombasa.
- Rivers supply water for both domestic and industrial use. The construction of industries in the area is also a major source of employment to locals hence improvement of standards of living.

12. a) Vertical aerial photograph

    b) I. Arcuate delta

       II. Birds foot delta

c) - Presence of large load/ample supply of load.

- Absence of strong waves/Currents in the sea/lake.
- Decrease in the velocity/speed of river
- Presence of gentle gradient
- A shallow shore at the river mouth.