Extreme Series

GEOGRAPHY

GRADE 11

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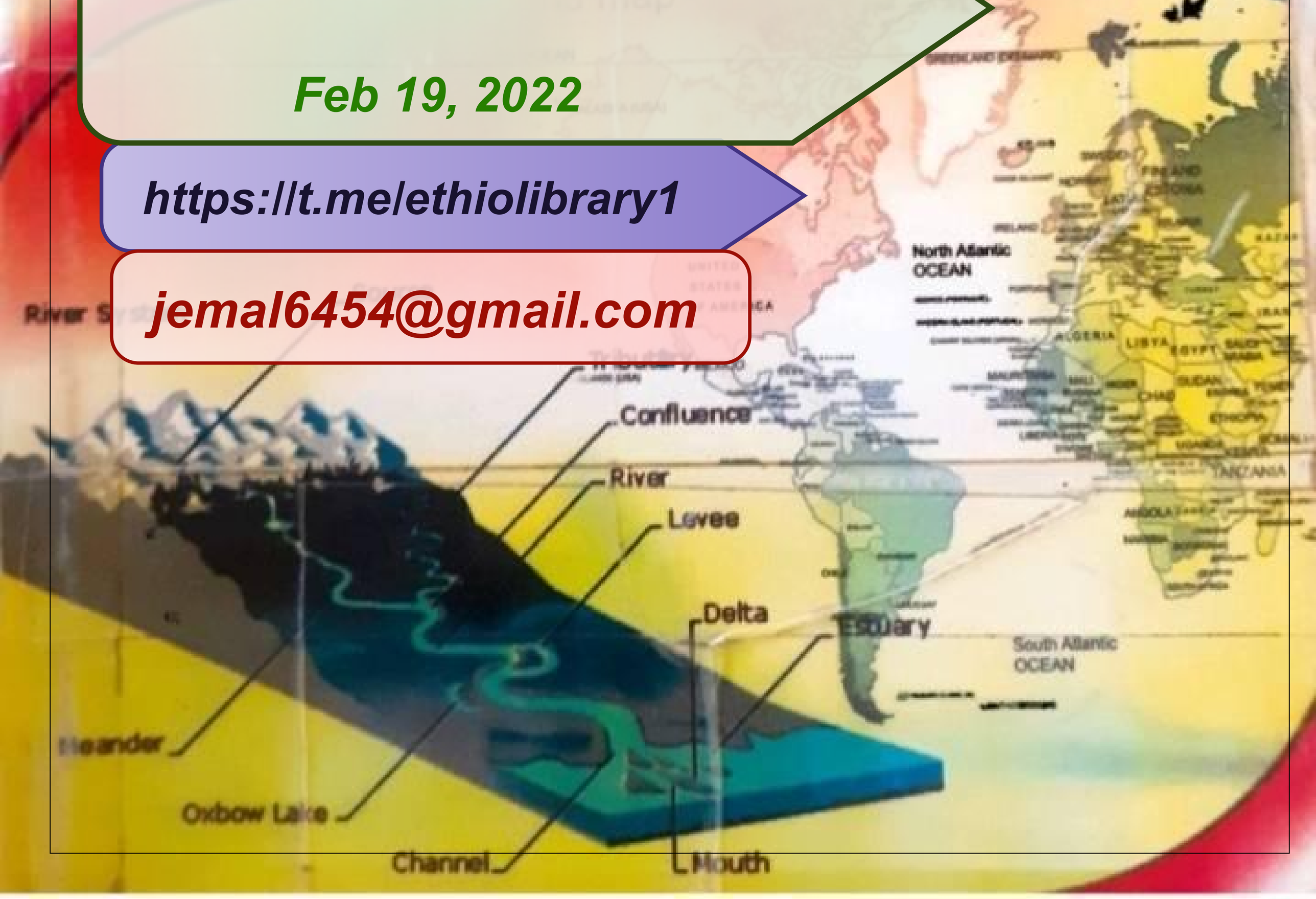

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UNIT ONE

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The Science of Geography

1.1. Meaning of Geography

Geography is a science. The word "Geography" first appeared in history at the time when the Greek civilization reached its apex. Eratosthease a famous Greek philosopher (276-194 B.C), defined geography as "the field of study, which deals with the description of the earth". Another scholar, by the name sir Halford Mackender opener of geography in Britain, defined the word geography. He called/if "Geography, an Art and a philosophy; for the subject we may claim, is characterized by its own technique primarily the map; by the visual way of thinking and by its own point of view namely the elevation of the place factor in the interrelationships of natural phenomena and human affairs".

A number of definitions have been given by different seholars. By mutual understanding most geographers agreed that, geography is the study of the spatial variation of phenomena on the earth's surface on one hand and the two way relationship existing between human kind and the environment on the one hand.

Geography is:

- "a synthesizing discipline to connect the general with the particular through measurement, mapping, and regional emphasis." (Alexander von Humboldt, 1845)
- "nothing less than an understanding of the vast interacting system between human beings and there environment on the earth's surface." (E.A Acreman, 1953)

- "a science that is meant to provide accurate, orderly, and rational description and interpretation of the variable character of the earth's surface." (Riechard Hartshorne, 1959)
- "a science concerned with the rational development and testing of theories that explain and predict the spatial distribution and location of various characteristics on the surface of the earth." (M. Yeates, 1968)
- "Concerned with the vocational or spatial variation in both physical and human phenomena at the earth's surface. (Martien Kenzer, 1989)
- "The study of the patterns and processes of human – built and environmental (natural), landscapes, where the landscapes comprise real (objective) and perceived (subjective) space." (Gregg Wassmausdorf, 1995)
- "The study of the environment of the earth's surface and the relationship of humans to this environment, Which includes both physical and cultural geographic features: (Microsfor (R)Encarta (R)2008)

Geography does not have a single definition that is universally accepted. Geographers ask five pertinent questions about the phenomena they study. There are:

- "WHERE are things located?"
- "WHY are they located where they are?"
- "WHEN did the things form?"
- "WHAT things are found where?" and
- "HOW are they arranged?" The answers to these basic questions are both descriptive and analytical.

Illustrative Questions

1. One of the following themes relates LEAST to the nature of Geography (EUEE – Geography 2002/2010)

   A. Interaction between human beings and the environment

4. Explain briefly the meaning (definition) of geography?

Explanation: The subject Geography define by different scholars in a different manner among this geography is the study of the spatial distribution of both physical and human made things and phenomena on the earth's surface and the two – way interactions and interdependences between natural and human environments.

5. Which of the following best indicates the central concerns of modern Human Geography?

A. Studying social and physical environment and preparing maps.

B. Identification of various types of cultural and physical features.

C. Studying the spatial organization of settlements and economic activities.

D. Studying the relationship that human beings have with the physical environment.

Explanation: The central concerns of modern human geography is studying the relationship that human beings have with the physical environment.

Answer: D

1.2. Scope of Geography

- Scope refers to the extent of interests or focus in a certain subject. It also refers to the capacity and limits that an academic discipline treats. In this regard, geography is said to have a greater scope than mere locations.
- Generally, the geo-sphere is considered as geography's scope.
- The geo – sphere itself is made up of five sub spheres, namely the lithosphere, hydrosphere, atmosphere (troposphere), biosphere and anthroposphere.

Table 1.1. The geospheres of the earth

Geospheres	Description	Geography's related area of study
Lithosphere	The solid part-i.e., the rock layers of the earth	Geomorphology, soil geography
Troposphere	The lower part of the atmosphere where weather changes occur.	Climatology
Hydrosphere	The water surfaces of the earth including oceans, seas and lakes	Oleanography
Biosphere	The part of the earth that supports all sorts of life	Biography
Anthropo sphere	The earth's cultural landscape	Cultural geography, population geography

- Geography has a very wide scope. However, this does not mean that its scope is limitless.
- The major areas that geography focus on area
  - → The earth, its position in the universe and its movements;
  - → The different physical features that constitute the earth surface, the forces that cause them, their variations from place to place and their changes over time;
- The different relationships between human beings and their natural environment.
- The conditions of the lower part of the atmosphere and the subsequent weather and climatic conditions, together with their spatial distribution and variation.
- The materials that make up the earth and its diverse land forms;
- The major economic activities of humans and the impacts on the environment.

Illustrative Questions

6. Describe the scope of Geography?

Explanation: Scope refers to the extent of interest or focus in a certain subject. Geography is a greater scope than mere locations. It treats a wide range of phenomena on the planet earth.

7. Why do you think that geography divided in to two branch?

Explanation: This is due to the fact that the broaden scope in order to easily study and understand the different aspects of phenomena geographers divided geography in to physical and human geography.

8. Mention the geography related study area of geospheres part. of lithosphere and Anthroposphere?

Explanation: the solid part of earth (Lithosphere) related to geomorphology and soil geography on the other hand Anthroposphere or the earth's cultural landscape related to cultural and population geography.

9. Do you think that the scope of geography is limitless? Why or Why not?

Explanation: It is true that the scope of geography has a very wide scope but not a limitless meaning that its focus area concentrated at a certain physical and human aspects. Example, the different physical features, major economic activities of humans and the impacts on the environment.

1.3. APPROACHES IN GEOGRAPHY

- Like other social scientists, geographers have an organized way of studing their subject.
- The most frequently adopted approaches are
  - Regional approach and
  - Topical or systematic approach

Topical or systematic approach

- In this approach geographers would look at one topic

- It applies a specific geographical element or phenomena over a defined geographical unit.
- It treats the distribution of the selected element over a country, contents or the world at large.
- It gives emphasis on a real differences of specific elements over the whole earth or major part of it.
- Example, the geography of land form.

Regional Approach

- It studies the various characteristics of each region (realm) of the world.
- It examines a variety of geographic features.
- It studied could be sub continent, continent or a number of countries that share a common geographic factor.
- Example, the geography of Africa, the geography of Asia, Africa, Oceania, etc.

Illustrative Questions

10. What are the differences between systematic and regional approaches?

Explanation: The topic or systematic approach applies a specific geographical element or phenomena over a defined geographical unit where as the regional is used to study an area of the world that can be called region.

11. The geography of climate is an example of topical or systematic approach why?

Explanation: Because climate is one of the single component or elements of physical geography.

12. Which approach would appropriate to a study of the geography of Africa.

Explanation: Regional approach is more appropriate because its nature focus on a subcontinent, continent or a number of countries that share a common geographic factor.

1.4. MAJOR SCHOOL OF THOUGHT IN GEOGRAPHY

- Geography is a dynamic subject; it has come a cross successive change and development in scope throughout its history.
- The development of the subject is treated that two very different schools of through

School of Determines

- It is based largely up on the teaching of Friedrich Ratzel.
- It holds that physical or environmental controls determine the activities of humans very closely, so that they have. Life free choice. This implies that the deterministic approach is based on the basic principle of earth created human kind. This entails that human beings are not only dependent on nature but also controlled by it.
- It emphasize environment determines the life style of people.
- It is based on the belief that the physical qualifies of geographical conditions are the causes not only for people's physical differences but also for differences from place to place in people's economic activities, cultural practices and social structure.
- The idea of environmental determines was laid down by Greek and Roman scholars. Many scientists agree that the publication of "The origin of specials" by Charles Darwin in 1859 laid the foundation for the concept, of the influence of the environment on people and other organisms. In the same way, Demolish (1901 and 1903) postulated that "the flourishment of society is based on the environment."
- It consider human beings as passive agents where the physical factors determine their attitude and process of decision making.
- The prominent scholars who supported the school of determines were = Charles Darwin, Demolins, F

Environmental possibilism

- It was postulated by Fever, in his book "Geography introduction to History." He stated that there are no necessities, but every where possibilities and human as master of those possibilities is the judge of their use.
- The main theme of possibilism in the possibility of two way relationship between human kind and nature.
- It is usually true that the influence of environment on the activities of humans is un avoidable. They state that people can influence the environment to enhance their way of life.
- They agree that the environment can potentially affect people's activities, but they believe that we can use our knowledge and skills to regulate these effects.
- The possiblism school of thought believes that human society cannot fully tame nature and is not always victories, Hence, it replaces more deterministic terms 'control' by 'influence' and 'influence' by more moderate terms like 'response' or 'adjustment'.

The Quantitative Revolution

- It marked the beginning of a new era in geography where inquiry methods began to employ statical techniques.
- Its roots in the 1950'sand flourished during the 1960's, helped geography to follow quantitative data analyses.
- It evolved a more abstract, theoretical approach to geographical research has emerged, and the analytical method.
- It sued rigorous mathematical formula, borrowing from the physical sciences.
- It was driven by the development of the computer and its ability to rapidly process data. Quantitative geographers "went radical" and applied computers, statics, and mathematical models to the study of geographers.

- Some of the techniques that became central to geography during the quantitative revolution were.
  - Descriptive statics
  - Inferential statics
  - Basic mathematical questions and models, such as gravity models.
  - Deterministic models eg. Vonthunen's and Weber's location Models
  - Stastical models, using concepts of probability

The Emergence of Applied Geography

- The emergence of scientific research has helped the emergence of applied geography; which has paved the way for solving problems that restrict human progress.
- Applied geography had its roots in the quantitative revolution emergence of applied geography increased the applicability of geographic knowledge.
- It is the use of geographic analysis in private business, government, non - profit organizations etc. Applied geography solves problems and aids in decision making.

Illustrative Questions

13. Which one of the following is a school of thought, which believes that the environment offer arrange of opportunities from which an individual or a group can choose?

A. Possibilism
B. Positivism
C. environmental perception
D. cultural determinism

Explanation: According to possibilism school of thought the physician environment was seen as a set of opportunities to be modified by human beings.

Answer: A

14. Which one of the following schools of thought in geography used to consider natural environment as the determinant factor for human behavior and activities?

analytical method of inquiry evolved this new approach we call it quantitative revolution.

Answer: D

18. What are the contributions of the quantitative revolution to the development of geography?

Explanation: Quantitative revolution bringing scientific thinking to geography, and also increased use of statical techniques in geographic research.

1.5. THE RELATIONSHIP BETWEEN GEOGRAPHY AND OTHER DISCIPLINES

- Geography is an interdisciplinary subject. It has strong relationship with various disciplines in both the natural and social sciences. It shares facts with them and explains certain aspects of those sciences.
- Examples, how geography relates to these other sciences.

Biology: is a science that deals with all forms of life, including their classification, physiology, chemistry, and interactions. As biogeography is the study of plant and animal distribution, it is liked with biology.

Geology: is the study of the internal composition of the earth. It examines the forces that change the earth's structure. It also investigates the history of those changes. Geography is linked with such branches of geography as geomorphology and soil geography.

Economics: is the study of the production, distribution, and consumption of goods and services. As economic geography is concerned with economic activities, it is strongly related to this field.

History: is a systematic and organized study of the past socio – economic and political processes of human society. History helps us anticipate the future. As it is concerned

with the past, it is strongly linked with historical geography.

Demography: is the study of human populations, including their size, growth, density, and distribution and stastics regarding birth, marriage, disease, and death. The body of knowledge that we learn in population geography is somehow linked with the subject matter of demography.

Mathematics: is the study of the relationships among members, shapes, and quantities. It uses signs, symbols, and roots and includes arithmetic, algebra, calculus, geometry, and trigonometry. Mathematical geography is linked with this academic discipline.

Illustrative Questions

19. Which one of the following is not true about the scope of geography and its relationship with other disciplines?

A. Geography shares the study of population with demography
B. Geography shares the study of certain aspects of vegetation with biology
C. Geography is involved in the study of the internal processes of the earth with geo-physics.
D. The study of the origin and diffusion of disease is hared among epidemiology geography and some other disciplines.

Explanation: The study of the origin and diffusion of diseases is not the concern of geography.

Answer: D

20. Geography is interdisplinary in nature what does mean?

Explanation: Interdisciplinary nature mean in short strong linked with other disciplines in other words, it refers to sharing idea, informatics concept with other disciplines.

21. Write the related disciplines of population, Geomorphology Biography political and economic geography?

Map Reading and Interpretation

2.1. RELIEF REPRESENTATION ON CONTOUR MAP

Meaning of Relief

- It refers to the way that the earth's surface is arranged.
- It shows the deference in altitude that exists between different land forms.
- It indicates the variation in the nature of the land surface
- It shows the broad features and relative heights of highlands and lowlands.

Contour lines

- They also known as isohypes
- They are imaginary lines shown on a map that connect places of equal altitude above mean sea level.
- They provide the most accurate way of showing relief on maps.
- They are used to show the different landforms of the earth on two – dimensional maps.
- They used to denote elevation or latitude and depth on maps.
- The term "contour line" is most commonly used in cartography. However, the term isohypse for underwater depths on bathy metric maps and "espouse" for elevations are also used. The process of drawing contours (esohypses) on a map is called isopletion.

- The patterns that the contours are drawn with, their spacing and shape indicate the characteristics of the relief of the place. for instance,
  - Every spaced contours represent an uniform slope;
  - Contours that are widely spaced indicate a gentle slope;
  - Contours that are close together near the top of a hill and widely spaced at the bottom indicate a concave slope;
  - Contours that are widely spaced at the top of a hill and close together at the bottom indicate a concave slope;
  - Overlapping contours; i.e. contours that merge at a point, indicate a cliff;
  - Crossing contours indicate an overhanging cliff;
  - Close contours with more or less circular shapes with values increasing towards the center and with the top indicated by a spot height represent mountains or hills.
  - Closed contours with more or less circular shapes, with values decreasing towards the center represents depressions;
  - Closed contours with elongated shapes, with values increasing towards the center with no specific tips indicate mountain ranges;
  - Closed contours with more or less rectangular shapes, with values increasing towards the center with the top being a very wide closed contour represent plateaus;
  - Contours with "V" shapes, with upward bending and values increasing upward represent valleys.

Illustrative Questions

1. Maps have long become the essential and distinct tools of geographers mainly because
   A. They are relatively easier to prepare in school situations.

A. Isophyses
B. Isobaths
C. Isomarines
D. Isolacustrines

Explanation: The term "isobaths" used to describe for under water depth on bathymetric maps.

Answer: B

5. In a topographic map contours with "V" shapes, with down ward bending and values increasing upward represents
   A. Plateaus
   B. Mountain ranges
   C. depression
   D. spurs

Explanation: Contours with "V" shapes, with downward bending and values increasing upward represent spurs.

Answer: D

6. Define the term relief?

Explanation: In short relief shows the difference in altitude that exists between different land forms.

2.1.1. Drawing contour lines from spot Heights

- Surveying the area to obtain spatial data about the relief of the place is important and mandatory to preparing the contour map of an area.
- The collection of spatial information that is vital for contour mapping can be done through ground survey, aerial photography or satellite imagery.
- The aerial photograph of the landscape has to be mapped through aerial photogrammetry, which uses an instrument called a stereoscope.
- Photogrammetry is the science of taking measurements from aerial photographs or satellite images to make maps, including topographic maps.
- Astereoscope is an optical instrument through which one may view photographs of objects not merely as plane representations. but with an appearance of solidity and in relief.

- The gathered data will be recorded on paper or stored in a computer by using spot heights, with each spot height representing the measured altitude of the specific point.
- The method contours are drawn from spot heights called interpolation
- Spot heights represent individual heights of places at varying points as obtained through ground surveys by using cline meters, which are hand held surveying instruments for measuring angles, of slopes, and altimeters, instruments to measure the elevation of places.
- Interpolation can be done in the following methods.
  - → **Estimation method**: is used to locate contour lines by rough estimation. It does not necessarily
  - → **Calculation method**: is the most accurate method of interpolation, where by the exact altitude of the contour will be determined by measurement and subsequent calculations. It is time – consuming and laborious.
  - → **Graphical method**: is the quickest and the most accurate method of interpolation of contours.

Methods of Depicting Relief on Maps

a. Layer Tenting;

- It is a method of showing relief by using different colours or different intensities of the same colour. Each shade of color, or band, represents a definite elevation range.
- It does not allow the map user to determine the exact elevation of a specific point.
- It only shows the range of elevation.

b. Form Lines:

- They give a general idea of relief represented.
- They are represented on a map as dashed lines and are never labeled with representative elevations

c. Shaded Relief:

- It is a method that indicates relief by a shadow effect achieved by tone and color that results in the darkening of one sede of terrain features, such as hills and ridges.

d. Hachures:

- They are short, broken lines that are used to show relief.
- They are sometimes used with contour lines.
- They do not represent exact elevations, but are mainly used to show large, rocky outcrop areas.
- They are widely used on small – scale maps to show mountain ranges, plateaus, and mountain peaks.

e. Contour Lines:

- They represents an imaginary line on the ground, representing altitude above or below mean sea level.
- They are the most common method of showing relief and elevation on a standard topographic map.
- All points on a given contour line are at the same elevation

Types of Contours

There are three types of contour lines shown on standard topographic maps. These contour types are:

i) Index:

- Starting at a zero elevation or mean sea level every fifth contour line is a heavier/ darker than the other contours lines are known as index contour lines.
- It is numbered at some point.

ii) Intermediate:

- It falling between the index contour, these lines are finer and do not have their elevation given.
- In most cases, there are four intermediate contour lines between index contour lines.

iii) Supple

- These contour lines resemble dashed or broken lines.

- They show changes in elevation of at least one – half the contour interval.
- They are found where there, is very little change in elevation, such as fairly level terrain.

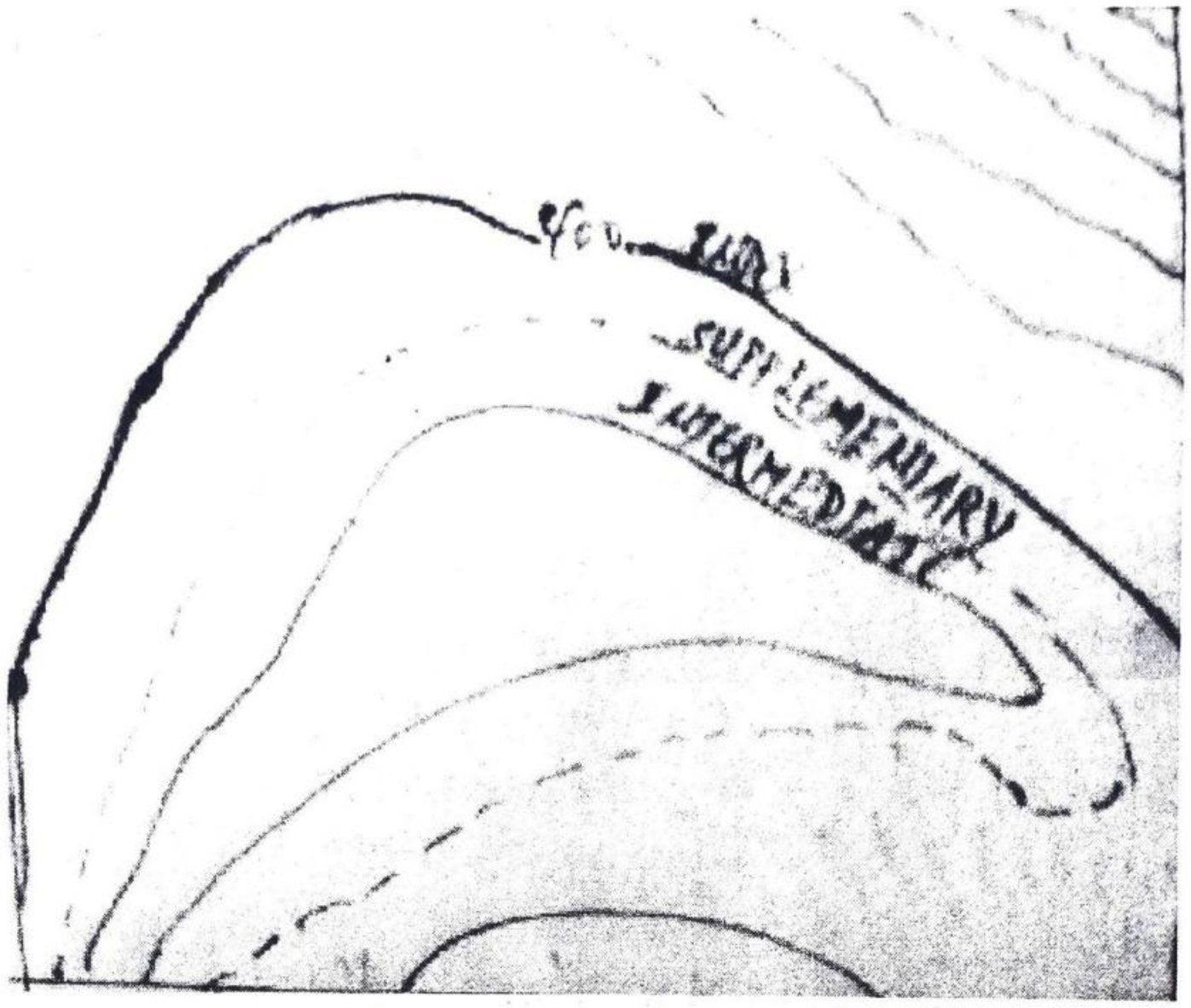


Fig. 2.1. Types of contour lines

- Contour lines are generated from spot heights,
- A spot height is astastical point that represents the specific altitude of a place at that particular point.
- Contouring is started by plotting the spot heights with their specific altitudes on the paper on which you want to draw the contour map.
- The elevations of the spot heights can be obtained by ground survey and associated measurement of altitude of points on the surveyed area.

Procedure: that contour lines are generated from spot heights.

Example:

Fig. 2.2. Drawing contour line using interpolation

1. Identify all the points between which the 400m contour line passes. In this case, they are all the points that lie between the following spot heights.
2. Connect all the 400m contour by using straight lines
3. Measure the length of each line connecting two spot heights to determine the distance on the map between the two points and see the height of represents (the difference in altitude between the two spot heights.)
4. Determine the point at which the 400m contour line passes.
5. Connect all the identified points of a certain contour line with the given contour interval by using curved lines to draw the contours.
6. Label the map and add all the required information.

When you finish drawing all the contour lines. You will have the following contour map.

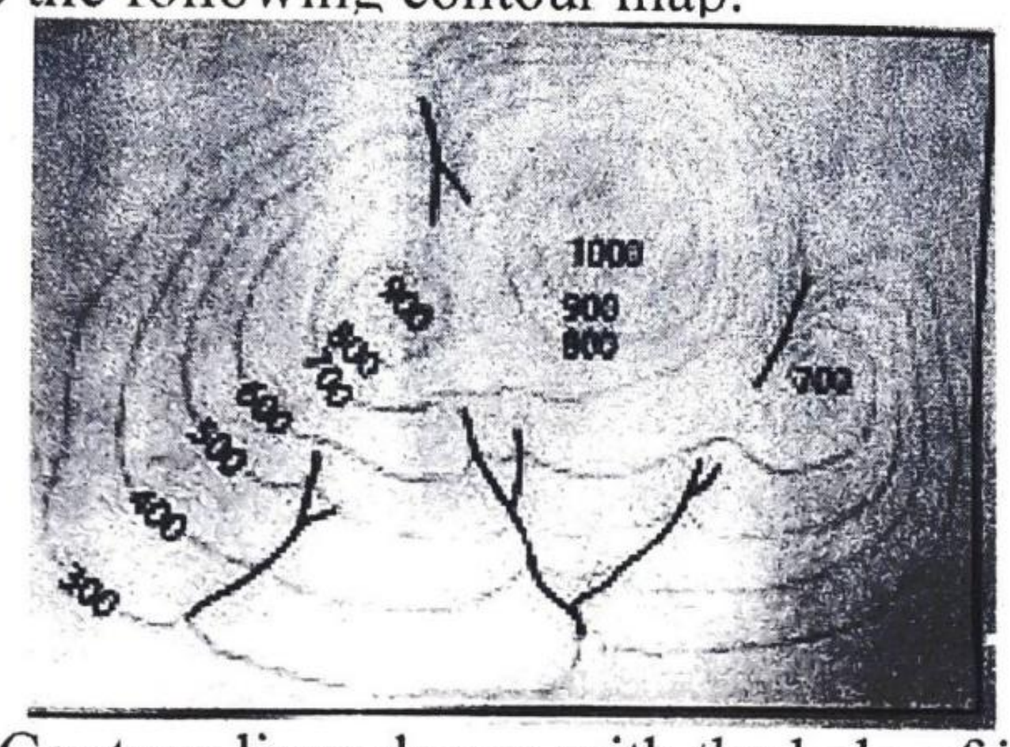


Figure 2.3. Contour lines drawn with the help of interpolation

2.1.2. Drawing Relief Cross – section (profile)

- A profile is a line, shows the rise and fall of the surface of the ground along a chosen line on a map.
- It is drawn to get clear idea of the nature of relief along a line.
- Section (profile) drawing is the construction of a vertical – section along a line on a map to enable you to have a better side view or cross profile of the physical feature of a region.
- It is one of the simplest ways of acquiring skills in reading counter maps.
- In section (profile) drawing, two different scales are used to draw the section. They are the horizontal scale and the vertical scale.
- In section (profile) drawing horizontal scale is the normal scale of any given map, on the other hand, vertical scale is the scale which is used to show the nature and type of relief on the contour map.
- The vertical dimension is exaggerated many times to enable the section to be drawn quickly and easily. But care should be taken not to involve great differences in the scale as this distorts the true picture of the relief.
- It is sometimes necessary to state, on the section, the actual exaggeration involved. This can be 'calculated simply by dividing the horizontal scale by the vertical scale.
- The vertical exaggeration/ vertical scale of the cross – section is determined by considering the scale of the map and the nature of the terrain.
- Vertical exaggeration is calculated using the following formula:

$$V.E = \frac{H.S\,(\text{Horizontal scale})}{V.S\,(\text{Vertical Scale})}$$

- Vertical exaggeration depends on the nature of relief eg. Higher vertical exaggeration for flat terrain; and small or no vertical exaggeration for rugged (rough) terrain.

Relief type	Amplitude	Approximate vertical exaggeration to scale			
		1:20,000	1 :50,000	1 :100,000	1 :250,000
Mountainous very hilly	700m	No	2	4	5
Undulating/ dissected	150 – 350m	2	4	8	8 or 16
Plains and plateaus	About 156m	4	8	15	20

Table 2.1. Relationship between relief and vertical exaggeration

Procedure

1. Prepare a basic frame work for the section with a base line the same length as the line AB. The section is to be drawn along this line. Mark and carefully label a vertical scale which will cover all the altitudes occurring along the section line.
2. Using the straight edge of piece of paper laid along the section line on the map, mark off on the edge of the paper where each contour crosses the section line. Note the numbers of the contour and indicate other salient features, such as rivers, lakes, peaks, roads and railways which cross the line.
3. Transfer the position of the marked off contours, etc to the section, entering a dot or cross for each contour at the appropriate height on the vertical scale. If the contours are marked – off at the appropriate height on the vertical scale.
4. Join the dots or crosses with a smooth line to complete the section. Label any outstanding physical or cultural features, such as rivers or lakes. It is often helpful to shade the section so that the outline can be seen more clearly.
5. Check that the section is clearly labeled, that the vertical and the horizontal scales are clearly stated, that ends of the base line are

labeled, including grid references where necessary, and that the section is clearly headed or titled.

Illustrative Questions

12. What is across-section (profile) mean?

Explanation: A profile is a line, which shows the rise and fall of the surface of the ground along a chosen line on a map.

13. What is the main reason in a cross-section drawing processes a vertical scale greater than the horizontally scale?

Explanation: In order to clearly visualize the terrain of an area the cartographers (map makers) exaggerate the vertical scale than the horizontal scale.

14. List the disadvantages of vertical exaggeration?

Explanation: If causes the slope of a hillside to look steeper than it actually and it may cause some distortion are some of the limitations of vertical exaggeration.

15. What is the main importance or significance of drawing relief cross-section (profile)?

Explanation: It is important to get clear idea or information of the nature of relief.

2.1.3 Intervisibility

- It is simply defined as the visibility of places to each other.
- Two points, A and B located in different direction are said to be intervisible if they can be mutually seen that is point A can be seen from point B and therefore, point B should also be seen from point A.
- All land that is not visible from a certain point in the field is known as "dead ground" from that point of view.
- Contour maps are important tools to determine whether two places are intervisible or not.

Importance of studying intervisibility

- Inter visibility is important for planning military operations;

- It is also important for understanding the distribution of dead and visible ground with respect to proposed plans of infrastructure;
- Inter visibility provides information for the evaluation of proposed sites for forest – fire lookouts.
- Inter visibility plays a significant role in the planning of lagging; and
- It is important for selecting appropriate sites for the development of recreation and refreshment centers.

Factors Affecting intervisibility

- The relief – altitudes, slopes and land forms
- The vegetation cover, eg. trees
- Buildings, houses and
- The physical distance between them

Cases to test the intervisibility of two points on a contour map.

1. If the land in between the two points in lower than both points, lie, if there is a valley or depression between them – then the two points are inter visible. But if there is a hill or mountain rising in between the two points, the points are not intervisible.
2. If the slope between the two points is concave then the two points are intervisible. That means the top and the flot of a mountain or a hill are inter visible.
3. If the slope of a hill is convex, you will not be able to see the bottom of the hill from its top and vice versa.
4. Two points on a level ground (uniform slope) are intervisible provided that there are no interfering obstacles such as tall buildings or trees between them.
   - The intervisibility of points can be determined by observing the nature of the contour lines and the direction at which elevation increases.

Example:

1. Points located at different altitudes (for example, one at the top and the other at the bottom of a hill) with contours that are drawn close to each other at the top and farther apart at the bottom (i. e., concave slopes) are intervisible.

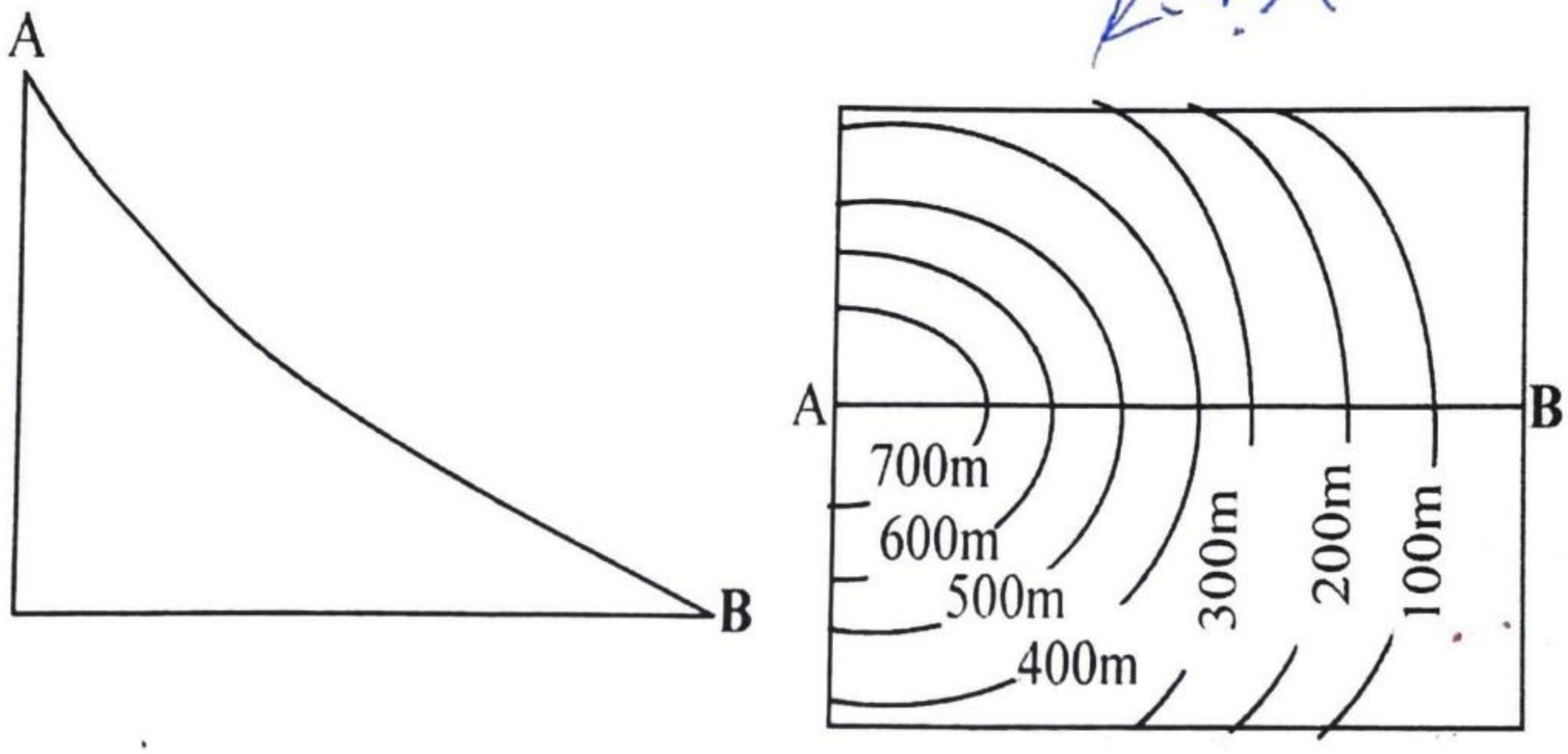


Figure 2.4. Intervisibility on a concave slope

2. Two point located at the top and the other at the bottom of a hill, with contours that are drawn far apart at the top and close to each other at the bottom (i.e. convex slopes) are not inter visible.

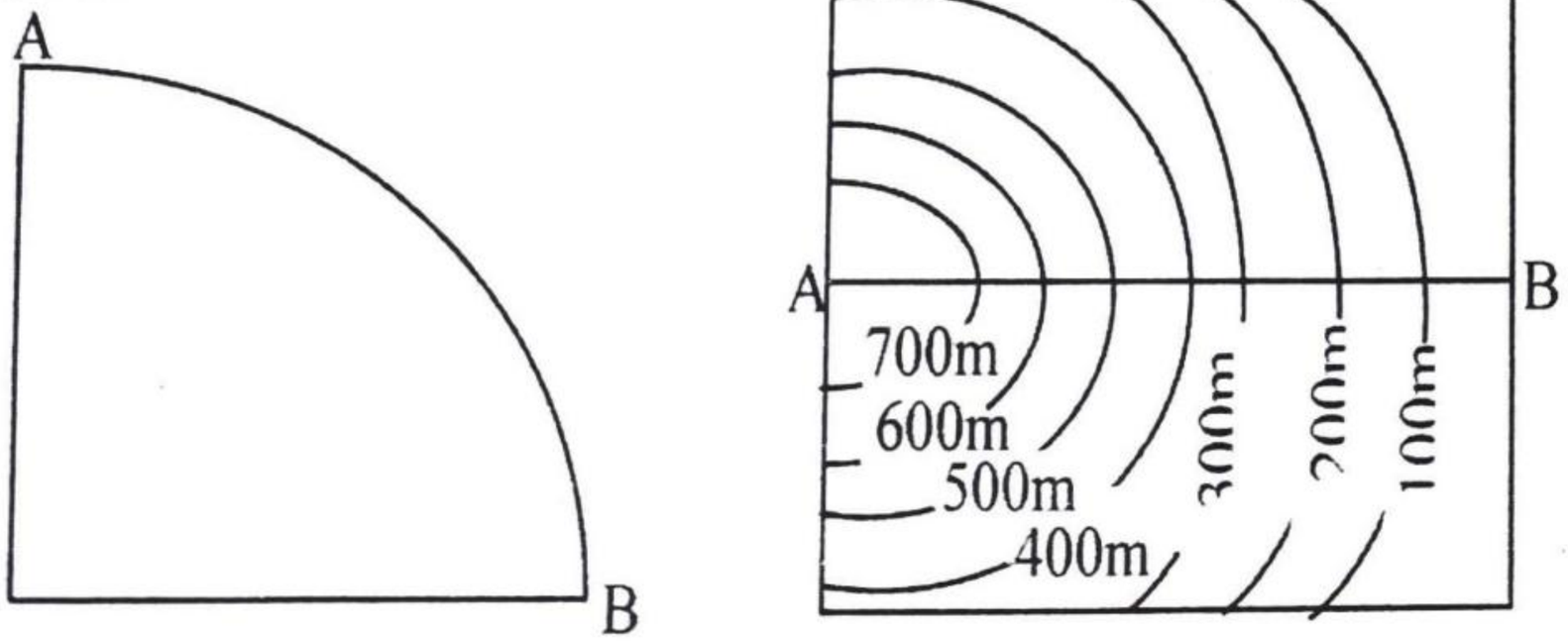


Fig. 2.5 intervisibility on a convex slope

3. Two points, one being located at the top of a hill and the other at its bottom, with contours that are evenly spaced (i.e.) gentle slopes are inter visible.

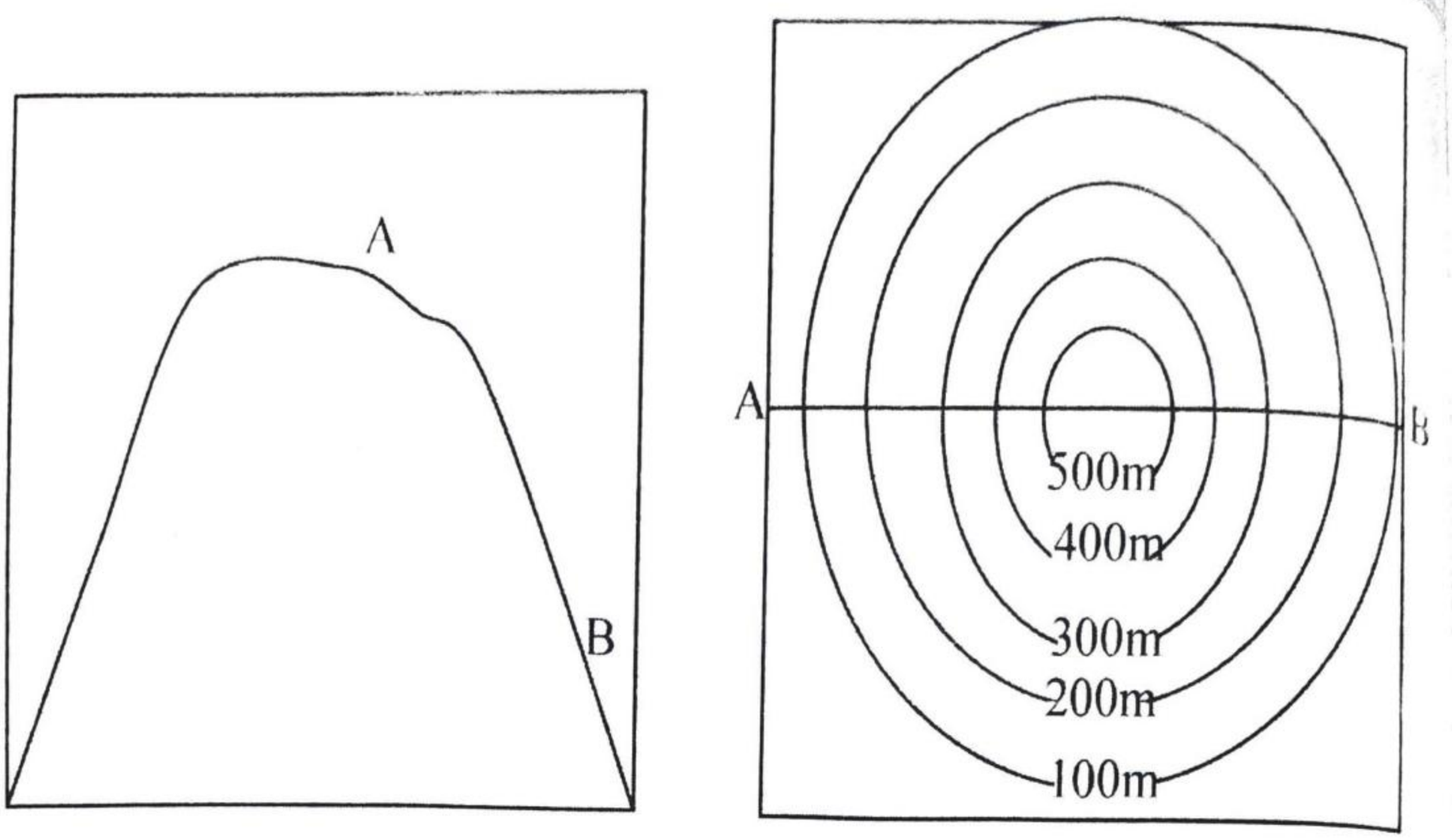


Fig. 2.6 Inter visibility on an even slope

4. Two points, one being located on top of a cliff or an overhanging cliff and other at the bottom of it (a relief feature that is represented by contours that merge at the points where the land scape becomes a cliff) are not inter visible.

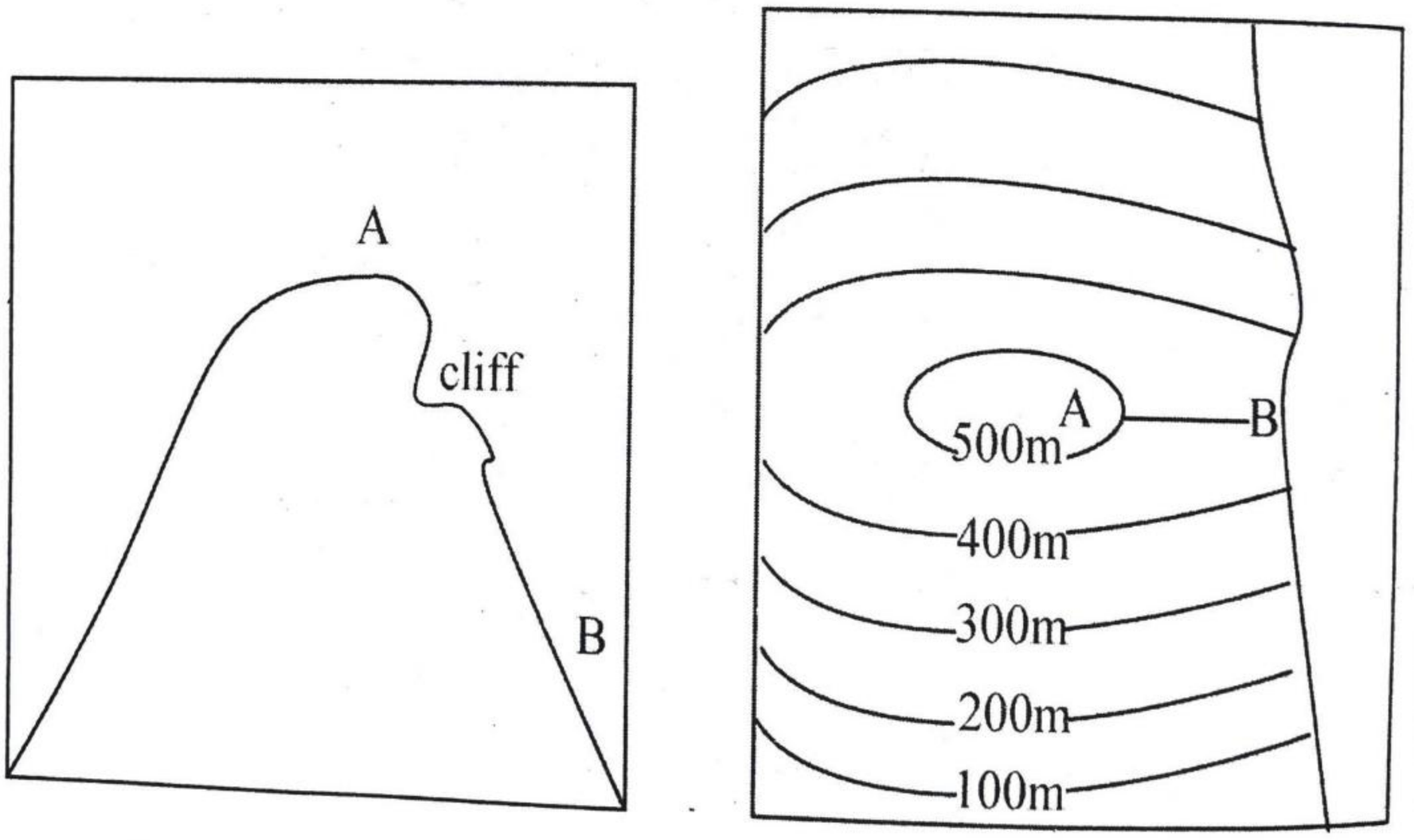


Fig. 2.7. Inter visibility between two heights a long a cliff

5. Points that are located at the same altitude are intervisible if there is no higher ground between the points. Otherwise, they are not intervisible.

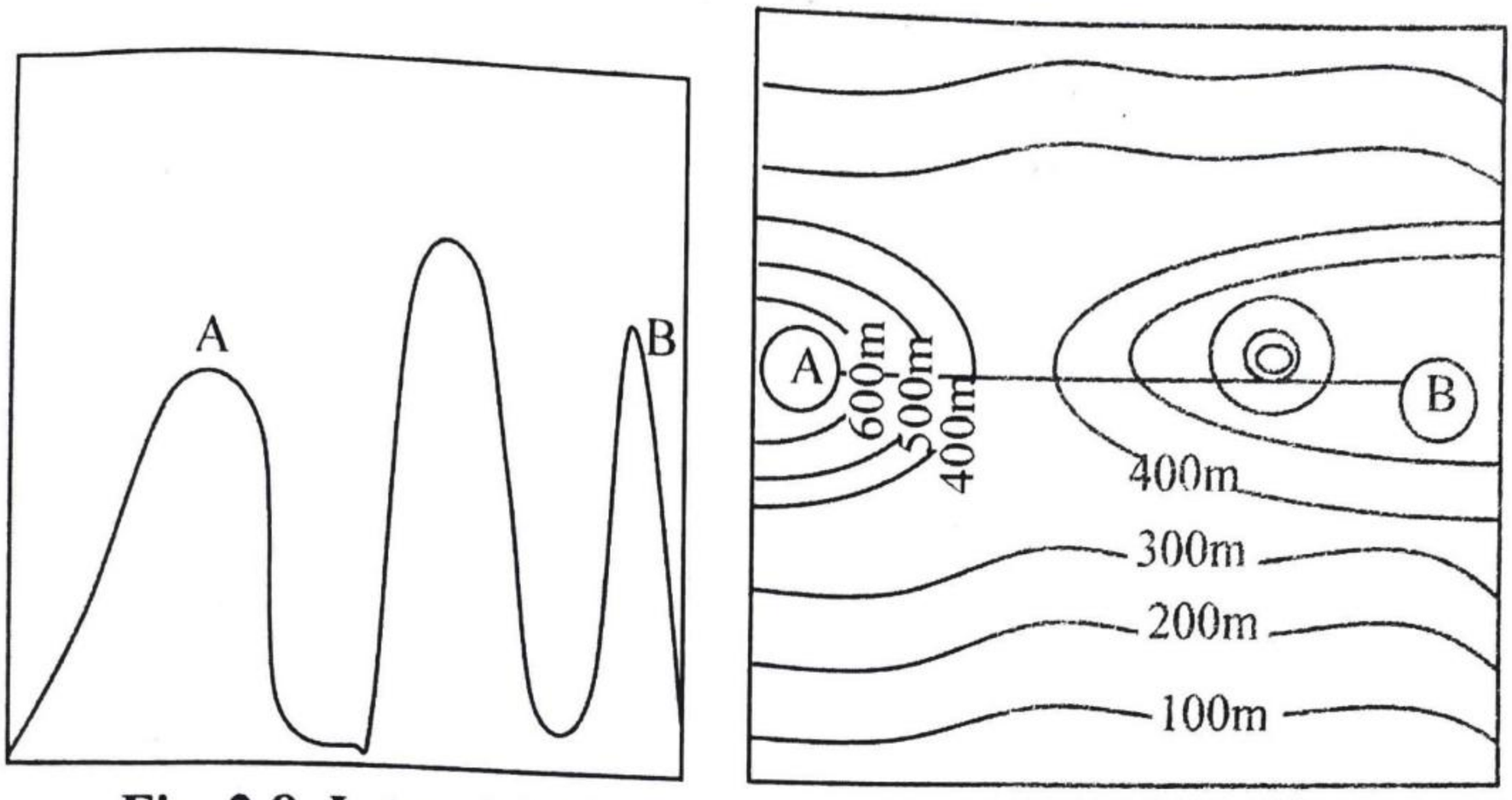


Fig. 2.8. Intervisiblity between two points with higher ground between them

6. Two points that are located at the opposite sides of a hill or a mountain (represented by nearly circular closed contours with their values increasing towards the smaller (innermost) closed contour) are not intervisible to each other because the higher ground between the two points prevents intervisibility.

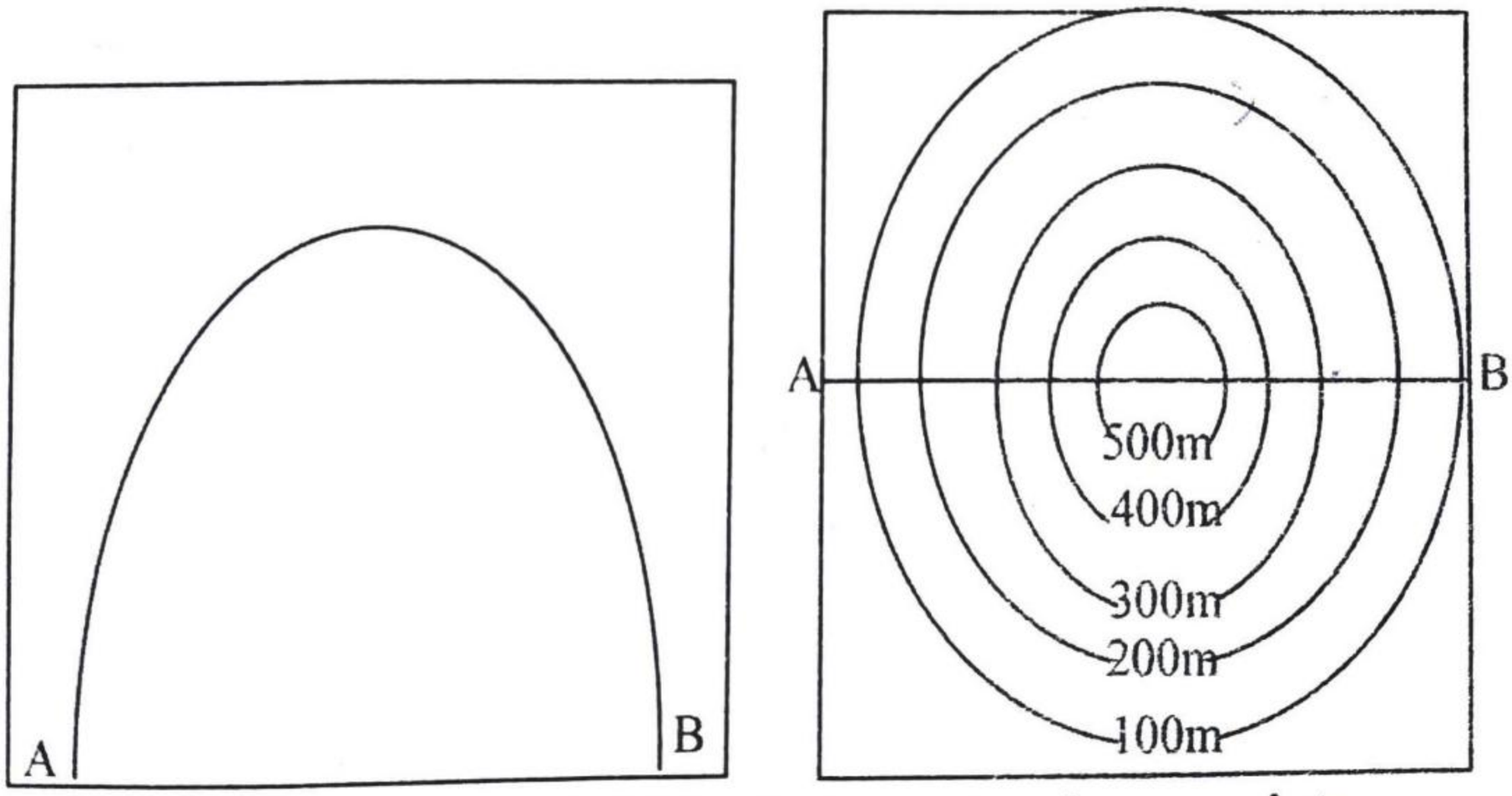


Figure 2.9: Intervisibility between two lower points

7. Two points, one located inside a depression on top of a mountain and the other on the side of the mountain outside the depression (shown by nearly circular closed contours with their values increasing towards the top of the mountain up to

the beginning of the depression and them closed contours with their values decreasing towards the most interior point are not intervisible.

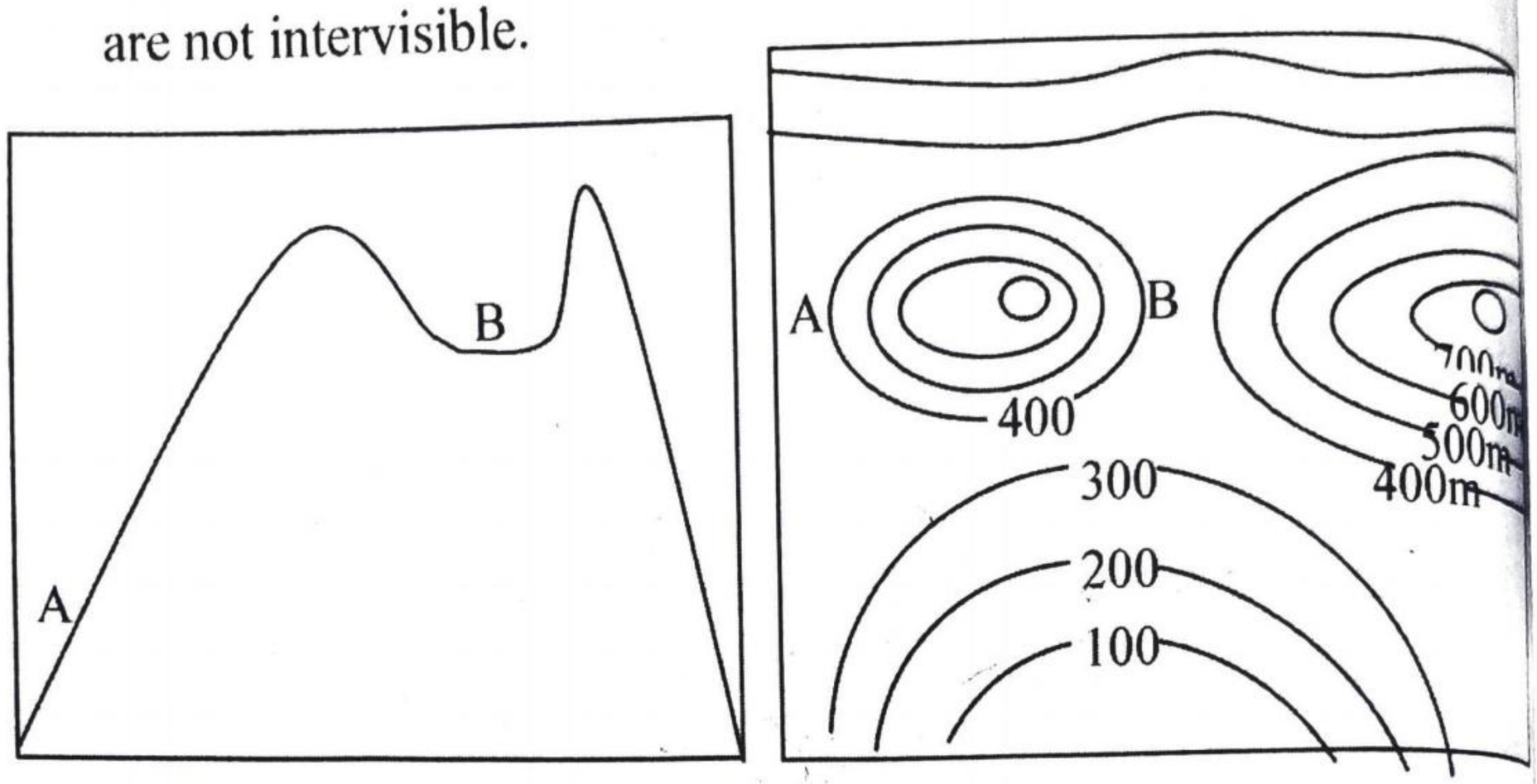


Fig. 2.10 Intervisibility between two points at lower and dead ground but at a higher altitude

Illustrative Questions

Question 16 and 17 are based on the map provided on the attached map. (EUEE – 2005/2013)

16. Which of the following spots are inter visible?

A. G and F
B. B and F
C. A and B
D. B and D

Explanation: spot B and F are inter – visible because, this two points separated by an even slope. (flat area)

Answer: B

17. What type of slope is shown by the line that connects spots E and D?

A. An even slope
B. A concave slope
C. A convex slope
D. A steep slop

Explanation: A type of slope that connects spots E and D are even slope due to the fact that such a slope is represented by contours which are spaced at equal distance.

Answer: A

Answer the following questions from Figure 2.11

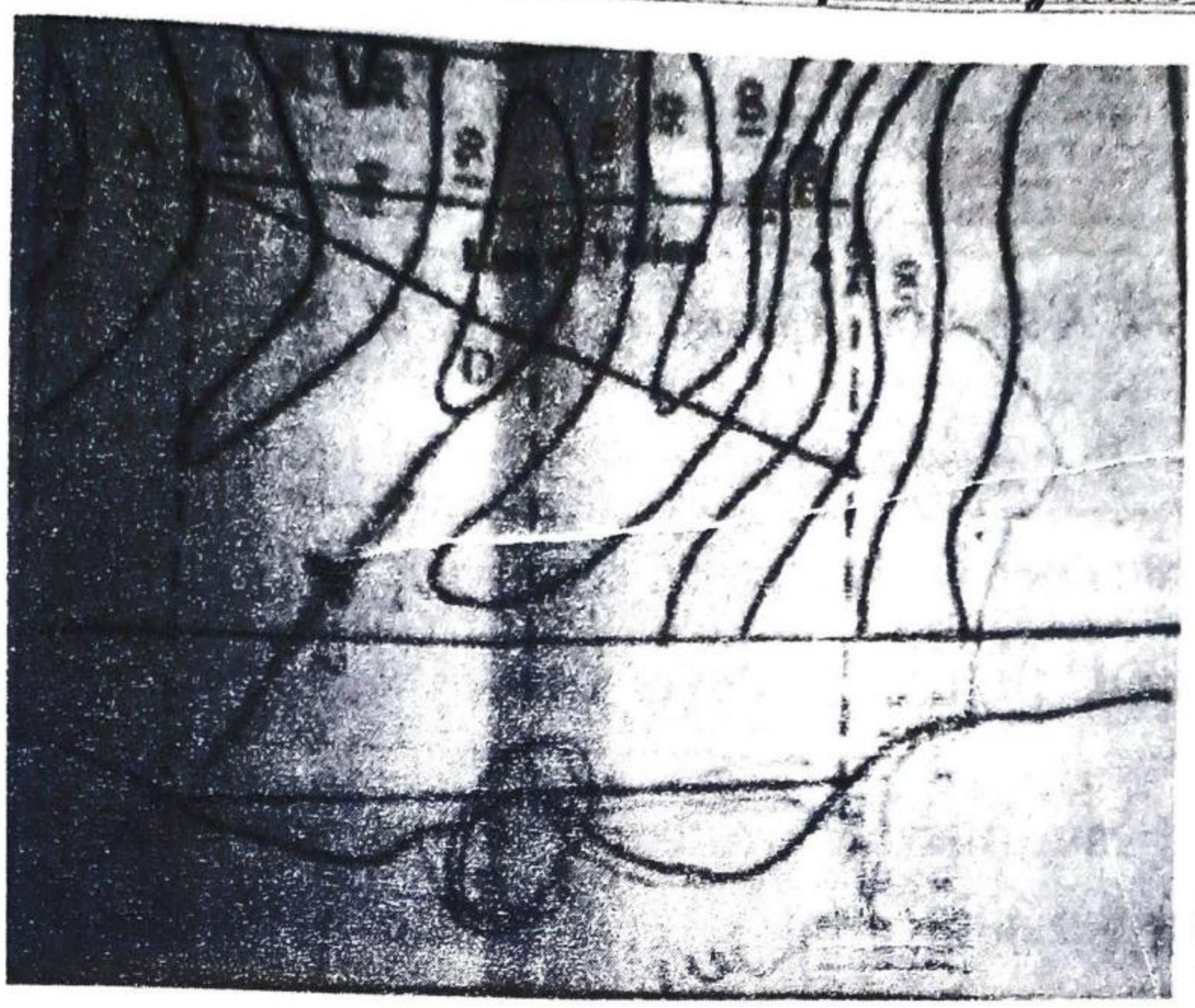


Figure 2.11 Intervisibility

18. Are A and C intervisible? Why?

Explanation: No, because, there are interfering obstacles such as tall buildings or trees between them, slopes and land forms and altitudes.

19. Can B be seen from C? Why?

Explanation: Yes, because the land in between B and C are lower.

20. What is the difference between dead ground and intervisibility?

Explanation: Inter visibility means when two points are mutually seen one to the other whereas dead ground means all land that is not visible from a certain point in the field.

21. What are the main factors that determine whether one point are intervisible or not?

Explanation: The inter visibility of two points depends on the relief altitudes, slopes and landforms, the vegetation cover, buildings. Houses and the physical distance between them.

22. Explain the importance of study intervisibility of place?

Explanation: Studying inter visibility is important for planning military operations, proposed plans of infrastructure, provides information for the evaluation of proposed sites for forest – fire lookouts, planning of lagging and

selecting appropriate site for the development of recreation and refreshment centers.

2.1.4. Land forms on contour Maps

- Different land forms can be shown on topographic maps by means of contour lines. Their patterns help map readers to easily identify the kind of terrain feature represented.
- Each land form will be illustrated by using contours and cross sections

1. Valley

- It is a long narrow depression lying between two or more higher grounds.
- It is a stretched out channel in the land.
- It is usually formed by streams or rivers.
- It begins with higher ground on three sides, and usually has a course of running water through it.
- It is presented by either u – shaped or v – shaped. While u – shaped contours represent valleys with steep slopes and flat bottoms, v – shaped contours show valleys with relatively gently descending slopes with v – shaped bottoms.
- Contours showing v – valley, they are pointing towards higher ground.

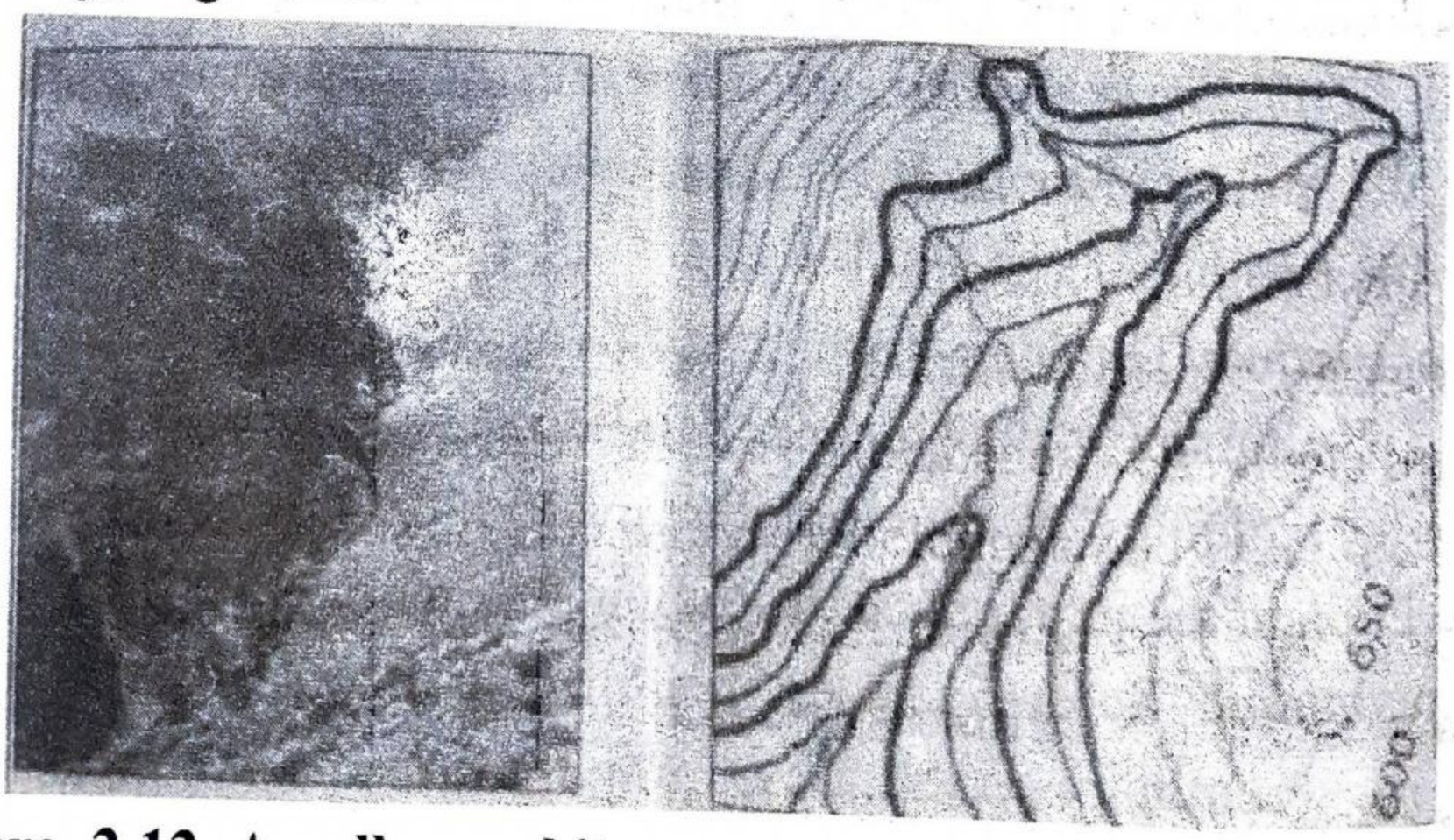


Figure. 2.12. A valley and its representation on a contour map

2. Spur

- It is an elongated area of higher ground projecting from the main body of a mountain towards low ground.
- It is formed by two roughly parallel streams that cut draws along the side of a ridge.
- They are shown on a contour map by using contours that point towards the lower ground with "U" or "V" shapes.
- The outer most contours shows the minimum height but the inner most contour indicates the maximum height.

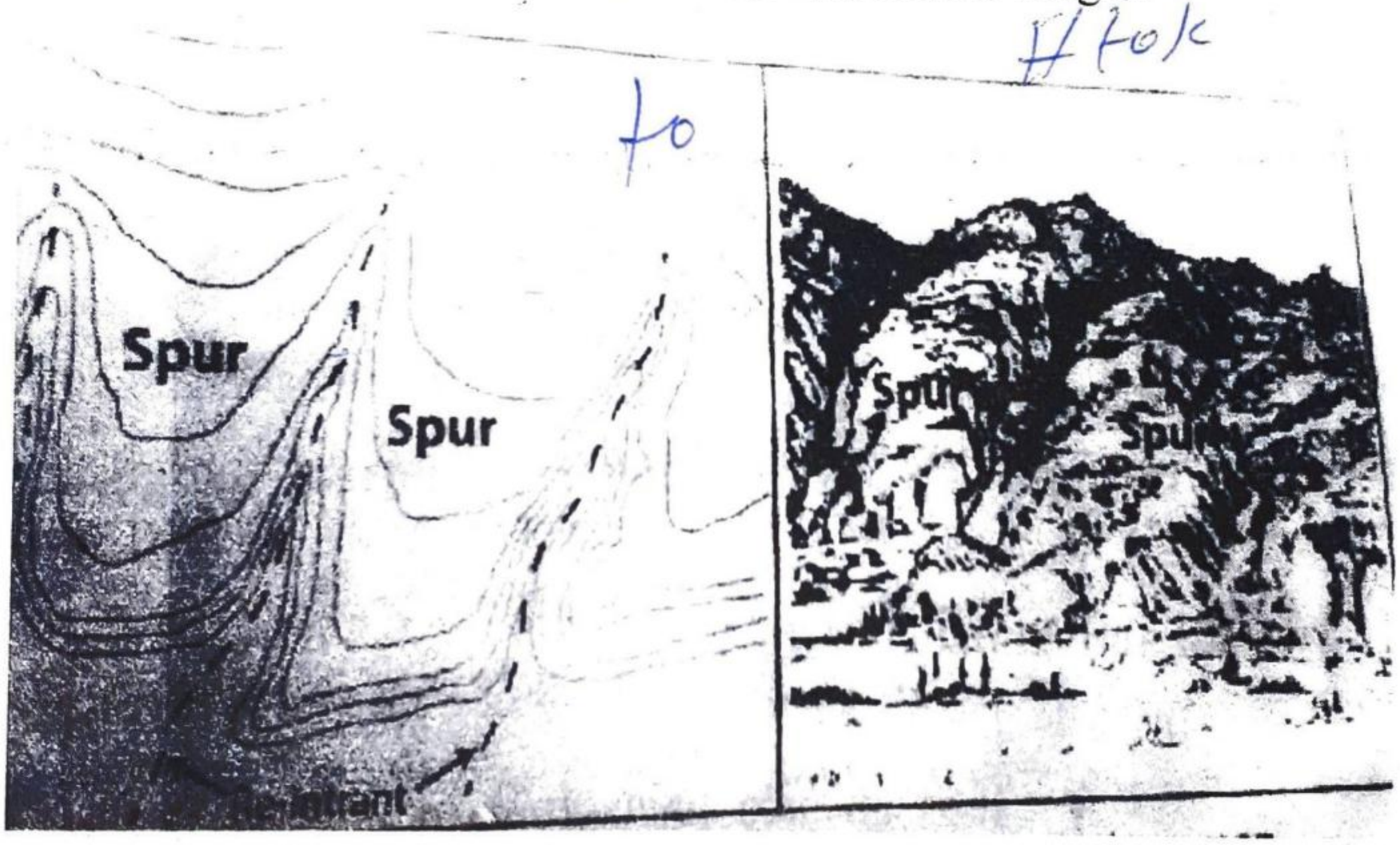


Figure 2.13: A spur and its representation on a contour map

3. Re – entrant, gorge and canyon

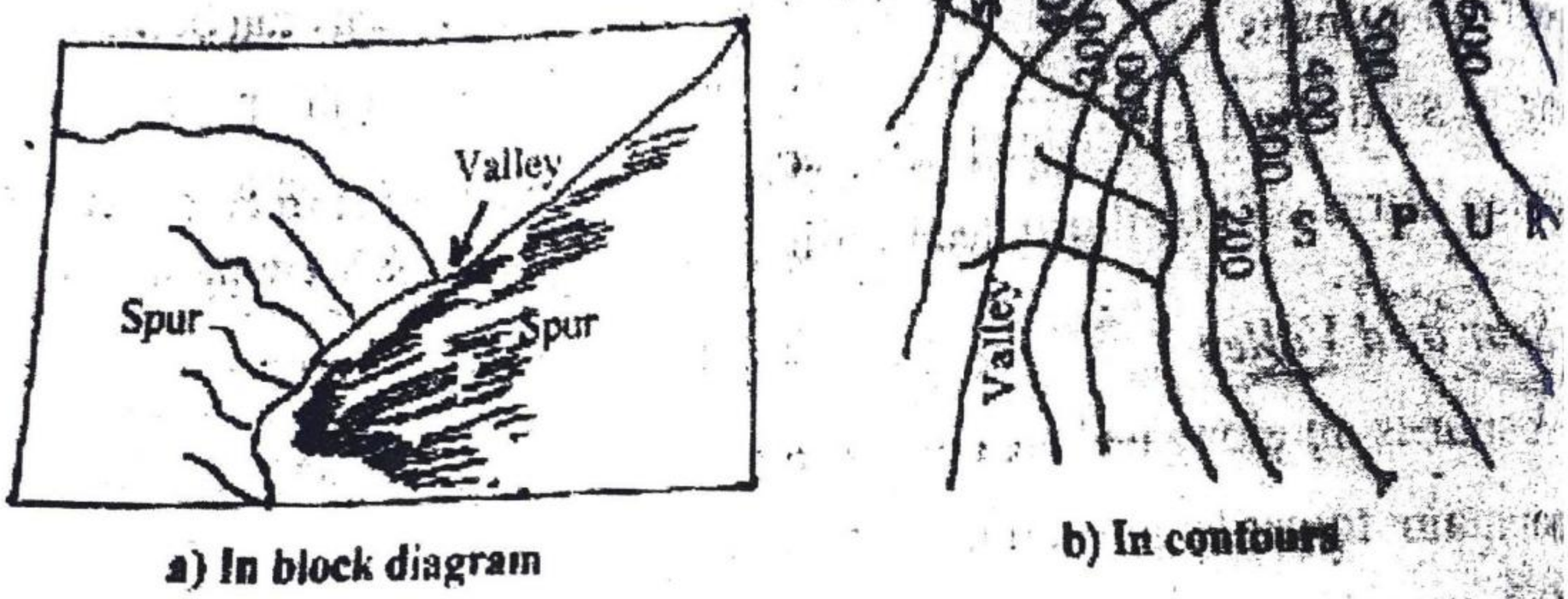
I) Re-entrant

- It is a less – developed stream course that is smaller than valley.
- It is a small v – shaped cut in a steep slope or the side of a hill or a mountain
- It is the initial stage in the formation of a valley

II) Gorge – is a deep narrow valley with steep sides. Gorge is usually formed in the upper course of a river.

III) Canyon

- It is a much deeper and wider valley than a gorge with a river at the bottom.
- It is formed in arid and semi arid areas. Formed because of lack of sheet erosion, which would normally widen the valley to form a gorge.



a) In block diagram

b) In contours

Figure 2.14 Contours representing re – entrant, gorge and canyon

4) Hill and Amba plato

i) Hill

- It is an area high ground but is lower than a mountain in elevation.
- It is shown by contour lines forming concentric circles. The inside of the smallest closed circle indicates the hilltop.

ii) Amba

- It is a flat – topped mountain usually capped with a resistant rock layer.
- It is remnant of a denudated plateau area.

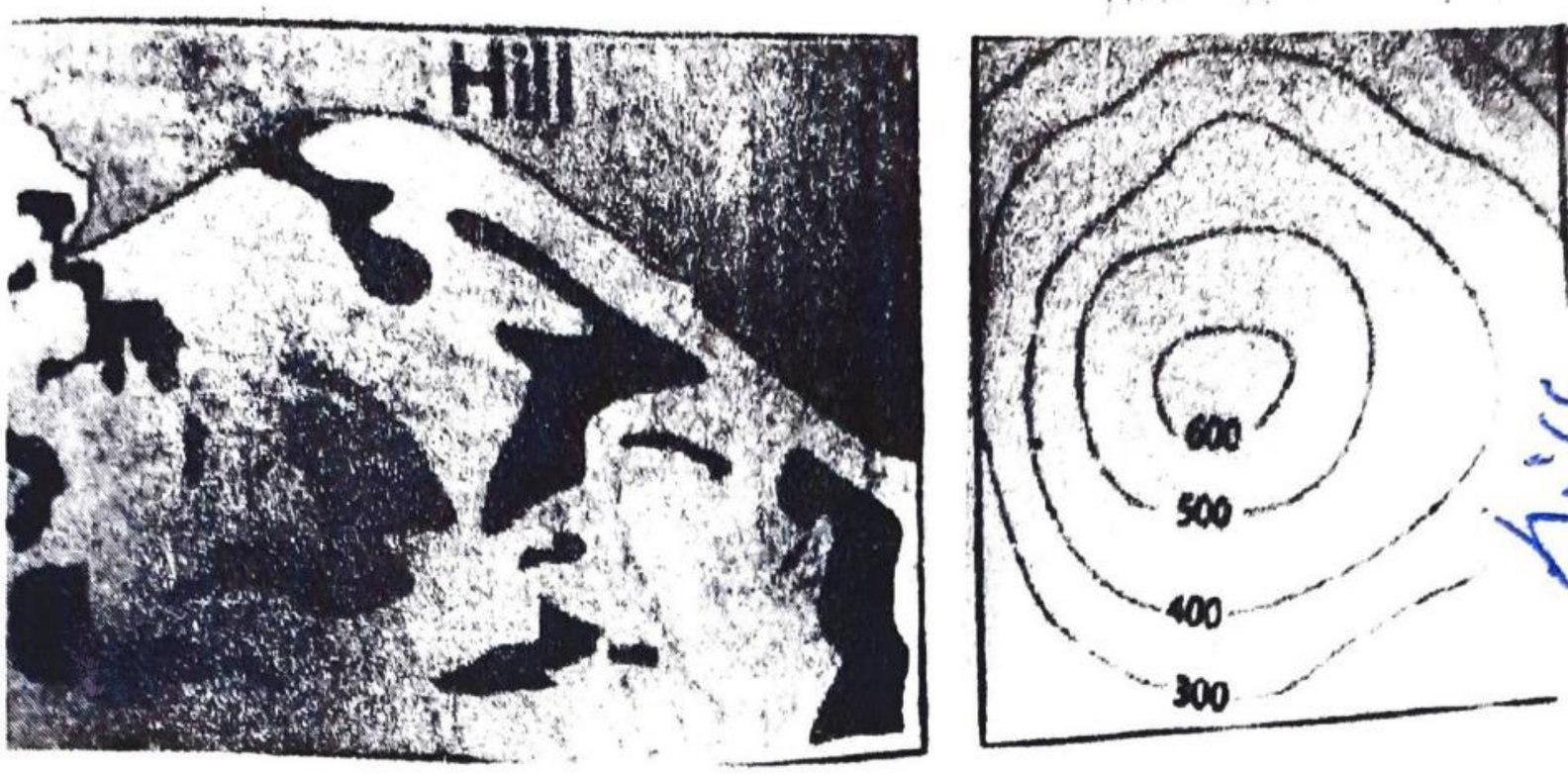


Fig. 2.15 A hill and its contour representation

40 **Gaps and passes, saddle and col**

i. Gap – is alow lying depression or valley which cuts through a range of hills or mountains, often occupied by a fairly large stream or river.

ii. Pass – is a deeper more pronounced depression than acol between two hills or mountains.

iii. Saddle – is a fairly shallow depression between two summits. The feature is like seat on a riding horse.

iv. Col – is a deeper and wider notch than the saddle. It is usually found at the watershed between two streams.

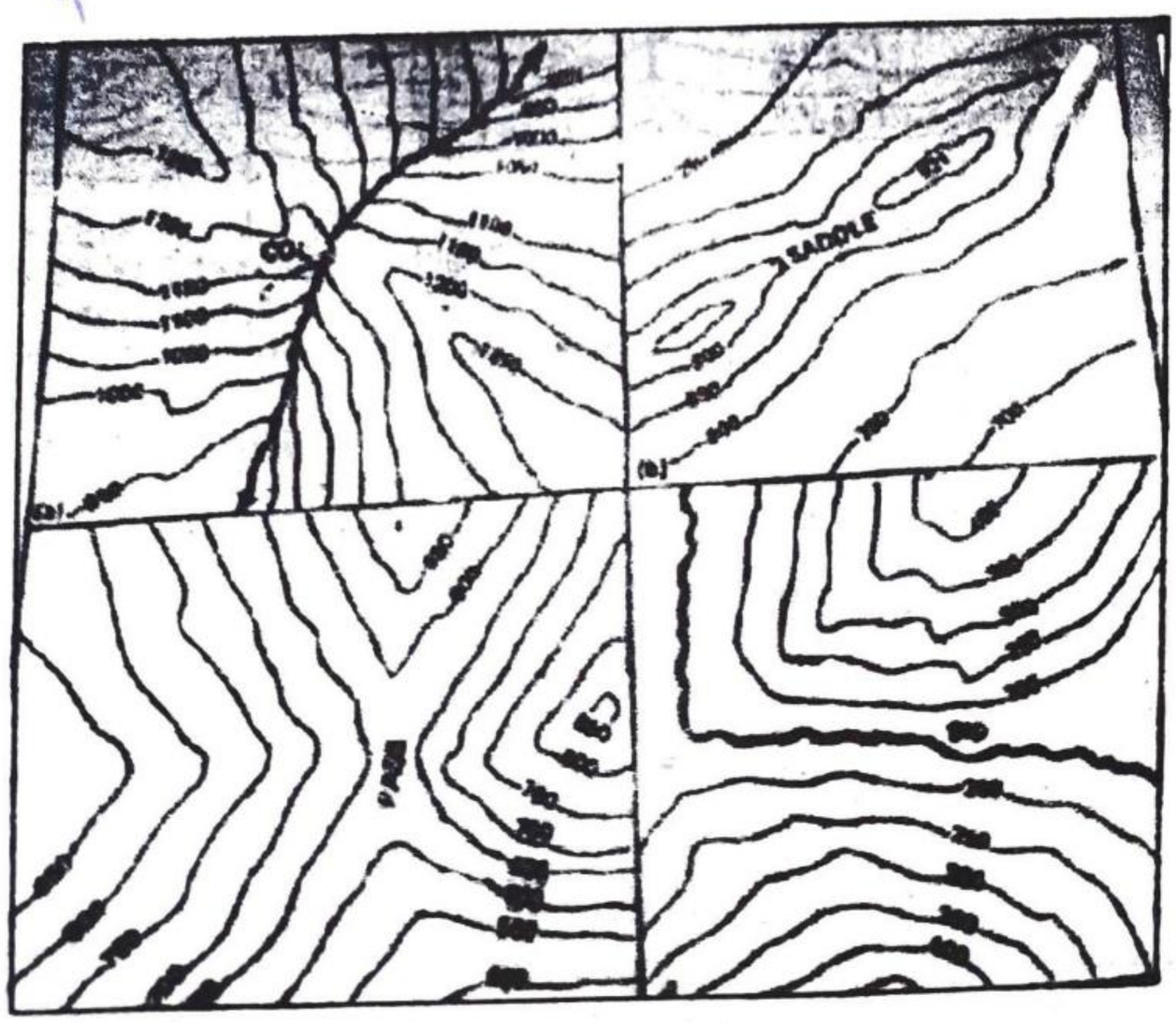


Fig. 2.16 Gaps and passes on a contour map

- If a gap contains a river it is said to be a water gap. If no river is present, usually the gap is at a higher level, these is known as a wind gap.

41 **Ridge**

- It is a sloping line of high ground.
- It is a long narrow hill top or arange of hills.
- It has low ground in three directions and high ground in one direction with varying degrees of slope.
- It is shown by u – shaped or V – shaped contour lines. The closed and of the contour line points toward lower ground.

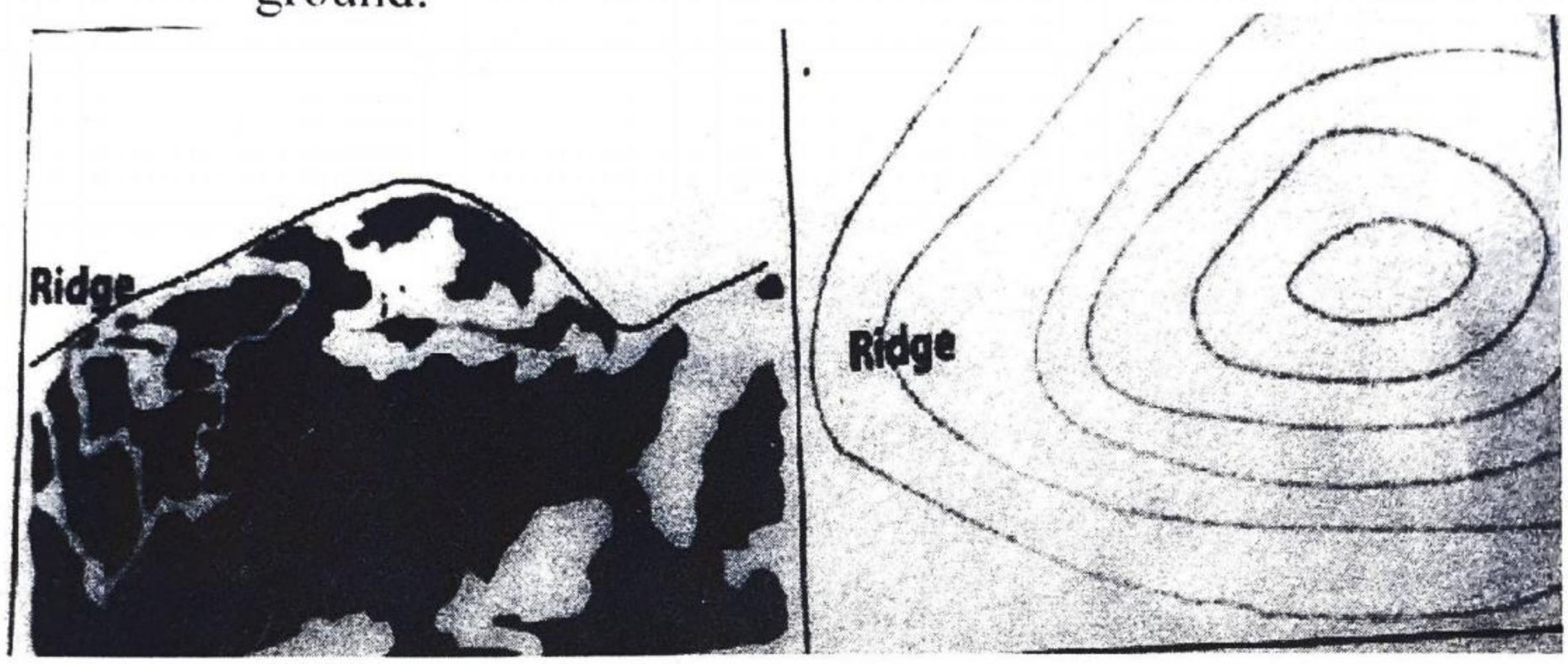


Figure 2.17 A ridge and its Representation on contour map

42 **Cliff and Water fall**

i. Cliff – is a high and very steep or vertical wall of a mountain or rock face.

- They are shown on topographic maps by using contour lines that are very close together (when there is a little change in horizontal distance and rapid increase in vertical distance) and, in some cases, by contours that overlap (merge) when there is no change in horizontal distance at all.
- It is also found along sea shores, river banks, etc.

ii. Waterfall

- A cliff along the river is water fall

- It is a steep fall of a river water where the course of a river is markedly and suddenly interrupted by a cliff

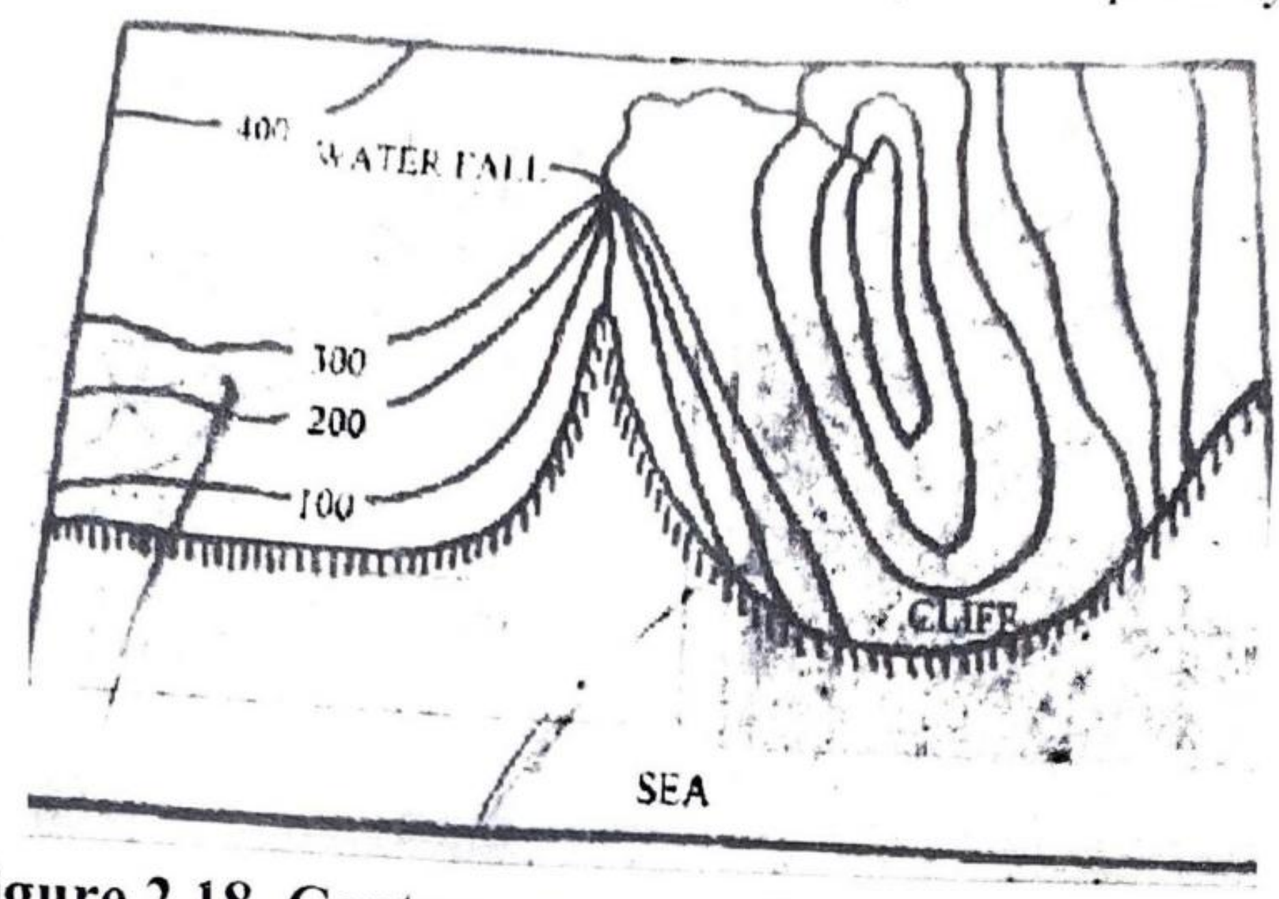


Figure 2.18. Contour representing a cliff and waterfall

43 **Depression**

- It is an area of land that is lower in altitude than the areas surrounding it.
- It is usually formed by the down ward movement of the top of a volcanic mountain.
- It is usually represented on maps by closed contour lines that have tick marks pointing downward to lower ground.

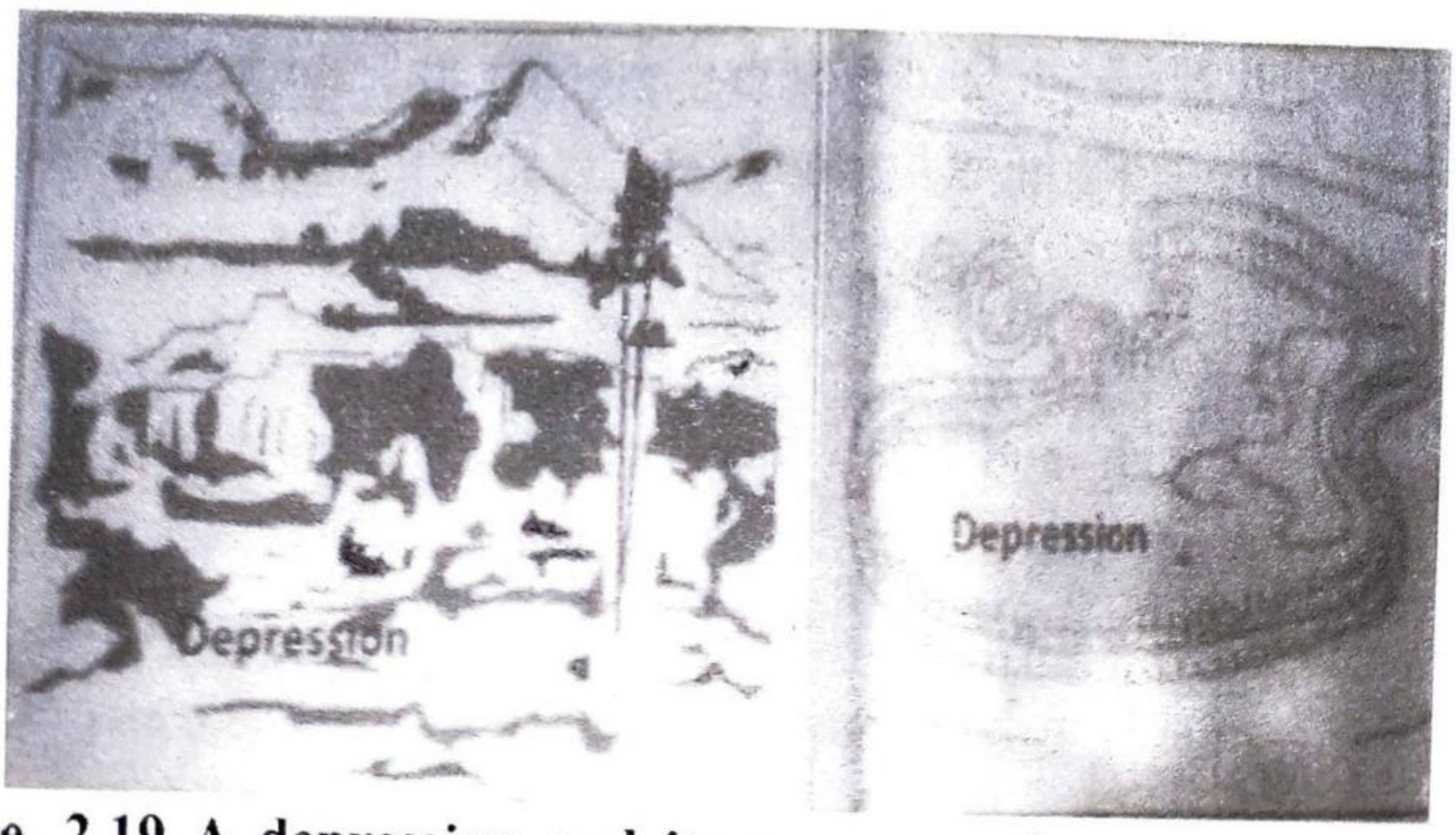


Figure. 2.19 A depression and its representation on a contour map

44 Escarpment, dip and scarp

i. Escarpment – an escarpment especially found at a point where the plateau ends and the lowland starts. A good example is the eastern escarpment in the central plateau of Ethiopia.

ii. Dip - a dip is the long and gentle slope in the opposite side of an escarpment.

iii. Scarp – is a steep slope of an escarpment. The contour lines are widely spaced on dip slope while they are close together an scarp slope.

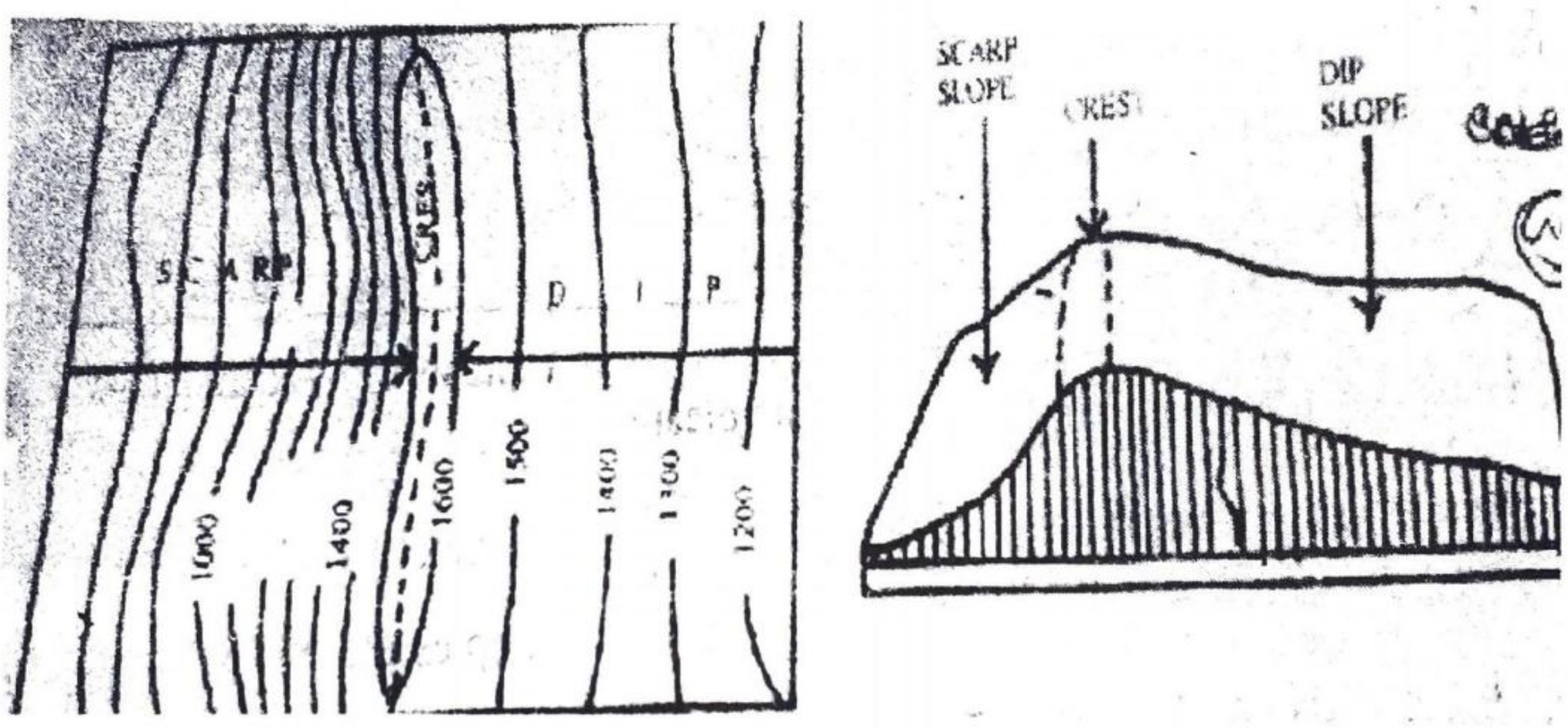


Figure 2.20 An escarpment

45 Mountain

- It is a high land area that rises several hundreds of meters (over 600m elevation) from its surroundings.
- Examples are mt. Kilimanjaro mt, Kenya and mt. Ras Dejene.
- A high land area which rises under 600 meters elevation is not a mountain it is rather a hill.
- Both mountain and hill are highland relief features. But mountain has higher altitude (peak), steeper slopes and larger size than the hill.

- Both mountain and hill are represented on contour maps by a series of closed contour lines whose values increase in words.

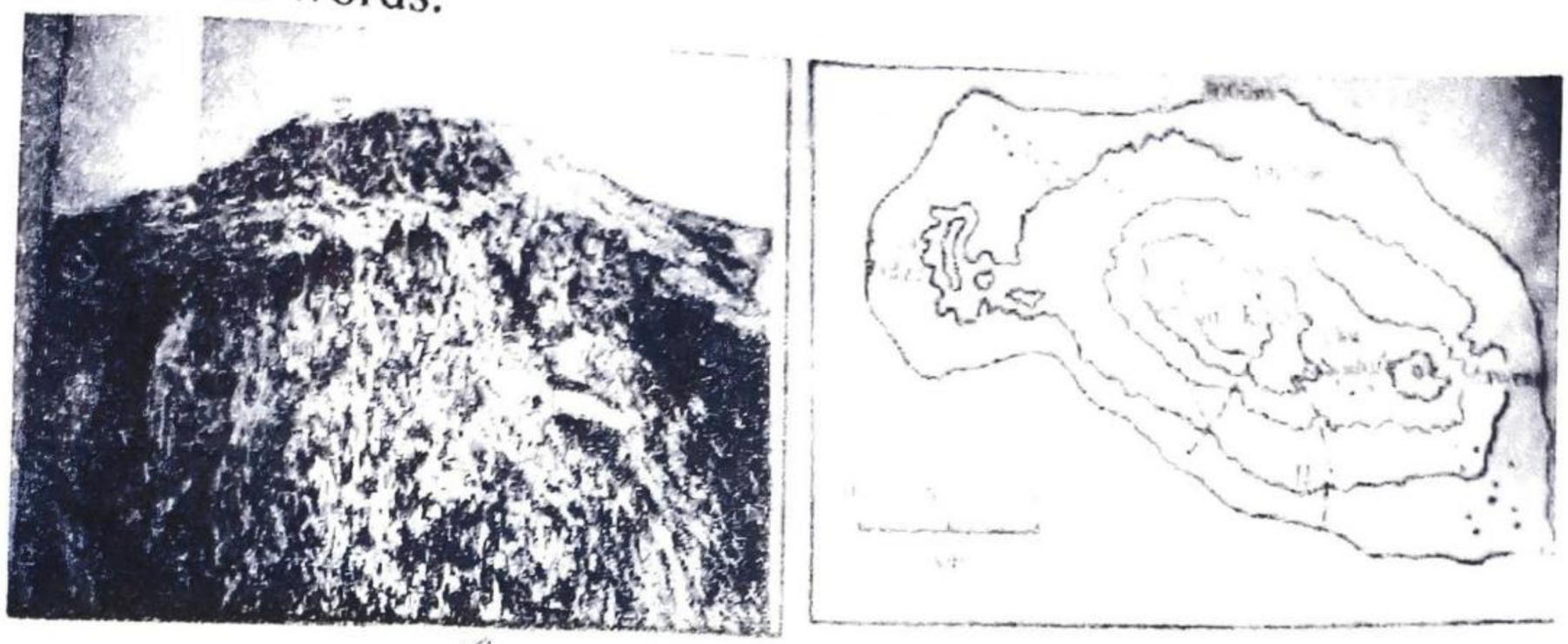


Figure- 2.21 A single mountain in photography and contours

46 Plateau

- It is a highland area with a more or less uniform, wide, and flat summit.
- Plateaus have wide, flat, top surface and uniform side slopes known as young plateaus.
- Plateaus have been broken (cut) by deep, steep sided river valleys and gorges are known as dissected plateaus.
- They are represented by contour lines have circular or rectangular shape.

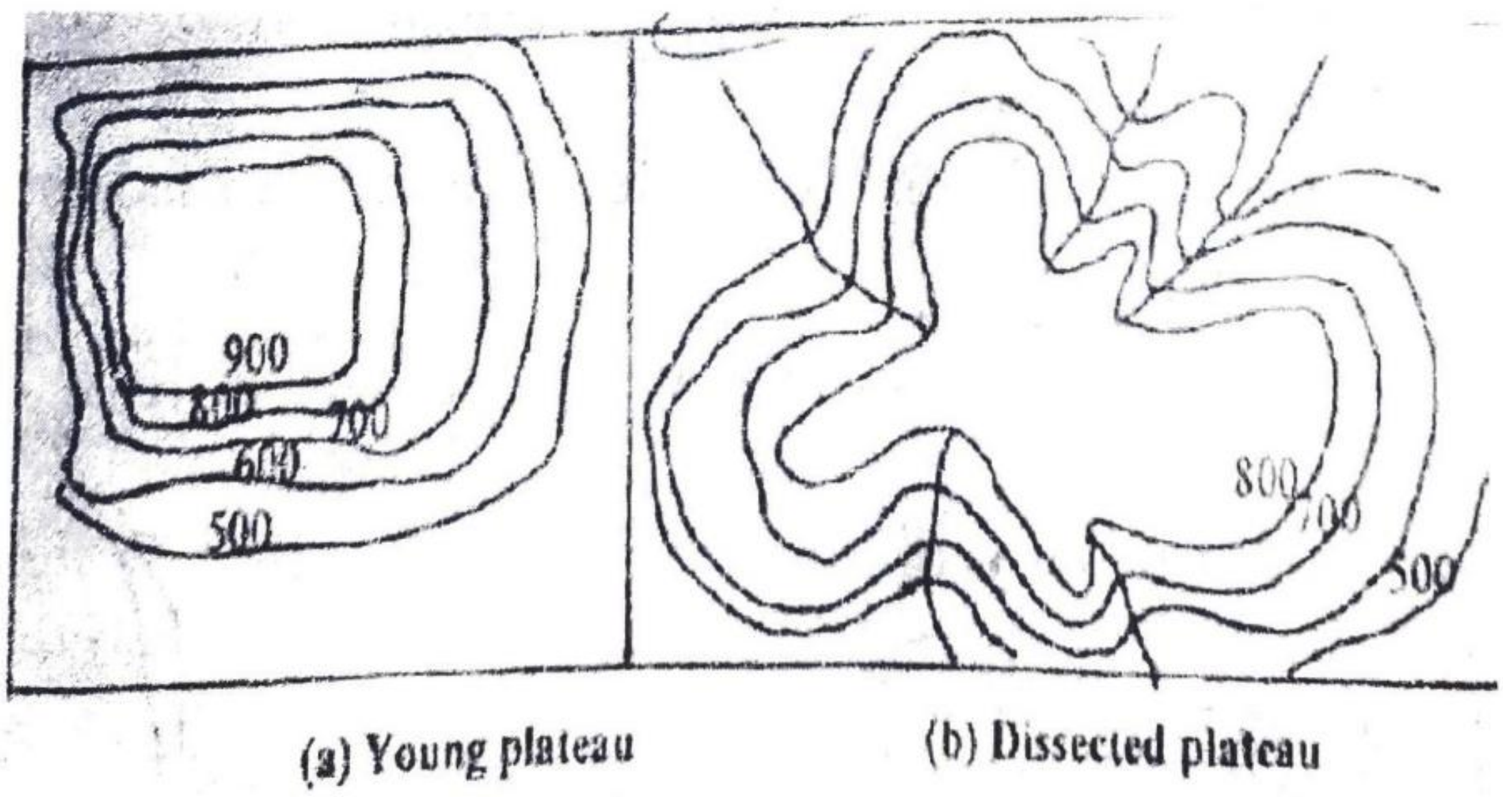


Figure 2.22 contours representing a plateau area

47 Plain

- It is an extensive area of level or gently undulating land usually of low altitude.
- A region with no steep slopes but with a gently rolling land surface and slight height differences is described as undulating plain land or region.
- They are represented by contours are irregular and fairly widely spaced.

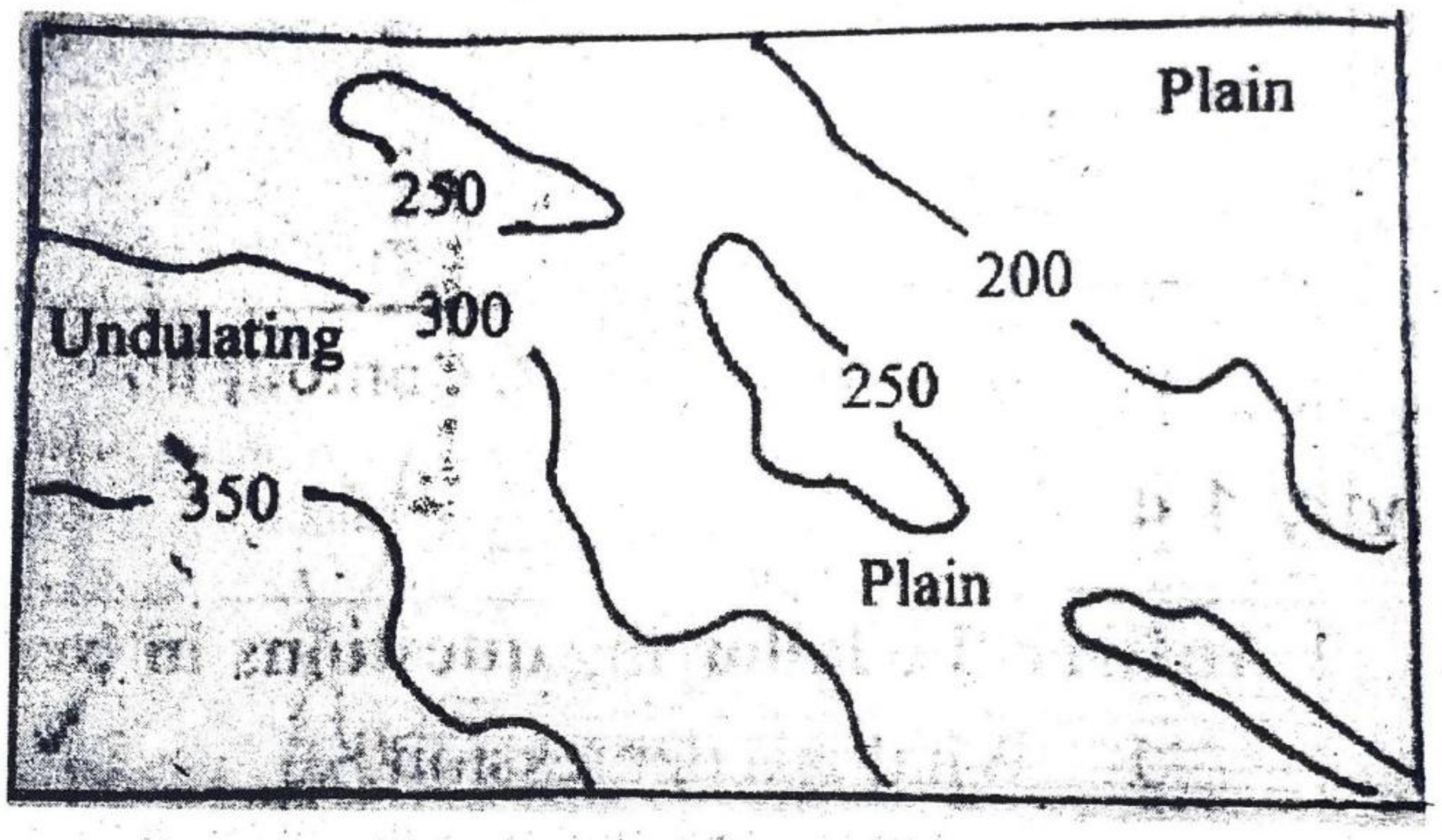


Figure 2.23 – plain area on a contour map

Supplementary Terrain Features

1. **Cut**
   - It is a human made feature resulting from cutting through raised ground.
   - It is made usually to form a level led for a road or rail road track.
   - They are shown on a map when they are at least 10m high.
   - They are usually drawn with a contour line along the cut line.
2. **Fill**
   - It is a human made feature.

- It results from filling along area, usually to from a level led for a road or rail road track.
- They are shown on a map when they are at least 3m high.
- They are drawn with a contour line along the fill line.

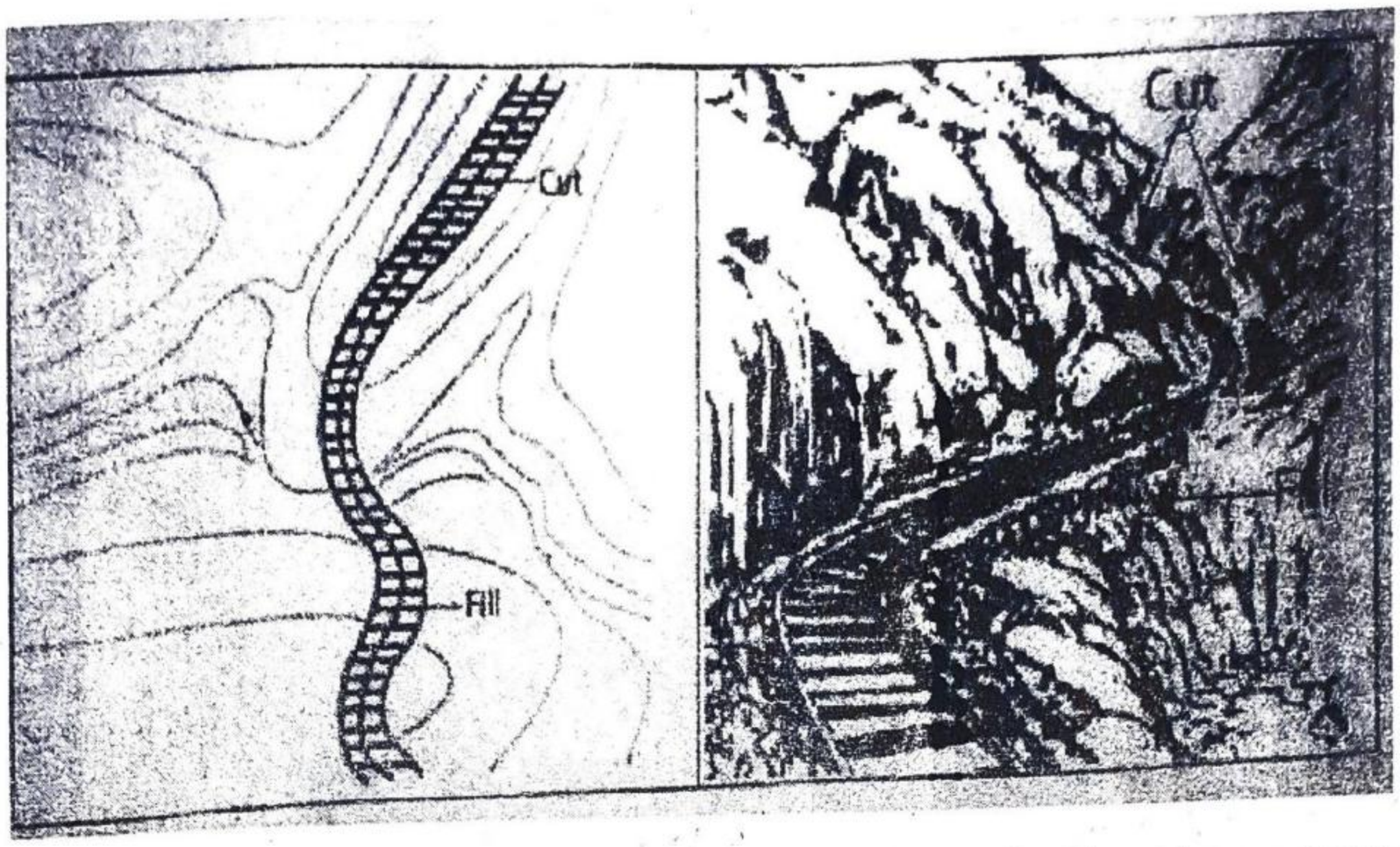


Figure 2.24. A cut and its representation on a contour map

Illustrative Questions

23. Which one of the following techniques is the most common to represent relief and elevation on standard topographic map?
    A. Contour lines
    B. Hachures
    C. Altitude
    D. Shaded relief

Explanation: Contour lines are the most common method for showing relief and elevation on a standard topographic map.

Answer: A

24. A type of land form which is high ground but lower than a mountain in elevation refers to
    A. Plain
    B. Plateau
    C. hill
    D. Ridge

Explanation: Both mountain and hill are highland relief features. The clear difference of mountain and plain based on the standard demarcation of elevation /altitude/, a high land area

Explanation: Re – entrant are shown on a contour map by using contours that pointing toward higher ground with u – shaped or v – shaped.

2.2. DRAINAGE ON MAPS

What is drainage?

- It is simply the discharge (flow) of water from any area through definite channels (courses) – rivers streams and brooks.
- Rivers usually start from highland areas and flow downstream ending in the sea, lake, swamp or main river. Small rivers that flow in to bigger rivers are called **tributaries**. The point at which the tributaries join the main stream is known as **confluence**.
- Rivers drain a certain area can be depicted by using contour maps.

2.2.1. Watershed and Catchment Area

- The rivers that drain a certain geographical area flow over the region and form a certain pattern that is the termed drainage pattern. It is also refers to the general arrangement of a river and its tributaries within their drainage basin/ catchment area.
- Drainage basin (catchment area) the entire geographical space, that is drained by the major river and its tributaries.
- A drainage system is a system that is made up of all the river basins that flow in the same direction.
- Watersheds – is the line separating head streams. which flow to different river systems. It may be sharply defined in the form of a crest or ridge or a divide.
- Watersheds divides in to two major and minor. A major watershed separates two river basins from one another

where as a minor watershed separates areas drained by different tributaries of the same river system.

- Interfluves the ridge between two adjacent river valley is known as interfluves.

Steps that identify a drainage basin and divide on contour maps

- Identify the course of the main river on the map;
- Identify the tributaries of the main river on the map;
- Look at the contour lines near the origin of the tributaries and find high points and ridges.
- Look at other rivers that originate nearby and check whether they flow away from the main river;
- Identify the rivers that flow away from the main river, follow the way between those rivers that flow towards our main river and away from it. Then mark these points with solid or broken lines to show the river basin and its watershed.

Important consideration that inserting a watershed on contour maps

1. A watershed (divid) is not drawn parallel between streams; rather the streams flow away from the watershed in opposite directions
2. Look at the streams 'direction' of flow carefully.
3. A watershed usually passes through the highest points between adjacent river basins.
4. A watershed runs in the middle of two contour lines of different altitude.

- A river's catchment area includes all the geographic space that is drained by a major river and many other small streams that feed the major river with water.
- The small stream that supply water to the main rivers are called confluence.

- The main point at which the major river in a basin starts is called the source of the river.
- The point at which the river empties itself in to an ocean, asea or a lake is called the mouth of the river.

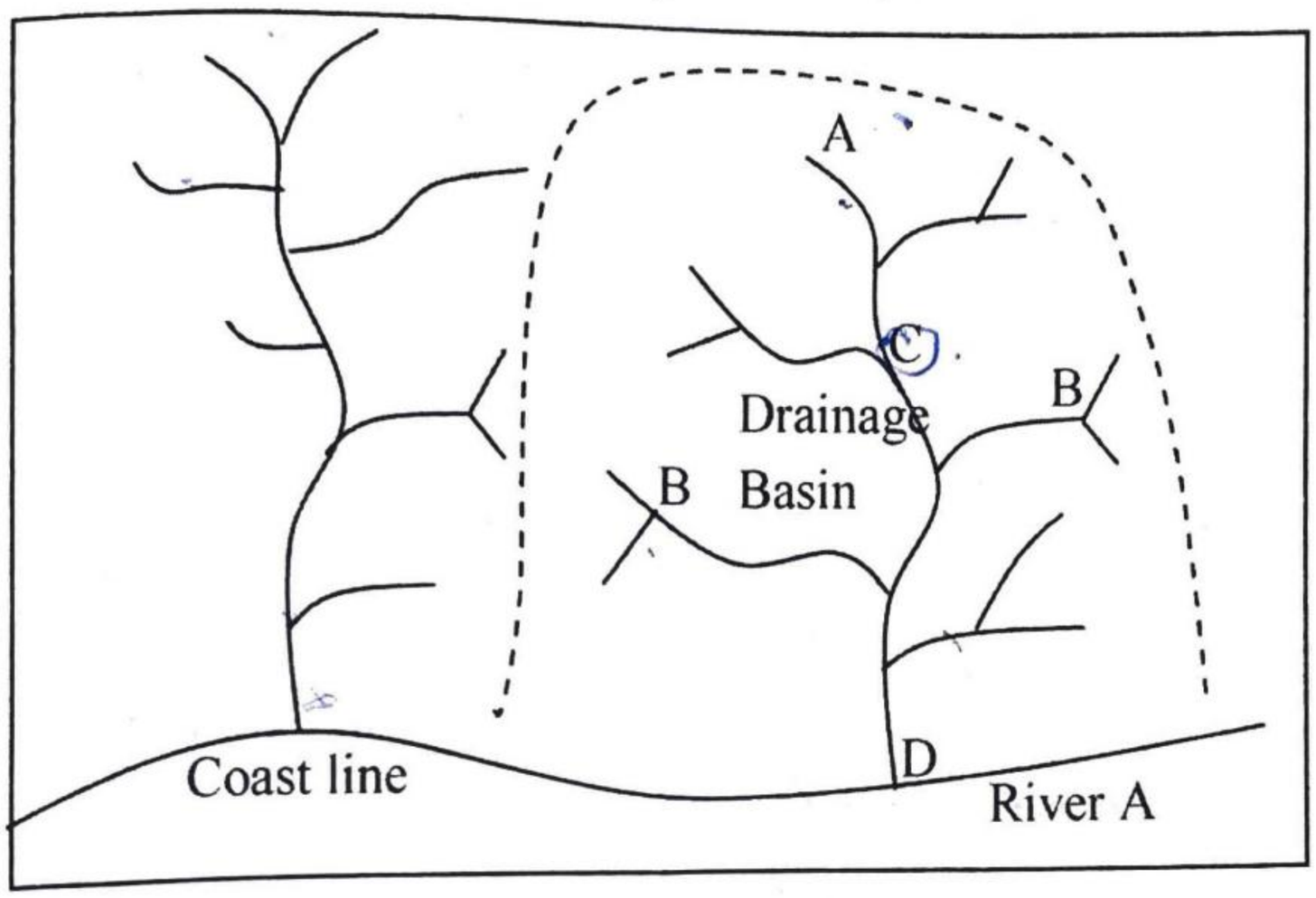


Figure 2.25 A river's catchment area

The labels on the map in Figure 2.25 represent the following features.

- Letter "A" represents the source of the main river.
- Letter "B" represents the tributaries of the main river;
- Letter "C" represents the confluences; and
- Letter "D" represents the mouth of the main river.

2.2.2. Drainage patterns

- It is the lay out or plan made by rivers and their tributaries on the landscape.
- It shows the characteristics way tributaries that feed other larger streams and rivers branch off in different directions.
- It is formed by the main river and its tributaries as they flow over the surface of the earth.
- They are based largely on the geological structure of the rocks on which they form.

- Depends up on slope of the land, rock structure (geology) and variation in rock hardness the most common ones are the following.

1. Dendritic Drainage pattern

- It is derived from the Greek word "Dendron" which literally means "atree".
- It is shaped like the trunk and branches of atree.
- It develops in a region covered with rocks, which offer the same resistance to erosion.
- It has a uniform structure. The direction of the river and its tributaries are determined by slope. The tributaries converge on the main stream from many directions and usually join at acute angles.
- It develops on massive crystalline rocks (granitic regions) or on level sedimentary rock surfaces.
- They are usually formed in areas of homogeneous rock which comprises horizontal strata rock masses,
- It is the most common drainage pattern of all the patterns

In sequent stream

- They are tributaries that flow towards the main valley joining the main, river (consequent stream) obliquely and in turn minor tributaries join them and the points where they flow in to the main streams are accordant functions.

Oblique tributaries

- They are minor tributary streams having a sloping directions, that join the in sequent stream obliquely.

2. Trellis Drainage pattern

- It is a rectilinear (rectangular) pattern with the major tributaries joining the main river approximately at right angles, inturn minor, tributaries join the chief tributaries at

right angles and flow more or less parallel to the main river.

- It develop in areas where harder and softer rocks alternate
- It is greatly affected by tectonic forces (folding and faulting)

Key

1. **Consequent stream** - the main rivers.
2. **Subsequent stream** – the chief tributary of the consequent stream;
3. **Obsequent stream** – minor tributary of the subsequent stream, flowing in the opposite parallel direction to the consequent stream.
4. **Resequent stream** – minor tributary of the subsequent stream, flowing in the same parallel direction with the consequent stream.

3. **Radial Drainage pattern**

- It develops on a dome or volcanic cone
- It occur when rivers flow in all directions away from a raised feature.
- The rivers flow outwards in all direction forming a pattern like the spokers of a wheel

4. **Centripetal Drainage pattern**

- It is formed by a series of streams converging on a central lowland (depression of lake) from the surrounding highland.
- It is commonly found in basins of inland (closed) drainage.
- Example, many desert areas and rift valley lakes of Africa and the Ethiopian Rift Valley Lakes Basin.

5. **Braided pattern**

- It is commonly found on broad flow plains with low gradients.
- It develops often due to back tilting.

2.2.3. River Capture and Stage of River Valley Development

A. River capture

- In a river capture situation, a river joins another river down – slope from a watershed that separates the two basins.
- In a river capture, a river of one basin will run over the drainage basin of another river.
- The river that flows over the basin of the other river is called the priate stream, and the other river, whose basin is over run by the priate stream, is known as the victim stream.

Conditions (situations) that cause the formation of river captures.

- The rock on the side of the victim river is softer.
- Heavy rainfall falls on the priate's river side of the watershed.
- The pirate river has a steeper course and erodes its course as a result.
- The watershed consists of very low ground and the watershed itself becomes indefinite.

Features of a river capture

→ **Elbow of capture** – is a point where one strong river cuts in to the course of another weak river during river capture.

→ **Misfit or underfit stream** – is a stream which is deprived of its head waters and becomes too small for the valley it belongs to.

→ **Reverse drainage** – occurs when a river which was part of the original capture river C_2 now flows in to C_1 in the opposite to that of direction the original direction of flow.

- **Wind gap** – is found at the elbow of capture which was once covered by the captured stream but now

contains no rivers and therefore becomes a "wind gap".

- Examples of river capture in Africa include:
  - Trival River in Kenya and Cunene river capture in Angola.
- Immediately after the formation of a river capture, there might be a connection across the newly formed watershed. This connection is known as a bifurcation, which means a stream divided in two.

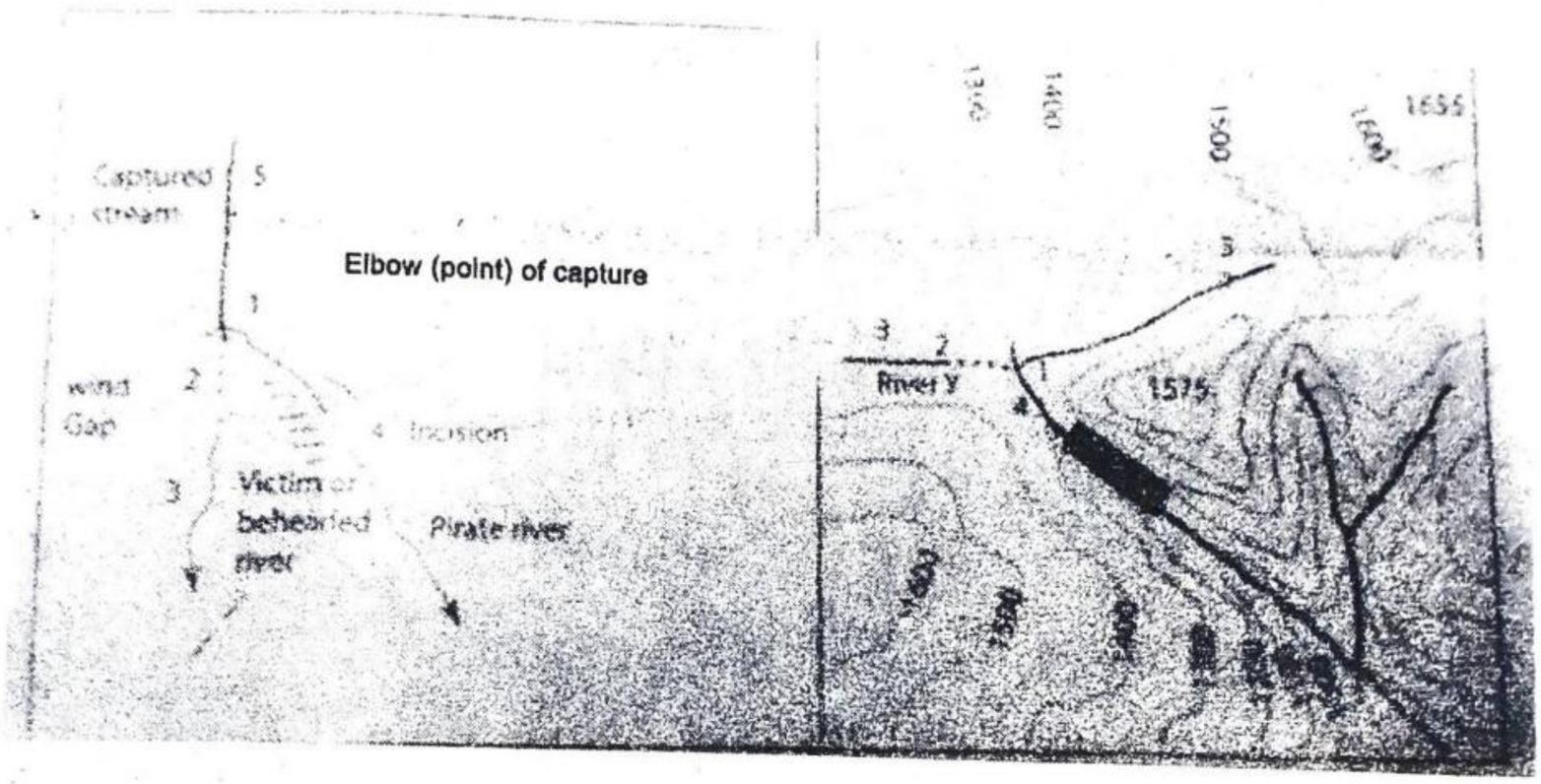


Figure 2.26 A river capture

B. Stages of River valley Development

Concepts related to stages of River valley

- The volume and gradient of a river are the two determinant factors of the force of a river before it reaches its base level.
- Base level is the surface of a river or lake or the sea in to which a river flows.
- All rivers have their own sources and mouths.
- The higher ground serves as the source region of the river or as the point at which the course of the river starts.
- A river has three distinct parts. These are:

A. The upper or mountain course;
B. The middle or valley course; and

C. The lower or plain course.

A. The upper course

- It is the head water zone in the mountains or hills where sediment is supplied from hill sides and transported down steep channels with narrow flood plains.

Characteristics of a river at its youth stage

- The development of deep narrow valley with v – shapes;
- The development of valleys with narrow and steep gradients;
- The presense of flat. Flowing rivers;
- The development of pot – holes;
- The formation of inter locking spurs; and
- The presence of waterfalls, rapids and cataracts.

B. The Middle course

- It forms when the mountains give way to the plains, where the steepness of the river channel decreases from as high as a 1 – to – 10 percent to less than 0.1 percent. At this stage, the volume of the river may increase.

Characteristics of a river at the middle course

- The river flows over a relatively gentle gradient as compared to its upper course, and the river flows slowly as a result;
- The river's volume increases gradually as it is joined by the tributaries that feed water to the river;
- The river's valley gets wider and deeper; the slope along the valley's sides gets gentler, altering the valley's shape from a v – shape nearly to a u – shape, and
- Braided streams may develop if large sheets of material are deposited on the level plain, splitting the river in to several channels

C. The Lower Course

- It is the course that is transported by the ocean or lake where the river ends.
- The sediment transported becomes very fine.
- At this stage, a delta may develop if enough sediment settles out of the water.
- Distributaries means where the river splits in to many new channels while discharging in to an ocean, asea or a lake where it ends.

Characteristics of a river at the Lower course

- The river flows in a U – shaped valley with a flat river bed, the rate of change in slope is minimal, and the river flows very slowly as a result;
- The river carries a heavy load of fine sediment of which some is deposited on its bed;
- The river flows with a number of twists and bends, resulting in the occurrence of meandering;
- The development of oxbow lakes as meanders gradually develop cut offs;
- The development of flood plains rich in alluvial deposits as fine sediment is accumulated on the river bed; and
- The river's mouth may sometimes be blocked by sediments causing the river to branch out forming distributaries

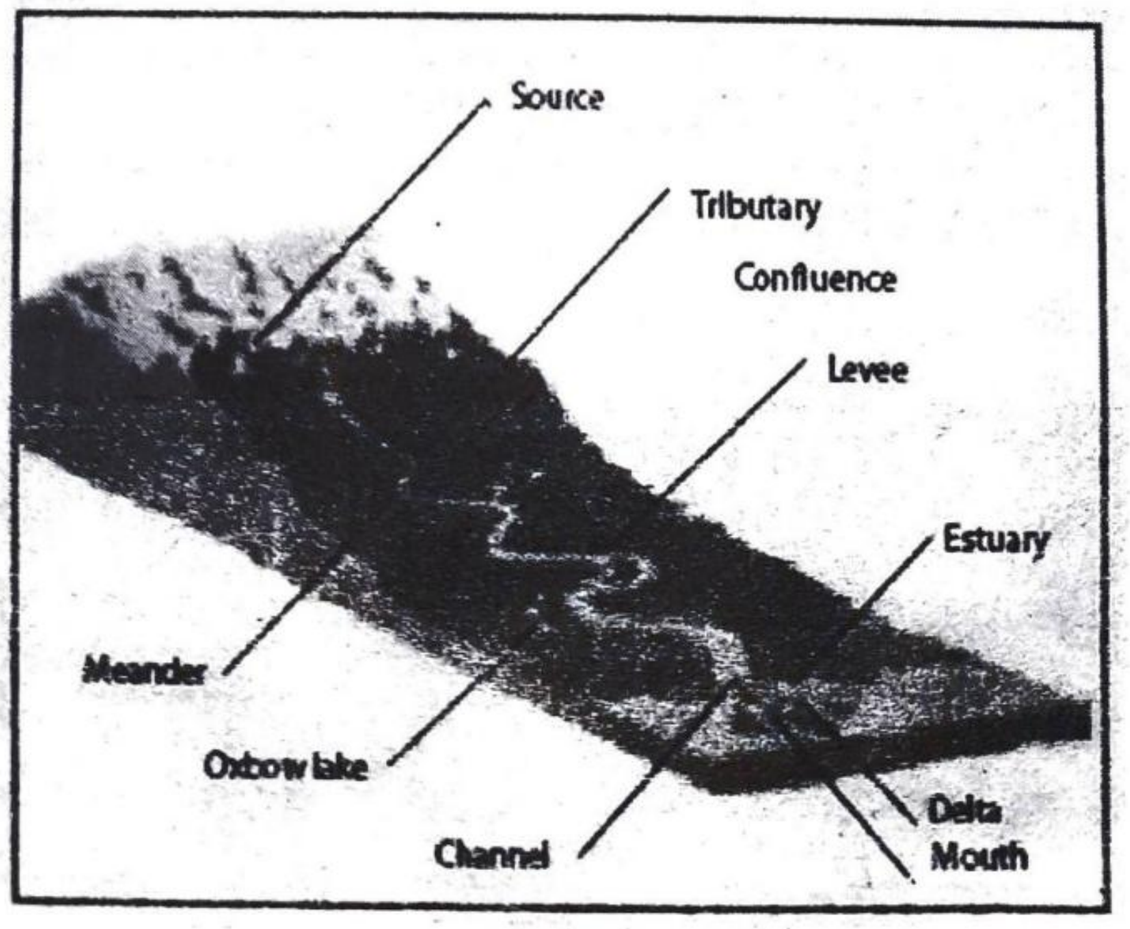


Figure 2.27 the course of a river from its source to its mouth

Key Terms

Source – A tributary is a small stream or river that flows in to a larger stream or river.

Confluence – is the point where a river and its tributary or a river and a glacier flow together. It can also mean the place where two or more streams merge in to one.

Level – is a ridge of sediment on either side of a river channel. This sediment is gradually deposited as the river periodically floods and over flows its banks.

Estuary – is the area in which the mouth of a river meets the ocean.

Delta – is a triangular deposit of soil or silt at the mouth of a river.

Mouth – the mouth of a river is the area in which the river enters a larger body of water. The mouth of a canyon is where the canyon empties on to a plain.

Channel – is the deepest part of a river and often has been used for navigational purposes.

Oxbow lake – an oxbow lake is a loop of an old river meander that has been completely cut off from the river because of a shift in the river's course.

Meander – A meander is a bend in a river created by the normal action of a mature stream as if winds across its flood plain.

Illustrative Questions

31. Drainage pattern which is shaped like the trunk and branches of a tree is known as

A. Dendritic pattern
B. Trellis pattern
C. radial pattern
D. braided pattern

Explanation: Drainage pattern which is shaped like the trunk and branches a tree is known as dendritic, it develops in a region covered with rocks, which offer the same resistance to erosion.

Answer: A

37. What is the difference between consequent stream and subsequent stream?

Explanation: Consequent stream means the main rivers where as subsequent stream refer to the chief tributary of the consequent stream.

38. Define the following terms

A. Delta

B. Tributary

C. catchment area

Explanation: A. Delta – A delta is a triangular deposit of soil or silt or silt at the mouth of a river.

B. Tributary – A tributary is a small stream or river that flows in to a larger stream or river.

C. Catchment area, drainage Basin (catchment area) the region drained by a river and tributaries.

2.3. The study of Human – Made Features on Maps

- A settlement is any place where people live – a house, hamlet, village, town and city.
- It is a place where people live close together.
- It is a unit or organized group of people inhabiting a certain geographical area and making a living out of their surrounding environment.
- It can also be defined as a group of buildings (houses in specified area with people living in them.
- It differ in their size, complexity and stage of development
- It ranges from a little collection of single buildings to megalopolises.

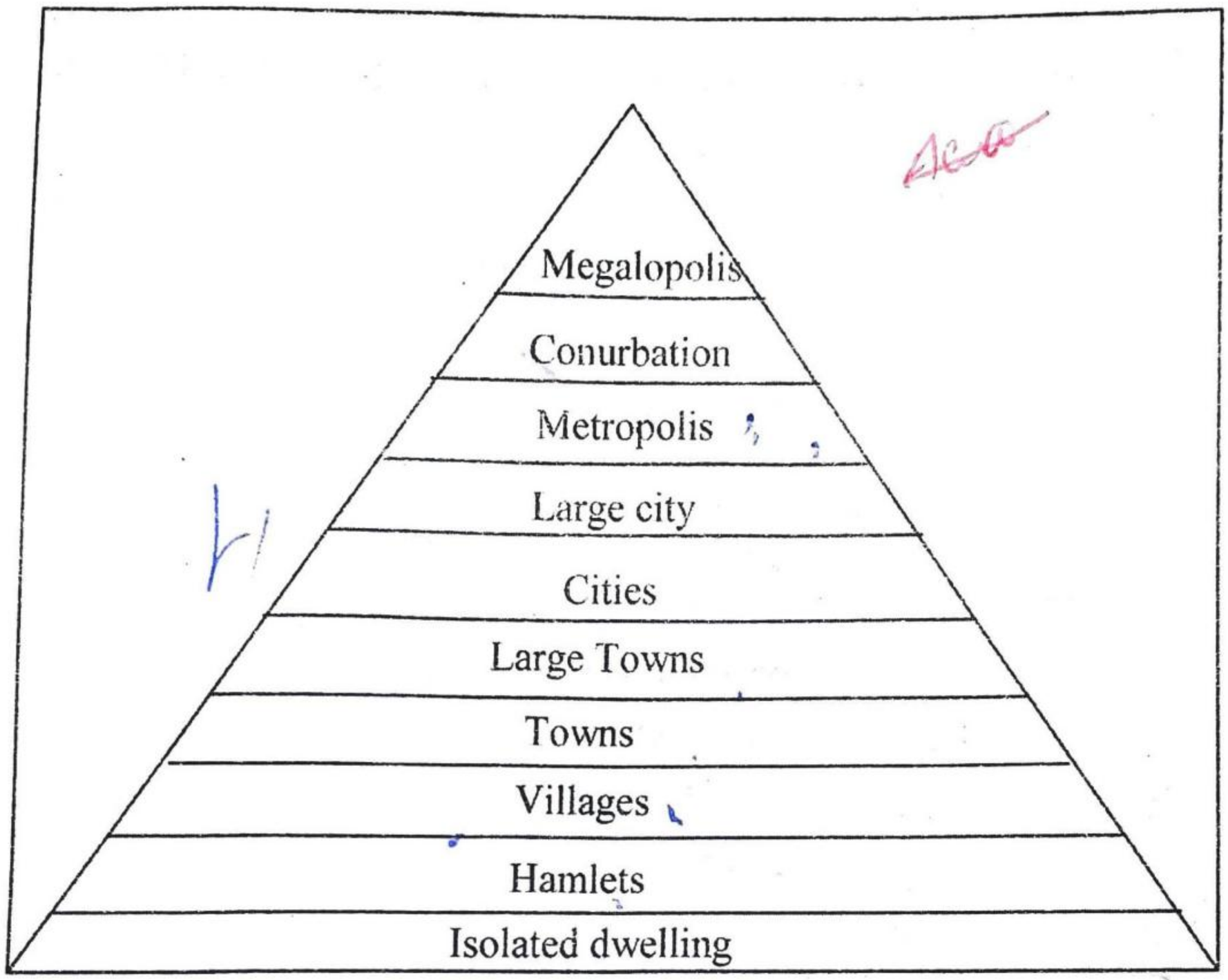


Figure 2.28 Settlement pyramid

- When we move up wards from isolated buildings to megalopolis, population increases and services get diversified on the other hand, frequency of occurrence increases down the pyramid.
- In the above figure, as we move from the bottom to the top of the pyramid, we observe changes in population size and in service delivery, quality and diversity.
- Settlements can be urban or rural. Urban settlements are developed in areas with non – agricultural economic activities. In contrast, rural settlements develop in areas where agriculture forms the base of the economy.

Key term

Site – is the exact location or land area of settlement or building the actual plot of land on which the village or town is built.

Situation – is the settlements position in relation to other settlements, to physical feature, to important economic zones and to communications.

Megalopolis – a group of conurbations, with each having more than ten million people.

Conurbation – a group of large cities and either suburbs, with three to ten million people.

Metropolis – a large city and its suburbs, consisting of multiple cities and towns with one to three million people.

Large city – a city with a large population and may service with a population of between 300,000 and 1 million.

City – a city abundant services, but not as many as a large city. A city has a population of between 100,000 and 300,000.

Large town – a large town has a population of 20,000 to 100,000.

Town – a town has a population of 1,000 to 20,000.

Village – a village generally does not have many services, possibly only a small corner shop or post office. A village has a population of 100 to 1,000.

Hamlet – a helmet has a tiny population, usually less than 100,and very few or no services, and few buildings.

2.3.1. Representation of settlements on maps

To represent settlements and their features, cartographers use different techniques including colors and different signs and symbols.

I. Symbols and signs the following are some of the signs and symbols that help us represent settlement on topographic maps.

Table 2.2. Signs and symbols that are used to show settlement features on maps.

II. The shape of settlements – basically, settlements are classified in to three major groups based on their shapes. These are:

→ Dispersed settlements
→ Nucleated settlement
→ Linear settlement

a. **Dispersed settlements (scattered)**

- It is the type of settlement pattern where there are isolated houses, buildings or small scattered hamlets. Farms are around or away from village. In such pattern, houses and farm steads way show either regular or random distribution.
- They are separated from one another by physical barriers.
- They are typically found in the tropical rainforests and scrub lands in Africa and Australia.
- They are mostly found in rural areas.

b. **Nucleated (clustered) settlements**

- They are groupings of several family residences.
- They are usually developed around a certain central point. There are collective amenities to serve the community like shops, houses, schools, places of worship, entertainment and transport networks. The settlement is compact, concentrated and distinguishable by certain well developed features.

c. **Linear (Ribbon) settlements**

- It is a type of settlement pattern which has developed along a main line of communication or along a river valley.
- It is a kind of settlement which has an elongated pattern.
- They may be the result of a constrictive site of a valley, the alignment of a root way or river, or an elongated relief features such as a ridge or escarpment base.

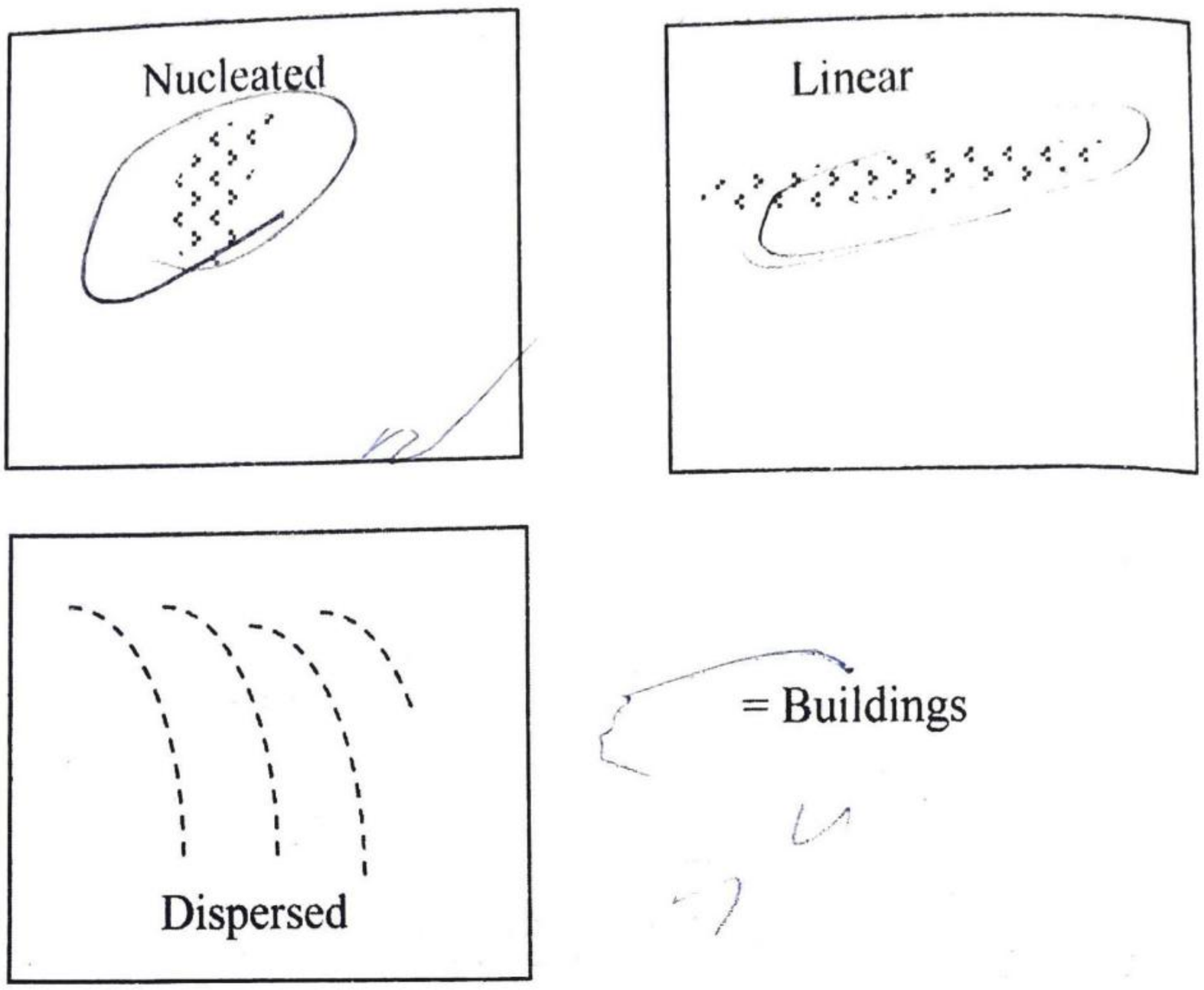


Figure 2.29 The three types of settlement shape

III. Types of settlements

a. Rural settlement

- They are develop in agricultural areas
- They have very low levels of socio-economic infrastructure and are poorly interconnected. Services are limited.
- They have very low divisions of labor.
- They are also sparsely populated.
- Generally, rural settlement has houses made out of simple materials (wood and mud), no planned streets, narrow and irregular roads, no defined shape and covers a small area.

b. Urban settlement

- They are characterized by non – agricultural activities such as different businesses, service – giving sectors, industries and the like.

- They have a high division of labor. Infrastructures, such as transport and communication facilities, schools, and hospitals, and modern houses, etc, are well – developed.
- They are densely populated as people live very close to each other.
- Generally, urban settlement has groups of buildings on vast built – up area, planned streets and defined shapes of settlement

c. Wet point settlement

- It is a kind of settlement where houses are built near areas where there is pure and adequate drinking water, fishing, cultivation (irrigation), power (HEP) generation are communication.
- It include parts of coasts, confluences, bridge points, spring lines and the base of escarpment, river banks, eg. Khartoum confluence town; Djibouti port town.

d. Dry point settlement

- It is a settlement on a site that purposely avoids water courses and areas occasionally subjected to flooding. People necessarily avoid poorly drained areas for the fact that if may cause them illness due to the prolification or tropical diseases eg. malaria.

IV. Factors Influencing the Location of Settlement Sites

The following are some of the more favorable factors of site, which have led to the establishment of settlement.

1. **Availability of fresh water** – water is the most important factor which influences settlement throughout the world in general and Africa in particular, water is chosen for a settlement because of a number of purposes such as pure and sufficient water, fishing, power (HEP) generation, cultivation, etc.
2. **Fertile alluvial plain** A fertile alluvial plain drained by rivers is ideal for raising food crops and maintaining a potable water

supply. A flat landscape facilitates the movement of people and goods.

3. **For the purpose of defense** – defense needs in the past may have led to a village being established on a hilltop; hillside, spur, or ridge or at the base of a mountains area; gap or sheltered valley, river terraces, meanders and island to which escape was swift and easy.
4. **Communication** – this becomes evident if the settlement produces cash crops for market proximity to transportation networks eases movement for speed by marketing of agricultural products.
5. **Mineral wealth** – valuable minerals attract investors and investment to work in the mines. Such conditions create favorable opportunities for settlements to develop.

Function of settlement

- All settlements perform certain useful functions to justify their continued existence.
- Most of them have several functions.
- The main function of settlements shown on maps are the following

1. Trade and Transport

- These are villages and towns that act as centers of exchange.
- They are collection and distribution centers for local products.
- There are financial institutions such as banking, insurance and other financial sectors.
- Example, New York is the financial centre of USA

2. Mining Towns

- The mining towns can be located in very usually places provided there are sufficient mineral resources.

- Mining centers can be located on maps by quarry symbols.
- Some of the more outstanding mining towns are copper mine lubumbas he (Zaire, gold mine in Johannesburg, Ndola copper mine (Zaire).

3. Holiday resorts, hill resorts and health resorts

- Various kinds of resorts are located in and around large center of population and in favorable geographical surroundings.
- They include coastal resorts for batting and yatching. For example, soderie (Oromia), Wanzaye (south Gondar).

4. Administrative towns

- These types of towns are the head quarters of the government and they are capital cities or centres of local administration.
- They deal with the organization and administration of the nation or of a division within the country.
- Some are continental capitals (Addis Ababa) and international capitals (Geneva, New York).

5. Industrial towns

- Industrial sites on maps are found a round towns, power sites and along modern transport routes.
- Towns of these kinds are engaged in processing raw materials in to finished goods.

6. Forestry (Lumbering)

- They are depicted on maps by pictorial (tree) symbols.
- The production of wood products such as saw wills, timber are also shown on a map.

7. Cultural and educational towns

- They are depicted on maps by pictorial (tree) symbols

- For example, oxford and Cambridge in England and Laiden in the Netherlands

8. Ecclesiastical cities

- Towns of this type are perform special functions such as historical and religions countries and are frequently visited by pilgrims from all corners of the world.
- They include Jerusalem (Judalsm, Christianity), Mecea (Islam), varanasi (Handuism) etc.

Illustrative Questions

39. A type of settlement which has an elongated pattern is
    A. Nucleated settlements
    B. Liner settlements
    C. nucleated settlements
    D. All

Explanation: A type of settlements which has an elongated pattern is linear (Ribbon) settlements.

Answer: B

40. Which of the following statements is true about settlement?
    A. A group of buildings (houses) in specified area with people living in them
    B. It consists megalopolises only
    C. It has the same stage of development
    D. Smaller settlements are usually in urban areas

Explanation: Different definitions are stated to settlement, in this case it is a group of buildings (houses) in specified area with people living in them.

Answer: A

41. All of the following are hierarchy of settlement except
    A. Towns
    B. City
    C. Delta
    D. Village

Explanation: Delta is a land form related concept which means a triangular deposit of soil or silt at the mouth of a river.

Answer: C

42. The key focus of ecclesiastical cities function is
    A. Focus on head quarters of the government
    B. Focus on historical and religious centers
    C. It describe recreation centre
    D. B and C

Explanation: The key focus of ecclesiastical cities function is historical and religious centers.

Answer: B

43. Mention at least two factors influence of settlements?

Explanation: fertile alluvial plain, hydro – electric power supply, communication centre, mineral wealth are some of the factors that influence settlements.

2.3.2. The study of Communication on Maps

Transport Network

- Communication feature can be shown on topographic maps by using different signs and symbols.
- Gradients of various transport networks can be also calculated and viable types of vehicles for them can be identified based on slope gradients.
- Transport network on the map includes fast paths, tracks, roads, railway lines airways, water ways etc.

a. **Foot paths (trails)**

- They are found in the open country side and in hills or mountain
- They are commonly found in rural Africa, and most of the people are served by trails and tracks.

b. **Roads**

- They ranging from mule tracks to modern high ways
- They are the most universal form of transport.
- They are classified by their width and surface quality.
- Topographic maps show various classes of roads by using different symbols. Some of them are tarmac

(asphalt) roads or first class roads (highways), metallic (graded surfaced) roads, and car tracks (dry – weather roads).

c. **Railways**

- It is cheaper and quicker over relatively long distances, and is safer and more comfortable.
- It avoids congestion causes less pollution.
- It can be shown on topographic maps with single and multiple tracks, small – gauge and menial working lines and all the constructional detail is given a long side the track.

d. **Cart tracks**

- It can be shown on topographic map are, at least in the dry season, used by four – wheel drive vehicles.

e. **Waterways (Navigation)**

- They are divided in to two major groups includes inland waterways and sea routes.

Inland waterways

- They include navigable rivers, canals and coastal shipping routes.
- They can be identified on maps by the presence of sea ports in association with structures like jetties, light houses, harbor offices and break waters.
- Canals are depicted on topo maps as long straight sections along the contours, moving from one level to another with the help of locks.

f. **Other means of communication**

- They include communication, radio/ TV stations and microwave and tower stations.
- They are shown by their own symbols and names.

Factors Affecting the development of Transport Network

- **Relief** – due to these large changes in altitude, roads make use of serpentine bends and tunnels or they pass around the mountains or over them.
- **Watershed road route** – road routes follow watersheds just to avoid crossing numerous rivers which require. Expensive bridges.
- **River valley roads route** – usually the gradients of river valleys have been smoothed by erosive action of rivers. This makes road construction easier and less costly.
- **Water bodies** – rivers can be crossed either by bridges or ferries.

g. Air Transport

- It is a recent mode of transport
- It is affected very little by different land forms or found conditions.
- It is ease and speedy means of transport.
- It can reach the remotest, the farthest and the most in accessible places on earth
- Aerodromes and air ports are points where single or several tarmac runways equipped with navigational aids exist.

2.3.3. Climbing capacities of vehicles

- There are a number of ups and downs with slopes varying in degree.
- Ups and downs are expressed in terms of slope and gradient.
- Rail ways are very much more affected by relief than roads because of their low hill – climbing capacity.
- Railways require much smaller gradients than roads, 2 percent is given as the maximum for railways.

- The railways uses a different and much longer route than the road.

Example – Two points, 'B', located at the foot of the eastern escarpment in Ethiopia at an altitude of 500m, and 'C' located at 2500 m are to be joined with a road and a railway. What is the length of road and railway?

Solution = $G = \dfrac{V(vertical\ rise(differnce)\ in\ altitude}{H(Horizontal\ (map)\ dis\ tance\ travelled)}$

$$\text{Altitude difference} = \frac{2500-1500}{1000} = 2 \text{ kilometers}$$

Maximum gradient for cars = 25%

Ground distance (unknown) = x

- the shorest possible distance for the road is

$$25 = \frac{Altitude\ difference}{x} x\,100$$

$$25 = \frac{2\times100}{x} = 8\text{km (the length of the road)}$$

- The shorest possible distance for the railway is

$$2 = \frac{2\times100}{x} = 100\text{km (the length of the railway)}$$

- Railways avoid large changes in altitude, which involves the construction of tunnels, embankments, cutting, etc.
- Because of the nature of the Ethiopian land form context roads are constructed along a steeper slope. As a result of this, the roads follow winding pattern. Roads that show such a pattern are known as serpentine road. This is done to minimize the steepness of the slope of the road. This reduction of gradient is important for the fact that different vehicles have different hill climbing capacity.

Table 2.3. Maximum gradients for different means of transport

Means of transport	Maximum Gradient
Train	2%
Ordinary cars	25%
4 wheel drive cars	30%
Man – walking up without support of hand	45%
Bicycles	10%

Illustrative Questions

44. Which of the following means of transportation avoids congestion and causes less pollution.
    A. Water
    B. Road
    C. Air
    D. Railways

Explanation: Compared with road transport, rail travel, avoid congestion and causes less pollution.

Answer: D

45. Identify the wrong combination
    A. Air transport – fastest means of communication
    B. Road transport – reach remotes area
    C. Water transport – Bulky goods
    D. Railway – less comfortable

Explanation: Air transport reach the remotest and the most in accessible places on earth.

Answer: B

46. The highest road gradient in Ethiopia is _____ percent
    A. 14 percent
    B. 18 percent
    C. 12 percent
    D. 10 percent

Explanation: The highest road gradient in Ethiopia is the Limalimo road, which is 12 percent gradient which stretches from R – Tekeze to Debark.

Answer: C

2.4. Geographical Information System (GIS)

2.4.1. What is Geographic Information System (GIS)?

- It is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.

- It is the science underlying geographic concepts, applications, and system.
- It is a branch of information technology, computer – assisted mapping, cartographic application and spatial – data analytical tools

Key terms

Data – it is a collection of raw facts representing places, things, people, events and concepts in the form of numbers, text, figures, symbols and signals.

Information – is data that have been transformed through processing such as structuring, formatting conversion and modeling.

System – can be used in different contexts. It can be used to describe physical entitles or (solar system, ecosystem, Drainage – system and Immune system) or conceptual entitles (political, democratic, computer and economic system).

2.4.2. Turning point on the development of GIS

- The first GIS called the Canada GIS was built in 1960s
- The increased accessibility of computers in the 1970s as a result of technological improvements and lover costs of computers heralded the beginning of wide application of GIS.
- In the 1980s GIS sales increased tremendously as governments and businesses found more uses of the systems.
- By the early 1990s, about 100,000 GIS systems were in operation
- Currently, GIS has come to be one of the most important system in making spatial analysis and many other geographic researches.

Uses of GIS

GIS are important for

- Urban planning conserved with the development of master plans

- Monitor patterns of urban growth
- Planning applications.

- **Trafic control** – GIS is used to regulate and monitor traffic flows in streets and overcrowded highways.
- **Emergency Management** – GIS and GPS (Geographic positioning techniques are used to emergency management personnel before, during and after natural or human made disasters.
- **Airport Noise management** – The degree of nosie is mapped around airports using data concerning air port configurations accompanied by air craft noise – generation monitoring. This information can be used to reduce noise impacts near the airports.
- **Education** – GIS is used in schools of all levels.
- **Scientific Research** – GIS – conducted research can assess the qualify of medicines that are imported from abroad to determine whether they fulfill international standards.
- **Social programs** – GIS methods are sued to generate data on unemployment rate increases in relation to economic development in a given country.
- **Public health** – GIS has been used to identify health problems caused by lack of sanitary practices such application – generated maps show the relationship between income and level of education and the number of people that lack sanitary practices.
- **Resource Management** – GIS was used to map, analyze and manage a complex weather condition.
- **Wildlife management** – GIS is also used in wildlife management applications. The approach

involved a study to find the territories of existing animals by radio tracking.

- **Military base Management** – GIS also used to protect plans and animal habitats when missiles and other weapons are tested.
- **Agriculture** – GIS is used in the agricultural sector. This application is known as precision farming to increase agricultural production by reducing farm coasts. The application depends on soil maps especially prepared by GIS technology.
- **Tourism** – GIS provides information about services and facilities of tourist sites.

Illustrative Questions

47. What is GIS?

Explanation: Geographic information system in a system designed to capture, store, manipulate, analyze, manage and present all types of geographical data.

48. Describe briefly the uses or importance of GIS?

Explanation: GIS is important for traffic control, improvement of public health, scientific research etc.

49. What does GIS agricultural precision farming mean?

Explanation: It is an agricultural GIS application in order to increase agricultural production by reducing farm costs.

50. Explain the contribution of GIS in modern map making process?

Explanation: In recent time GIS related to modern cartography because it manipulate and analyzing date in short time and also solving complex spatial problems.

51. _____ is a method of showing a relief feature on a map by using different colors or different intensities of the same color

A. Form line
B. Hachure
C. Layer tinting
D. Relief shading

- selecting appropriate site for recreation
- understanding dead and visible ground distribution.

Answer: D

Review Question on Unit 2

Part I. True or False questions

Write "A" if the statement of true and "B" if it is false

T 1. The different topographic features that characterize landscapes are shown on topographic maps by using contours.
F 2. Contours that are widely spaced indicate a uniform slope.
T 3. Across-section helps us to acquire a better view of the nature of the slope.
F 4. Form lines is a method of showing relief by using different colors.
T 5. Air transport is a recent mode of transport.
T 6. A linear settlement pattern is usually a road oriented settlement pattern.
F 7. Centripetal drainage pattern is common over granite rock
T 8. All rivers have their own sources and mouths.
T 9. A cut is a human – made feature that results from the cutting higher ground, usually to form a level bed for a read or rail way track.
F 10. The intervisibility of places cannot be affected by the amount of vegetation that covers the area.

Part II. Matching questions

Match items in column "A" with that of column "B"

Section-I

A	B
E 11. Hill	A. U-shaped contour line pointing toward lower ground.
L 12. Depression	B. U – shaped contour line pointing toward higher ground.
H 13. Cliff	C. priate stream
B 14. Re – intrant	D. consequent
A 15. Ridge	
J 16. Dendrite Drainage pattern	

17. First – order streams
18. Secondary consequent streams
19. Delta
20. Tributary

E. triangular deposit of soil
F. forming concentric circles
G. confluence
H. Close together contour lines
I. Resequent
J. "a tree"
K. Small stream
L. closed contour lines, tick marks down ward to lower ground

Section II

A	B
21. Megalopolis	A. Between 300,000 and 1 million people
22. Conurbation	B. less than 100 people
23. City	C. more than ten million people
24. Large city	D. one or two buildings or families
25. Village	E. 1,000 to 20,000 people
26. Town	F. three to ten million people
27. Metropolis	G. More than twenty million people
28. Hamlet	H. 20,000 to 100,000 people
29. Large town	I. Between 100,000 and 300,000 people
30. Isolated dueling	J. between 50,000 and 60,000 people
	K. 100 to 1,000 people
	L. one to three million people

Part III Complete Questions

Fill in the blank space with appropriate words or phrases.

31. _____ is a dip or low point between two areas of higher ground.
32. _____ are short, broken lines that are used to show relief.
33. The most common method of showing relief and elevation on a standard topographic map are _____
34. _____ is the science of taking measurements from aerial photographs or satellite images to make maps, including topographic maps.

35. A contour line starting from zero elevation or means sea level, every fifth contour line is called Index Contour line
36. FSU is a human made feature resulting from filling alow area usually to form a level bed for a road or rail road track.
37. Elbow of capture is a point where one strong river cuts in to the course of another weak river during capture.
38. A type of settlement lives in groupings of several family residences is called Nucleated Settlement
39. The river splits in to many new channels is called Distributo
40. SPUR is a short and continuously sloping line of higher ground that normally extends out from the side of a ridge.

Answer Key to Review Question on Unit – 2

Part I True or False Item

1.A 2.B 3.A 4.B 5.A 6.A 7.B 8.A 9.A 10.B

Part II.

11.F 12.L 13.H 14.B 15.A. 16.J 17.D 18.I 19.E 20.K

21.C 22.F 23.I 24. A 25.K 26.E 27.L 28.B 29.H 30.D

Part III

31. Saddle
32. Hachures
33. contour lines
34. Photograpmmetry
35. Index contour line
36. Fill
37. Elbow of capture
38. Nucleated settlements
39. Distributaries
40. Spur

UNIT THREE

An overview of Physical Geography of Africa

3.1. POSITION, SIZE AND SHAPE OF AFRICA

3.1.1. Position of Africa

The geographical location of Africa can be treated in two ways as follows

A. Absolute Location.

- Absolute location can be exactly shown on globes or maps by using astronomical grid reference, i.e. the network of lines of latitude and longitude
- Africa lies between, 37^0N and 35^0 and 25^0 11'sand 51^0 24'E.

The four extreme points of the continent include.

- Cape Bon (Tunisia) – $37^0$21'N – Most northerly point
- Cape Agulhas (Republic of South Africa (RSA) – $34^0$52'S – Most southerly point
- Cape Guardafui (Somalia) – $51^0$28'E – most easterly point
- Cape verde (Senegal) – $17^0$33'W – Most westerly point

Because of its astronomical location, Africa are approximately unique features.

- The north – south and east – west extents of Africa are approximately of equal distance, with only very small distance, i.e. the N – S distance is 8000km and the E – W distance is 7560km.
- The equator runs almost through the centre of Africa. However, the land area north of the equator is about twice

that of south. Generally, Africa has a balanced position around the equator.

- Africa is the only continent crossed, by all of the following the tropic of cancer and tropic of Capricorn the equator and the prime meridian.
- Africa has the largest proportion (nearly $3/4^{th}$) of the total land area with in the tropics. Therefore, Africa has largely inter – tropical location. As a result it is said to be the hottest continent in the world.

B. Relative Location

- Relative location means the location of a country or continent with reference to physical features, such as land masses and water bodies.
- Land masses may include countries or continents while the water bodies consists of oceans, seas, etc.
- Africa is found to the
  - South of Europe
  - Southwest of Asia
  - South of the Mediterranean sea
  - West of the Indian ocean
  - East of the Atlantic ocean
  - North of the southern ocean
  - Europe across the strait of Gibraltar, which is about 22 kms wide between Morocco and Spain.
  - Africa relation to Asia, the continent comes closest across the strait of Babe elmandab, Which is about 40kms wide.
  - A narrow stretch of land called the Isthmus of suez,which is cut in to two by an artificial canal called the suez canal, connects Africa with Asia.

- Africa's relative location makes it to have the most control (accessible) location in the world. It has a much more opportunity to make easy and quick contacts with almost all other continents of the world.
- Africa's relative location has significant effects on its socio – cultural, economic and political behaviors. For example, the nearness of Africa to Europe and Asia has encouraged the development of socio – cultural and economic contacts between the people of the continents science the ancient times.

3.1.2. Size of Africa

- Africa is the second huge continent next to Asia.
- The continent's total area is about 30,335,000 km^2.
- It is about two – thirds of the size of Asia and three times bigger than the size of Europe.

Advantages, of Africa's large area

- It can be used settlements, agriculture, and other economic activities
- Huge resource potentials in terms of resources like soil, water, minerals, flora and fauna and the like, which are vetal for its development.

Disadvantages

- It makes geographical connectivity difficult among the people of the region and of the world.
- It makes problems related to integration among peoples of the continent and others outside, making both integrated development and international trade a challenge.

3.1.3. Shape of Africa

- It denotes the geographical form of an area.
- It is also the external geographical appearance of a place.
- It has great impact on the socio economic integration and flow of goods and services within each region.

- It could be classified as compact, elongated, fragmented, perforated and the like.
  - → A moderately compact shape is close to that of a circle
  - → An elongated shape is a shape with one side longer than the other.
  - → A fragmented shape is made up of multiple discounted areas.
- Africa has a relatively compact shape. Possible evidences for this are the following:
  - → The N→S and E →W extents are almost equivalent with a miner difference.
  - → Africa has much more straight or smooth (unbroken coastline). The continent's coastline does not have many indentation, in lets,, bays or gulfs.
  - → The unbroken coastline of Africa makes the continent poor in natural harbors.

Illustrative Questions

1. Which one of the following is most likely an outcome of the location of a country?

   A. Its geographic size
   B. Its geopolitical character
   C. its geographic shape
   D. A and C are correct answers

   Explanation: Geographical size and Geographical shape of the country is most likely an outcome of its location.

   Answer: D

2. The Northern extreme point of Africa is located at

   A. Cape Agulhas
   B. Cape Bon
   C. cape verde
   D. cape Guardafui

   Explanation: The Northern extreme point of Africa is located at cape Bon- (Tunisia) – $37^{0}21'N$.

   Answer: B

3. The astronomical location of a country is expressed _____

   A. Using lines of latitude and longitude
   B. In relation to the location of water bodies

Regional Division of Africa

- Based on similar physical economic and social characteristics Africa has five major regions.
- Based on the above characteristics. the continent is sub divided into five regions; namely.
  - Eastern Africa
  - Central Africa.
  - Northern Africa.
  - Southern Africa
  - Western Africa

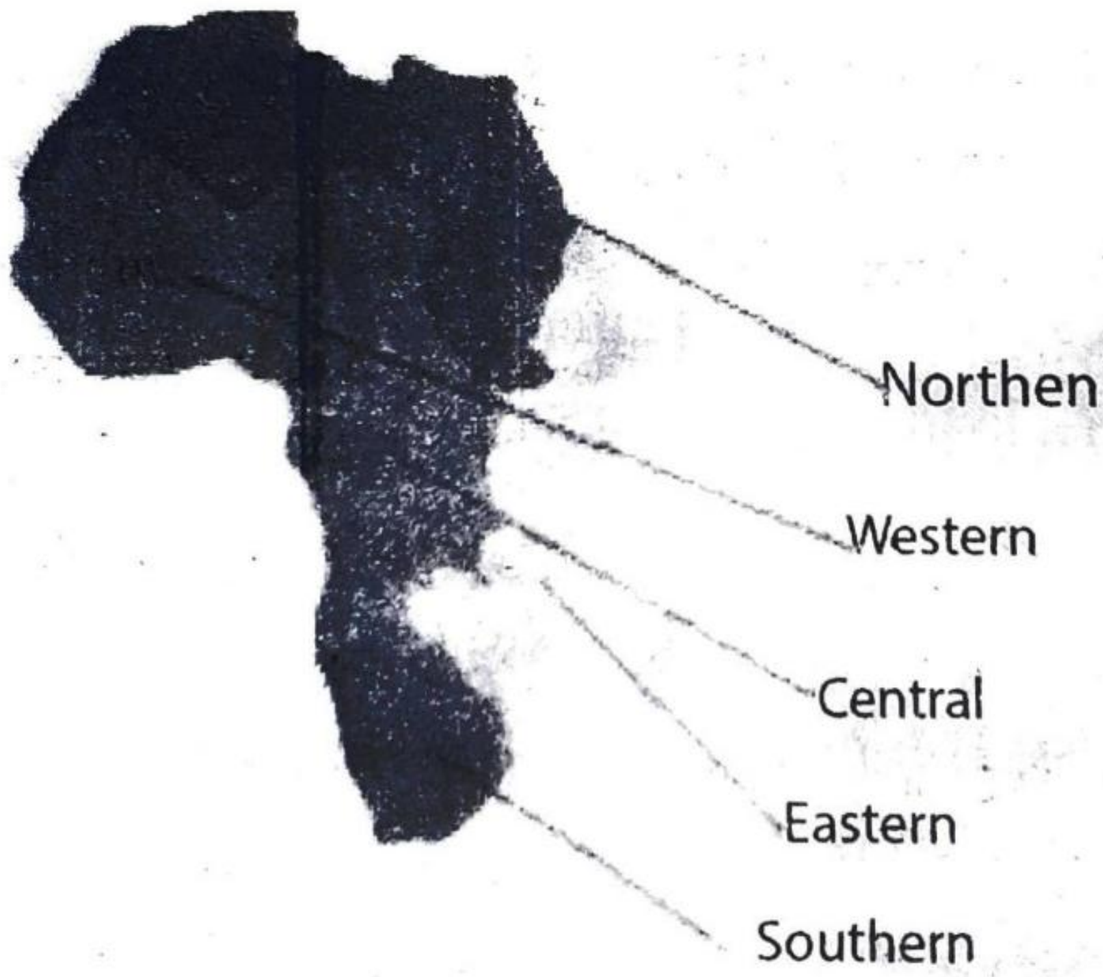


Figure 3.1. Regional Division of Africa

Name of region	Astronomical location	Number of countries	Area (km^2)	Population (2009)	Population density (per km^2)
Eastern Africa	18^0N-27^0s and 22^0E – SI^{0}24^{0}E	18	6,384,904	316,053,651	49.5
Northern Africa	3^0N-$37^0$31'N and15^0W–36^0E	11	8,533,021	211,087,622	24.7
Western Africa	4^0N-25^0N and $17^0$33'W–16^0E	17	6,144,013	296,186,992	48.2
Central (Middle)	$23^0$30^0'N-$15^0$30's and	9	6,613,253	121,555,754	18.4

Africa	8^0E–32^0E				
Southern Africa	18^os-$34^0$52'N and 7^0E–32^0E	5	2,693,418	56,406.762	20.9
Africa total	$37^0$31°N-34^0 52's and$25^0$11' W-$51^0$24^{0}E	61	30,368.609	1.001.320.281	33.0

Table 3.1. The major regional divisions of Africa

- Table 3.1. Shows that central Africa is the only region with an exclusive tropical location.
- Northern and Western Africa are entirely in the Northern hemisphere while southern Africa is, wholly confined to the southern hemisphere.
- In terms of population densities eastern Africa has the largest population density 49.5 people per km^2 followed by western Africa. Central Africa has the continent's lowest population density, 18.4 people per km^2.
- In terms of its territorial size. Northern Africa is the largest followed by central and Eastern Africa.

The major regional divisions of Africa

Eastern Africa

- It is located between 18^0N – 27^0s latitudes and 22^0E – 24^0 28'E longitudes.
- It covers an area of 21% of the continent's total area.
- It consists of 18 countries namely, Burundi, Comoros, Djibouti, Eretria, Ethiopia, Kenya, Madagascar, Malawi, Maritius, Mozambique, Reunion, Rwanda; Seychelles, Somalia, Tanzania, Uganda, Zambia, Zimbabwe, of which seven are landlocked, constitute the region.
- It is characterized by diverse relief such as very high volcanic mountain extensive plateaus, great rift valleys and low depressions.

- The region has its climate ranges from desert and semi – desert type of high altitude alpine climate.
- It is drained by the Nile, Wabishebelle and Genale river basin
- It is the most populous of all the regions accounting for about 31.3%
- Life expectancy average 51 years.
- Agriculture is the most dominant economic activity in the region;
- The meaning and industrial sectors are little developed in the region

Northern Africa

- It is found between 3^0N – $37^0$31'N and 15^0N – 36^0E.
- It is the largest region in terms of area coverage.
- It covers an area of 8,333,021 km^2.
- It consists of seven countries namely, Algeria, Egypt, Libya, Morocco, Sudan, Tunisia and Western Sahara, Among these countries Sudan and Algeria is the largest while Tunisia is the smallest.
- All the states of this region have direct access to the sea.
- It is characterized by desert climate.
- It accounted for about 20.5% of Africa's total population and life expectancy averages 69 years.
- The economy of northern African is dominated by agriculture, industry and mining.

Western Africa

- It is found between 4^0N – 25^0N latitudes and $17^0$33'N – 16^0E longitudes.
- It covers all area of about 6,144,013km^2.
- It consists of 17 countries namely Benin, Burkinafasso, Niger, Cape Verde, Cote D'Ivoire, Gambia, Ghana, Guinea, Guinea – Bissau, Liberia, Mali, Mauritania, Nigeria, Senegal, Sierra Leon

and Togo. Among these countries Niger is the largest while cape Verde is the smallest.

- It is characterized by highlands and low lands relief.
- It is the second most populous region in the continent, accounted for about 29.7% of the total population of Africa.
- Life expectancy averages 51 years.
- The economy of the region is dominated by agriculture, While industrial development is limited to coastal areas.

Central Africa

- It is located between $23^0 30'N - 15^0 3^0'S$ and $8^0E - 32^0E$.
- It covers an area of about 6,613,253 km^2.
- It is the second largest region in Africa.
- It consists of 9 countries, namely, Angola, Cameroon, Central Africa Republic Chad, Congo, Zaire Equatorial Guinea, Gabon and Sao Tome and Principe. Among these Zaire is the largest country while the island of Sao Tome and Principe is the smallest.
- It experiences almost all types of climates of the content, except the Mediterranean type.
- It is characterized by low population density due to its climatic condition.
- The average life expectancy in central Africa is about 51 years.
- The dominant economic sector of the region is subsistence, agriculture,

Southern Africa

- It is located between $18^0 s - 34^0 52'N$ and $7^0E - 32^0E$.
- It covers an area of about 2,693,418 km^2.
- It is dominated by high plateaus of over 300m high.
- It includes countries like Botswana, Lesotho, Namibia, Republic of South Africa and Swaziland. The largest country in terms of area is R.S.A while Swaziland is the smallest.

- It's the smallest region
- It is the least population in the continent.

Illustrative Question

7. Which region of Africa has most diverse climatic conditions and biodiversity?

A. Eastern Africa
B. Western Africa
C. Central Africa
D. Southern Africa

Explanation: Central Africa experiences almost all types of climates of the content, except the Mediterranean type. The diverse climatic conditions of the region make central Africa rich in biodiversity.

Answer: C

8. Identity the wrong combination

A. Central Africa – $23^0$30N – 15^0 30's and 8^0E – 32^0E
B. Western Africa – 18^0s – $34^0$52's and 7^0E – 32^0E.
C. Eastern Africa – 18^0N – 27^0s and 22^0E – 51^0 28'E
D. Northern Africa – 3^0N – $37^0$31'N and 15^0W – 36^0E

Explanation: The region of western Africa is stretched between 4^0N-25^0N latitudes and $17^0$33 W – 16^0E longitudes.

Answer: B

9. In terms of area the largest region in Africa is

A. Eastern Africa
B. Northern Africa
C. Western Africa
D. Southern Africa

Explanation: In terms of area Northern Africa is the largest which covers nearly 1/3rd of the continent's total area.

Answer: B

10. Which regional division of Africa is the most populous region?

A. Eastern Africa
B. Western Africa
C. Central Africa
D. Southern Africa

Explanation: In terms of population. Eastern Africa is the most populous of all the regions accounting for about 31.3% of African's total population.

Answer: A

11. The region of Africa which has the most developed and high density road and rail way' network is (EUEE. 2005/2013)
    A. West Africa
    B. North Africa
    C. south Africa
    D. Central Africa

Explanation: Relatively speaking, in all respects including railway network South Africa is the most develop region.

Answer: C

12. Mention the basement characteristics that classify Africa Regional devision.

Explanation: Based on similar physical economic and social characteristics the continent is sub divided in to Northern Easters, western, Central and Southern Africa.

13. Why do you think central Africa has rich in bio – diversity?

Explanation: This is because of the result of diverse climatic conditions, in central Africa experiences almost all types of climates of the continent, except the Mediterranean type.

14. Write the major economic Activities in western Africa?

Explanation: The major economy of western Africa is dominated by agriculture while industrial development is limited to coastal area.

15. What are the major river basins that drained southern Africa?

Explanation: Limpopo, orange and real are the major rivers that drained southern Africa.

3.2. Geological History and Relief Structure of Africa

3.2.1. Geological History of Africa

- The earth was as old as 4.6 billion years.

- The major geological events which occured in each of the major eras since the existence of the super continent called Pangaea ("all earth").
- In the Jurassic period of the Mesozoic era Pangaea was broken up in to two big ancient continents known as LAURASIA and GONDWAN ALND.
- Laurasia was located in the north while Gondwanaland was in the South separated by a narrow sea called Tathys.
- Africa was part of Gondwanaland. Through a long period of time, Laurasia and Gondwanaland were further split in to the present day major continents and islands.
- Different theories and views have been formulated to find out how and when the African structure was formed. Among such theories, the most popular and widely accepted one is Wegener's theory of "continental Drift" or "continental Displacement." According to Wegener's theory, Africa had been part of Gondwanaland.
- Professor Wegener are nowned German Geologist, provides the following three proofs for the existence of Gondwanaland.
  1. **Land form evidence** = Similarities of contental coast lines are very common the jigsaw fit of the Southern continents of Africa and South America is the best example.
  2. **Geological evidence** = rocks of similar structure have been identified along the coasts and main lands of these continents.
  3. **Biological evidence (old fossil remains)**: various fauna and flora of similar physiology, species and living style have been discovered along the coasts of the present southern continents.

  The major geological and geomorphologic events that occurred in Africa as follows.

Precambrian Era (4.5 billion – 600 million years before the present)

- It is oldest and largest division of the geological time scale.
- It covers almost $5/6^{th}$ of the geological history of the planet

Major events

- Formation of the Basement complex Rocks or crystalline basement complex. Vast areas are observed with Precambrian rocks exposed to the surface. Such areas are known as **shield lands** or **cratons**.
- orogenesis is a mountain – forming processes.

Paleozoic Era (600 – 250 million years before the present

- It is the second – longest and second oldest era in geological history

Major events

- Series of denudation and peneplanation occurred
  - Denudation is the lowering of the earth's surface, while seeking of land and its resultant peneplanation refers to the formation of almost level surfaces as a result of lowering in altitude.
- Heavy erosion
- Formation of coal during the carboniferous period.

Mesozoic Era (250 – 70 million years before the present)

- It is the third – largest and third – oldest era in the geological history of the earth.
- It is a time of alternate sinking and rising of the land
- It is divided in to Triassic, Jurassic and cretaceous period.

Major Events

- Sinking of the Horn of Africa resulted in the gradual transgression of the sea during the early years of the Triassic period.
- Formation of sedimentary rocks.
- Uplifting of the land in the Horn of Africa, resulted in the regression of the sea during the cretaceous period;
- The flooding of the Sahara region, by water that advanced from Tathys

Cenozoic Era (to million - present)

- It is the most recent and the shortest era in the geological history of the earth.
- It is sometimes called the living era.
- Africa gained its present physical appearance or surface configuration during this era.

Major events

- Formation of the Mediterranean Sea, the Great East African Rift Valley, the Red Sea and the Gulf of Aden.
- Formation many of the volcanic mountains, plateaus and young fold mountains (Atlas fields) of Africa.
- Climatic change that resulted in the cooling and later warming of the earth's climate.

Illustrative Question

16. To what geological process does the term "orangey" refer?
    A. Denudation and peneplanation
    B. Mountain building
    C. Faulting
    D. Erosion and deposition

Explanation: orogeny or orgensis meaning it is a mountain building processes.

Answer: B

17. One of the following part is not correctly matched
    A. Precambrian era – Basement complex rocks formed
    B. Mesozoic era – the Mediterranean Basin acquired its present form
    C. Paleozoic era – Gondwanaland was highly eroded
    D. Cenozoic era – the East African Rift-valley was formed

Explanation: the Mediterranean Basin acquired its present form in the Cenozoic era not Mesozoic era.

Answer: B

18. Which of the following geological era responsible for the formation of the present surface configuration of the African continent

A. Paleozoic era
B. Mesozoic era
C. Cenozoic era
D. Precambrian era

Explanation: Africa gained its present physical appearance or surface configuration during the Cenozoic era.

Answer: C

19. Mention some possible evidences to show that the present continents were once joined together

Explanation: According to Wegener the possible evidences are land form evidence, geological and biological (old fossil remains) evidences.

20. Write the major geological events in the Paleozoic era:

Explanation: The major geological events in the Paleozoic era are denudation and peneplanation, Heavy erosion and formation of coal during the carboniferous period.

21. Rearrange the following geological era recent to past – palezoic Cenozoic, Precambrian and Mesozoic

Explanation: The correct arrangement from recent to past – is Cenozoic – Mesozoic palezoic – Precambrian

3.2.2. The Relief structure of Africa

- The Relief feature of Africa is highly diverse such as extensive plateaces deep valleys and gorges, plains etc.
- It is described as a vast platea.
- The continent's relief consists of 75% plateaus, 25% plain's and 4% mountains.
- Altitude in Africa varies from Quattara depression (about 132 below sea level) in Egypt to the top of mount Kilimanjaro 5,895m above sea level in Tanzania.

Continent	Landform Type (%)		
	Mountains and tills	Plateaus	Plains
Africa	4	75	25
Asia	44	24	32
Europe	25	8	67
North America	24	24	52
South America	20	24	56
oceania	28	24	48

Table 3.2. Percentage distribution of major landforms of the earth, by continent.

The relief of Africa can be broadly classified in to fours

1. Mountains
2. Plateaus (High plains)
3. Plains (coastal lowlands)
4. Rift valley

I. Mountains

- It is a high land with steep slopes and a peak.
- Africa's land form is dominated by two major mountains includes volcanic and fold mountains

Fold mountains

- They are confined to the extreme north and south of the continent
- They are of two types young and old. The young fold mountains of the atlas in the north and the old fold mountains of cape Ranges in the south.
- The young fold mountains formed during the Alpine orageneses during the Cenozoic era where as the old fold mountains formed during the Hereynia rageny in the Mesozoic era.
- Fold mountains are formed as a result of compression force. Where the earth's curst is compressed due to horizontally moving surface, the land between two places will be forced to bend upwards and forming fold mountains as a result

Volcanic mountains

- They were formed as a result of the great volcanic activities that took place in the Tertiary period of the Cenozoic era.
- They make the highest part as many of them rise beyond 4000m elevation.
- They are largely concentrated in the eastern region of the continent.

Mountain	Elevation (m)	Country (location)
Kilimanjaro	5895	Tanzania
Kenya	5200	Kenya
Ras Dejene/Dashen	4600	Ethiopia
Meru	4567	Tanzania
Elgon	4321	Uganda and Kenya border
Cameroon	4070	Cameron

Table 3.3. Highest Mountain peaks of Africa

2. Plateaus

- Most parts of Africa are plateau lands.
- In most parts of Africa, areas above 300m above sea level altitude are considered to be plateaus.
- Africa's average altitude, 700m, is a dividing line for plateau types. The continent's land mass can broadly be divided into two types of plateaus high plateau and low plateau.

High plateaus.

- They are found in the southern and parts of the eastern half of Africa.
- They includes the Ethiopian highlands, the east African plateau, the Bihe plateau, the south – west African highlands and the Madagascar Highlands.
- They are also two major basins, namely the Kalhari Basin in the west and the Great Karroo Basin in the south.
- They are extensive plateaus that lie above 700m, and their general elevation is above 2000m.

Low plateaus.

- They generally lie between 300 and 700m above sea level.
- They are extensively found in the northern and western parts.
- They include both basins and uplands listed below.
  - → Structural basins or depressions they consists of the Eljuf, middle Niger, Chad, Libyan, Sudd and the Congo basins – Many of these basins form areas of inland drainage system as they are cut off from the sea by high plateaus.
  - → Uplands include highlands such as Fouta Djalon, Jos (Bauchi), Adamawa, Ahggar, Tibesti and the Red sea Hills.

3. Plains

- They are areas of low relief with more or less flat surface configurations.
- They generally lie below 300m above sea level considered plains.
- They are confined to the coastal areas of eastern, north eastern, south eastern and Western Africa.
- They are very narrow structures that account for about 25% of Africa's relief.
- Generally, Africa's coastal plains are:
  - → Found along the east, south east, north east western coasts of the convenient.
  - → Very small in size;
  - → Topographically very low, lying entirely below and an elevation of 300m.
  - → Extremely narrow;
  - → Hot and dry and thus sparsely vegetated and populated;

→ Smooth and regular – as a result they lack large bays, gulfs and inlets.

4. Rift valley

The Great East African Rift Valley

- It is a depression formed during the Tertiary period.
- It is an extended part of the World great Rift valley system that stretches in the north – south direction. i.e. from Syria (Middle East) to the south east coast of Africa (Beira – part of Mozambique)
- It covers a distance of 7200km. The biggest portion (some 5600km) of the world's great rift valley system is found with in eastern Africa; touching is countries in the continent
- It has four trenches (branches). These are:

a. Ethio-Eritrea – Djibouti – Northern Somalia Branch

- It is known as the eastern branch.
- It is the northern most part of the African Rift Valley, extending north from lake Turkana in Kenya.
- In Ethiopia the rift Valley system runs between the north western and south east highlands.
- It branches out in to three trenches at the Afar Triangle, forming the Red sea and the Gulf of Aden.
- It has many lakes, including Ethiopian Rift Valley lakes like lakes Hawassa, langano, Shalla, Abijata, and Zeway.

b. Western Branch

- It starts in northern Uganda goes south wards through the eastern part of the Democratic Republic of Congo, Western Rwanda, Burundi and Tanzania.
- It is associated with the uplifted Ruwenzori horst between lakes Albert and Edward, with in this branch of the rift valley, lakes kivu, Edward, Albert and Tanganyika are found.

c. Eastern (Gregory) Branch

- It runs from lake Turkana in northern Kenya, crossing Tanzania to the east of Lake Victoria.
- The major lakes include Turkana, Navasha, Norton, Manyari and Eyasi are located in it.

d. Malawi Rift Valley

- It is bounded by steep escarpments (edges);
- It has numerous active and dormant volcanoes;
- It is often affected by earth tremors like earth quakes, volcanism and landslides, making the Rift Valley very unstable;
- Has a hot and dry climate in its many parts, making the place difficult for human habitation;
- Many structural basins (lakes) occupy the floor of the Rift Valley

Illustrative Question

22. Which relief features of Africa has the lowest spatial coverage in the continent?

A. Plateaus C. plains

B. Hills D. mountains

Explanation: Plains are very narrow structures that account for about 25% of Africa's relief.

Answer: C

23. Which of the following terms refers to the process of mountain formation?

A. Orogeny C. Deposition

B. Denudation D. peneplanation

Explanation: oragensis is a mountain – forming process. In this era, many mountains that make the face of the continent very rough and undulating, were formed.

Answer: A

24. Which one of the following mountains of Africa is different form the others in its formation?

A. Ruwenzori
B. Kilimanjaro
C. Ras Dashen
D. Elgon

Explanation: Mount Elgon is an extent shield volcano on the border of Uganda.

Answer: D

25. What is the most extensive type of land form on the African continent?

A. Plateaus
B. Mountains and hills
C. low lands and plains
D. river valleys and basins

Explanation: Africa is the only continent that is predominantly covered by extensive plateaus which consists of 71%.

Answer: A

26. What common characteristics do you find among Atlas, Alps and Himalayas?

A. They are old fold mountains
B. All are the result of tensional forces
C. All are found in the Mediterranean region
D. They were formed during similar geological era.

Explanation: Atlas, Alps and Himalays were formed during similar geological era especially alpine orogensis during the Cenozoic era.

Answer: D

3.3. Climate of Africa

3.3.1. Controls of Weather and Climate in Africa

Climate: is the average weather condition as observed over a long period of time (almost 30 – 35 years) in a given geographical environment.

→ Africa has varied climatic conditions due to the intervention of weather and climate controls.

→ The following are some of the main factors responsible for the spatio tempora/distribution and Variations of climates in Africa.

Latitude

- It indicate the distance places have from the equator.
- It affects the amount of incoming solar radiation the place receivers, and there by its temperature.
- Due to its latitudinal position, Africa has extensive areas of tropical and subtropical climates. Mid – latitude climates are confined to the extreme northern and southern parts of the continent.

Altitude

- It plays a major role in modifying temperatures over extensive areas.
- Africa is composed of plateaus, mountains and hills. Because of this, temperature decreases with an increase in elevation and vice versa.
- In Africa, the impact of altitude on climate is highly pronounced in the areas of the atlas mountains the cape Range – fold Mountains and the extensive East African Highlands.

Distance From the Sea

Africa has a relatively straight, smooth coastline. Besides, the continent north of the equator is much broader than its southern part. As a result the main lands of Africa. Particularly those north of the equator, such as the Sahara Desert, are remote from the influence of maritime (onshore) winds. Thus, there is very little maritime influence on Africa's climate since the continent has a compact shape, abroad plateau heartlands and very small, narrow coastal lowlands.

Ocean currents

- Oceanic water moves in two dimensions, vertically and horizontally the horizontal movement of oceanic water is called ocean current.
- Warm ocean currents have high temperature and high moisture content, and therefore they have warming effect. They also tend to bring moisture to the coastal areas.
- Cold ocean currents have cool temperatures and low moisture content. Therefore. They have cooling effects on the areas that they blow over. They also bring no rain to adjacent areas, making places over which they blow very dry and desert.
- The warm Mozambique current on the south eastern coast, and the two cold currents, namely the canary and Benguela on the western sides of the continent have a great influence on the climate of the coastal areas that they come in touch with.

Major Planetary winds and Atmospheric pressure

- The distribution and variation of temperature and rainfall depends on the pattern of atmospheric circulation over the continent. All the winds blow from high pressure areas to low pressure areas.
- The inter Tropical convergent zone (ITCZ) changes its position in accordance with the position of the over head sun. the circulation of winds is affected by high pressure cells. The location of these high pressure cells usually is over the adjacent oceans about the tropic of cancer and the tropic of Capricorn.
- Wind systems and air pressures also affect seasonal distribution of temperature and rainfall in Africa. The major global winds that affect African climate are:-
  - → The north east trade winds;
  - → The south east trade winds; and
  - → The south –west (equatorial westerly's)

3.3.2. Temperature Conditions in Africa

- In Africa temperature condition varies with seasonal change mainly because of the apparent movement of the overhead sun north and south of the equator.
- Spatially, lowlands (coastal areas) and the desert and semi desert areas of Africa experience the highest temperatures in the continent
- The distribution of temperature in Africa also has seasonal variation such variation is the result of the apparent movement of the overhead sun between the two tropics.
- December, January and February constitute, the summer season in the southern hemisphere. During this time, the sun is overhead, south of the equator. As a result, areas of high temperature are found in southern Africa. The Northern and northeastern parts of the continent remain relatively cool and dry at this time.
- June, July and August constitute the summer season in the northern hemisphere. This season is a season of high sun angle in Africa north of the equator.

3.3.3. Rainfall Distribution in Africa

- It is controlled by the inter tropical, convergence zone (ITcZ) the position of ITCZ is, in turn determined by the position of the overhead sun.
- The Guinea monsoon (equatorial westerly) winds from the Atlantic ocean bring rainfall to the north of Africa up to the southern frings of the Sahara in July;
- Moist winds from the Atlantic ocean and the south east monsoon winds from the Indian ocean bring rainfall to southern Africa in January;
- The westerly winds bring rainfall to the Maghreb region of North Africa and the cape province of south Africa in their respective winter seasons. Summer is not the wettest season in these places;

- Summer is a season of heavy rainfall in all parts of Africa, except in the Sahara desert and the Mediterranean – climate regions;
- Winter is dry in all parts of Africa, except for the equatorial and Mediterranean climate regions.

3.3.4. Climatic Regions of Africa

- Africa has hundreds of different climates because of its great spread of tropical latitude, great variation in altitude, large land mass and different ocean currents.
- On the basis of these factors, seven major climatic types are identified as follows.

1. Equatorial climate
2. Tropical continental (savanna) climate
3. Tropical Desert and semi desert climate
4. Tropical Maritime (Monsoon) climate
5. Warm temperate continental climate
6. Highland (Mountain) climate
7. Mediterranean climate

Note: The following map shows the locations of the major climatic regions of Africa study if carefully and try to identify the geographic locations of each region.

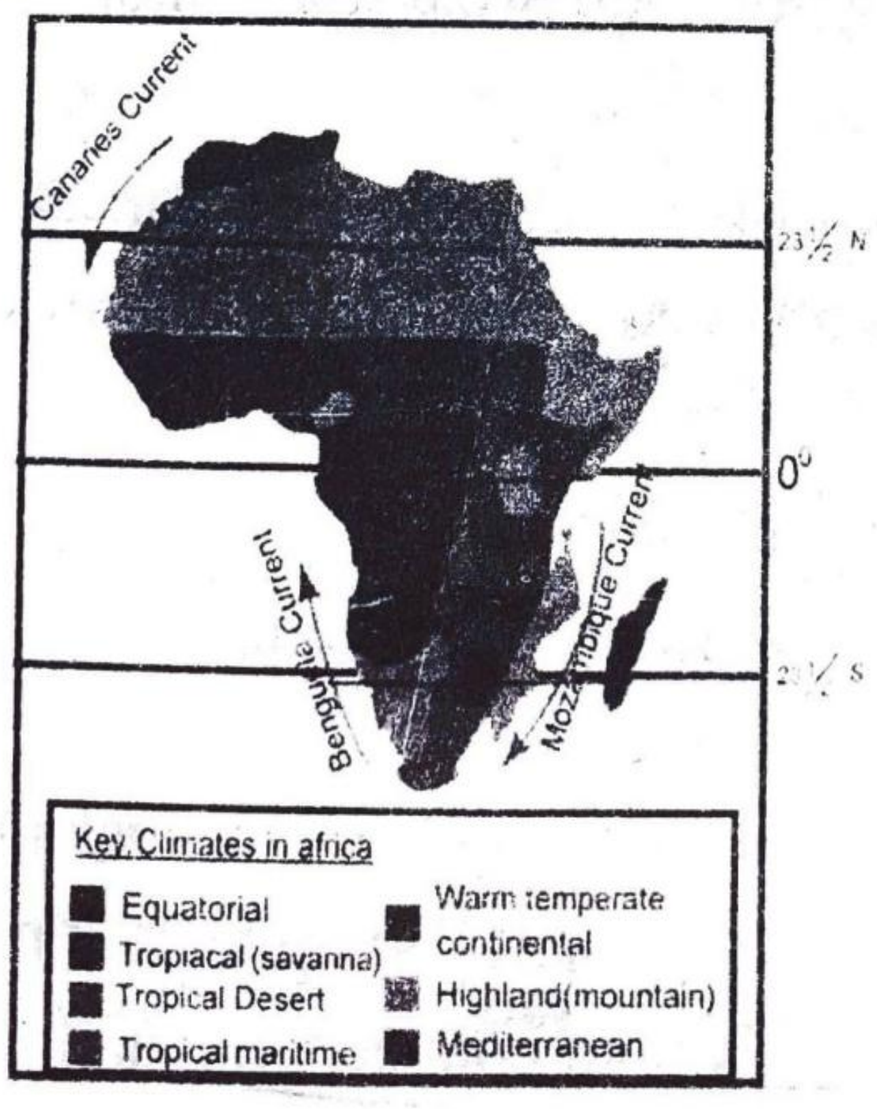


Fig: 3.2. Climate Regions in Africa

I. The Equatorial Climate

- They are found around the equator
- It extending between 6^0 or 7^0N and s latitudes.
- It is dominant in western and central Africa
- Both diurnal and monthly average temperatures are high throughout the year due to the high angle of the sun.
- Temperatures remain high throughout the year, averaging more than 27^0c annually, and rarely falling below 21^0c. Most of the time, the annually range of temperature of this region is between 1^0c to 3^0c.
- Heavy rainfall – largely conventional type occurs almost in all months.
- Rainfall is high, normally exceeding 1,500mm per years.
- The equatorial climatic regions cover the wettest parts extending from the gulf of Guinea through the Congo Basin to the proximity of East African High lands.

2. Tropical continental (Savanna) Climate

- It is found between 5^0 and 15^0 north and south latitudes.
- It is a transitional zone between the wettest (equatorial) region and the driest (desert) region.
- It occurs north and south of the tropical wet zone, in many parts of western Africa and southern Africa and in most of Madagascar.

The main features of tropical climate are

→ Summers are very hot, well over 25^0c and winter is cool, with an average temperature of slightly above 15^0c.

→ Almost all the rain falls in summer with great relation from about 380 mm (near the desert margins) up to 1520mm (near the equator). The rainfall is both connectional and frontal in charter,

→ That part of the savanna which borders the equatorial rainfall region receives high rainfall, with that amount decreasing as distance from the equator increases.

→ Winters are cool with temperatures almost above 15^0c and little or no rainfall.

3. The Tropical Desert and semi Desert climate

- It is found bordering the tropical savanna climatic region, especially in north central and southern Africa.
- Africa's, desert land includes the vast Sahara region, the Namib-kalhari area and the coastal plains of Horn of Africa.
- They are the hottest and driest areas in the content.
- They have extremely low rainfall and high temperatures. The daily and annual ranges of temperatures are very large.
- The hot desert of Africa falls into two categories.

a. **Marine (Nambi) Desert**: found along the south west coast and washed by the Benguela cold ocean current.

b. **Continental Desert**: found in and around the Sahara region in the north and the Kalahari area in the south. Here, there is little or no maritime influence over the whole Sahara and Kalahari deserts.

4. Tropical Maritime (Monsoon/ Climate

- It is also known as sub – tropical Humid climate.
- It is found only in the southern hemisphere, dominating areas that are located on the southeast coast of Africa.
- It extends roughly between Durban in south Africa and Dares-salaam in Tanzania.
- It is largely influenced by the warm Mozambique current.
- Rainfall is heavier in the hot (summer) season.
- Temperatures are very warm all the year round.
- Summers are hot and wet while winters are warm and dry.

Basic features

→ The impact of the warm Mozambique ocean current on temperature and rainfall conditions.

→ High total annual rainfall throughout most of the year, due to the wetting effect of the warm Mozambique current;

→ High temperature throughout the year, due to the warming effect of the warm Mozambique current; and

→ Low annual range of temperature, which is similar to, but relatively higher than, that of the equatorial climatic regions.

5. The warm Temperate continental climate (Steppe climate type)

- It is found only in the high veld (Temperate grassland) of the Republic of south Africa.
- It is the smallest of all the climatic zones in the continent.
- It has higher rainfall (up to 760mm) and cooler temperatures, due to high altitude.

Basic features

→ Great influence of the high altitude of the region an its temperature and rainfall conditions; and

→ Great influence of on shore winds that originate from the Indian ocean.

6. High land (Mountain) Climate

- It is predominantly found in areas where altitude is relatively high.
- It is found in the equatorial and tropical high mountain and plateau regions of Africa.
- It experienced in the Ethiopian and East African highlands and the higher parts of south Africa (Drakensberg),
- It is similar to the temperate climate of the world.
- orographic rain is commonly observed in this climatic region.

7. Mediterranean climate

- It prevails on the western margin of continents between 30^0 and 45^0N and S latitudes.
- It is also known as the temperature western margin climate.
- In Africa, such climate region is found in the northern and southern extremes the Maghreb (atlas) Region and the cape province
- Most of the rainfalls in winter, with a total annual rainfall that ranges from 250mm to 1000mm.

Main features

→ A hot, sunny, bright, dry summer season; and

→ A mild wet winter season.

Illustrative Question

27. Which one of the following is NOT true about the characteristics of the equatorial climatic region?
    A. The region is located within 6^0N and S from the equator
    B. Both diurnal and monthly average temperatures are high throughout the year.
    C. The annual range of temperature is very small.
    D. The precipitation of the area mostly falls in the forms of snow

Explanation: The equation climatic region, receives extremely high amount of total annual precipitation throughout the year and also convectional type of rainfall is dominant

Answer: D

28. The Maghreb region in Northern Africa receives in winter rainfall from the.
    A. South east monsoon winds
    B. North westerly winds
    C. North polar easterlies
    D. South polar easterlies

Explanation: The Maghreb region in the North Africa receives its winter rainfall from North westerly winds.

Answer: B

Explanation: In July, the sun is over head North of the equator, i.e. the ITCZ and areas of greatest heat tend to be North of the equator. As this time low pressure cell is found in Northern Africa while high pressure develops along the tropic of Capricorn, over south Africa.

Answer: A

3.3.5. Drought in Africa

- It is a condition of un usually dry weather with in a geographic region
- It is a condition of lack of rainfall for along period of time.
- It occurs mostly at latitudes of about $15^0 - 20^0$, in areas bordering the permanently arid regions of the world.

Drought prone areas in Africa include.

- Sub – Saharan (sahel) region stretching from Senegal and Mauritania in the west to the Horn of Africa in the east.
- Eastern African countries, such as Kenya, Tanzania, Ethiopia, Somalia, Eritrea etc.

Causes of drought in Africa

- Un wise use of natural resources
- Deforestation
- Overgrating and over cropping
- Expansion of farm lands and settlements
- Environmental degradation
- Climatic changes
- Shortage of rainfall
- Desertification
- Demographic pressure on natural vegetation and farm lands

Effects of Drought

- Habitat destruction
- Shortage of water and famine (shortage of food)
- Displacement/ migration of people and animals.

- Death of people and animals
- Decling carrying capacity (deterioration) of form lands and range lands.

Illustrative Question

43. Which of the following is NOT among the consequences of drought?
    A. Famine and starvation
    B. Increase in Biodiversity
    C. depletion of water resources
    D. soil degradation

Explanation: The effect of drought in Africa such as decrease or destruction of biodiversity. Answer: B

44. Though Africa has a great potential to produce sufficient food for its people, the continent has been suffering from chronic food insecurity mainly due to.
    A. Serious shortage of working age population
    B. System of trade which encourages food export
    C. Conversation of some food crops to bio – fuels
    D. Heavy dependence on backward farming techniques and tools

Explanation: This is due to highly dependence on backward farming technique and tools.

Answer: D

45. The geographic region referred to as the "sub – Saharan Africa" Stretches from
    A. Cape verde to the cape of Good Hope
    B. Mediterranean, sea to the Atlantic ocean
    C. Southern margins of the Sahara Desert to the cape of Good Hope.
    D. Red sea to the Gulf of Guinea

Explanation: Sub – Saharan (Sahel) region stretching from at the southern things of the Sahara desert and extends from east to west for about 5000km.

Answer: C

46. Which of the following is NOT a likely outcome of large scale deforestation and over grating?

A. Climatic change
B. Land degradation
C. Greater biodiversity
D. Increased runoff and flooding

Explanation: Deforestation and over grating results loose greater biodiversity not greater biodiversity.

Answer: C

3.4. DRAINAGE SYSTEMS OF AFRICA

- Africa is rich in terms of water resources.
- The Africa continent is endowed with plentiful drainage systems. It has many rivers, lakes and swamps.

3.4.1. The Major Rivers and Drainage systems of Africa

- Africa has thousands of big and small, long and short rivers.
- Almost all of them rise from the central highland (plateau) areas and drain to different directions in to the ocean, seas, lakes or swamps.
- The major rivers to the continent include the Nile, Congo, Zambezi's, Limpopo, orange, Niger, Volta, Gambia and Senegal.
  - → **Focus**: The entire area that a river drains is called its catchment area or drainage basin.
  - → A group of drainage basins, which are supplied by multiple rivers, with common characteristics, such as a common destination, form a drainage system.
- The Africa continent has four major drainage systems; namely:
  - → Atlantic ocean drainage system;
  - → Indian ocean drainage system;
  - → Mediterranean sea drainage system; and
  - → Closed (Inland) drainage system.

Figure 3.3. Major rivers in Africa

A. The Atlantic ocean Drainage System

- It is made up of all major rivers that drain westward and southward and empty in to the Atlantic ocean.
- It is the largest in terms of catchment area, annual discharge and drainage density
- It accounts for about 90 percent of the continents surface flow.
- The major, river basins that constitute this system area the Congo, Niger, voltage,, Gambia, Orange and Senegal basins

The Congo (Zaire) River Basin

- It is the largest river in Africa in terms of total annual discharge
- It is the 2nd longest river in Africa and 2nd largest in the world.
- It is the wettest and widest of all river basins in Africa.
- It is Africa's largest river by volume and catchment area
- It has no great fluctuation in volume of water. This is mainly because Congo drains much of tropical (equatorial) Africa and

thus receives many tributaries from different regions fed by permanent equatorial rains.

- Kassai and Ubangi are the most important tributaries of Zaire river

The Niger River Basin:

- It is the 3rd longest river in Africa.
- It drains Guinea. Mali, Niger, Benin and Nigeria.
- It rises from the very wet Fouta Djalon Highlands of Guinea and flows south ward in to the Gulf of Guinea.
- The volume of Niger shows marked seasonal variation

The Votla River Basin

- It has Africa's largest artificial lake
- It has three major parts, Black volta, white volta and Red volta.
- It drains two – third of Ghana.

The orange River Basin

- It rises in the high Drakensberg mountains of south Africa
- It drains through the lands (coastal Namib desert) that become progressively drier to the west.
- The chief tributary of the orange river is the Vaal.

B. The Mediterranean Sea Drainage System

- It includes all the major rivers that flow northwards in to the Mediterranean sea.
- Nile river is the largest river basin in this system.

Nile:

- It is the only largest and permanent river of the basin
- It has two major tributaries, namely the white, Nile and the Blue Nile. White Nile, emerges from lake Victoria while the Blue Nile originates from lake Tana in the central highlands of Ethiopia. These two rivers meet in Khartoum.
- It is the longest river in African with a length of 6650 km.
- Its basin covers most countries of central; eastern and northeast Africa.

- It flows generally north wards through the Sudan and Egypt and empties in to the Mediterranean forming an extensive delta in north Egypt.

C. The Indian ocean Drainage System

- It includes all the major rivers that flow east wards into the Indian ocean.
- It is the second largest drainage system, in Africa in terms of drainage density, catchment area and annual discharge.
- The Zambezi, Limpopo, Wabishebella and Juba river basins are the major basins in this system.

The Limpopo River Basin

- It is the major river in southern Africa
- It forms the boundary between the Republic of south Africa (Transvaal) in the south, Botswana in the west and Zimbabwe in the North. The basin includes rivers that drain in to the Indian ocean

The Zambezi River Basin

- It has Africa's largest waterfall, Victoria Falls;
- It has two major dams = Kariba (Zambia and Zimbabwe) and Cabora Bassa (Mozambique)
- It drains part of Botswana, Zambia, Zimbabwe and Mozambique.
- Its lower course is navigable.
- It is the most utilized river in the Indian ocean drainage system
- The river has potential for irrigation but little has been used.

The Juba and Wabishebelle River Basin

- Wabishebelle and Ghenale along with their tributaries emerge from the south eastern highlands of Ethiopia.
- Wabishebelle travels south wards and disappears in the Sands of the desert in Somalia before reaching the Indian ocean.

- Ghenale travels south wards and joins Dawa and forms a larger river called Juba. Juba drains Somalia and finally discharges into the Indian ocean.

D. The Closed (Inland) Drainage System

- It is a 'closed drainage' system.
- It includes rivers and streams that do not have access to the sea.
- It is bounded by land surface.
- Most of the rivers in this system have multiple flow directions.
- It covers, nearly 32% of the total area of the continent.
- It receives nearly 4% of the continent's total annual run off.

In Africa, the best example of in land drainage systems are

→ **Lake Chad Basin** _ it covers the great Saharan desert region in north central Africa. This is the largest inland drainage basin in Africa. The main source of water for the lake Chad is the chari – logone river.

→ **Sudd Basin** _ in Northeast Africa (Southern Sudan)

→ **Okovango Basin** – in southern Africa (Botswana)

→ **Rift valley lake Basin** – in Ethiopia and Eastern Africa

→ **Danakil Basin**: in Ethiopia and Eritrea.

3.4.2. General Characteristics of Africa Rivers

Most African rivers share some common characteristics

a. Steep long profile

- As a result of the continent's relief, most of the rivers in Africa have steep courses.
- Most of the rivers empty in to the major water bodies by falling from the edges of interior plateaus of the continent. This affects the Navigability of many of the rivers of the continent.

- River Niger is the only African river which descends slowly to the sea.

b. Waterfalls and Rapids

- It impede navigation and irrigation potential of the rivers. But they are useful for hydro – electric power generation.
- It occur mainly due to the land configuration of Africa highlands
- Examples of rivers with these features are the Congo, Nile, Niger, Zambezi, orange and Cunnen Rivers.

c. Seasonal Fluctuation

- The seasonal variability in the amount of rainfall result in periodic fluctuations of the volume of river water.
- The Nile and Niger Rivers are good examples of this phenomena
- This seasonal feature of the river limits navigation and irrigation agriculture.
- The songe river is the only African river does not show significant volume variation. This is due to the fact that it has tributaries running from both within and south of the equator.

d. Deltaic Mouths and Mangrove Swamps

- As a result of low pressure force along their lower courses, deltas and mangrove swamps at the mouths of the rivers are formed.
- The Nile, Niger and Zambezi rivers have extensive deltas and are swampy at their mouths.
- This delta formation limits the navigability of rivers towards the interior and the development of the parts a long the coast.

e. Exotic Nature of the Rivers

- Many of Africa's rivers are in humid upland areas and travel across arid deserts or extensive areas of swamp before reaching the ocean's as a result, considerable proportion of their run off is lost by way of evaporation and seepage.

- The Nile river faces the greatest impact in this case. It losses nearly 64% of its total run off through evaporation and seepage. The Senegal River loses 54% and the orange river has a total loss of 55% in its runoff.

3.4.3. Lakes and Swamps of Africa

- Africa has many lakes and swamps.
- Some lakes are natural and others are anthropogenic (artificial)
- The lakes differ in their size and depth.
- For instance, lakes Tanganyika and Malawi are deep and large, while Victoria and Tana are wide and Shallow, respectively

Lakes of Africa

African lakes are grouped in to two broad categories, namely natural lakes and human made lakes.

Natural Lakes

→ They are formed by tectonic, volcanic and/ or denudation process or natural conditions.

→ Based on location, natural Africa lakes are divided in to two groups: Rift valley and Non – Rift Valley lakes.

The Rift Valley Lakes

→ They are found within the Great East Africa Rift valley

→ They includes Tanganyika, Malawi, Kivu, Edward, Albert, Turkana and the rift valley lakes of Ethiopia.

→ They are relatively long and narrow.

→ Many of the lakes that mark the western branch of the Rift valley have outlets to the ocean through rivers.

Non – Rift Valley Lakes

→ They are found outside the East African Rift Valley floor.

→ They can be classified as highland, glacial, ox bow lakes, and inland /coastal swamps.

→ They include lakes Victoria, Tana, Ngami, Chad, Okovango, etc.

→ It is broad and shallow and has many islands and an outflow to the Nile over the own Falls.

Lake	Area (km^2)	Maximum depth (m)	Type	Remake
Victoria	83,000	92	Non Rift valley	Largest in Africa, largest tropical lake in the world, 2nd largest fresh water lake in the world and 3rd longest in the world.
Tanganyika	32,890	1435	Rift Valley	World's longest fresh water lake, Africa's deepest lake and Second in the world, Africa's second largest lake.
Malawi	30,800	706	Rift Valley	The most southern lake in the great African Rift Valley system.
Chad	18,000	12	Non Rift valley	
Turkana	8,660	72	Rift valley	
Albert	5,500	17	Rift valley	The northern most of the chain of lakes in the great Rift Valley
Meru	4,920	NA	Rift valley	
Tana	3,600	9	Non Rift valley	Shallowest in Africa
Edward	3,550	NA	Rift valley	
Kivu	2,650	475	Rift Valley	

Table 3.4. Natural Lakes of Africa

Artificial (Anthropogenic) Lakes

→ They were built along the major rivers of the continent

→ They are used for hydro electric power and irrigation agriculture

→ Examples of Africa's major artificial lakes are lake Nasser (Nile R.) lake Volta (Volta R.), lake Kariba (Zambezi R.), and lake kaindic (Niger R.).

Swamps of Africa

Swamp: is the tract of low lying land which is permanently full of water,

Marsh: is a tract of low lying land which is temporarily wet because water cannot drain away from it.

- They develop mostly in depressions and areas of seasonal flooding along the courses of the major rivers of the Nile, Niger, Congo, Zambezi and Senegal.
- The major swamps of Africa include:
  - → Sudd and Machar swamps along the Nile River
  - → Kamulando swamp in the Congo Basin
  - → Batorse and Kofue swamps in the Zambezi Basin
  - → Okovango swamps in Botswana
  - → Swamps adjacent to lake Chad
  - → Mangrove (Coastal) swamps mostly near deltaic mouths of Africa's rivers
  - → Timbuktu swamps in Mali.

3.4.4. The uses of African Rivers and lakes

- They are very important natural resources for the development of socio – economic and cultural activities, in the continent.
- Some of their general uses are given briefly below.

Hydro – Electric power (HEP)

- Africa has about 4% of the world's HEP potential.
- African rivers have a very high potential for generating HEP, mainly due to the presence of steep gradients and waterfalls.

- Currently the continent use only 5% of HEP potential.
- The Congo River has the highest HEP potential in the continent.
- In Africa, the period between 1958 and 1968 can be designated as the "Decade of large Dams". Because during this period, large dams have been constructed.

Table 3.5. Major Dames of Africa

Dams	River	Location
Aswan High Dam	Nile	Egypt
Owen Falls	White Nile	Uganda
Koka	Awash	Ethiopia
Akosombo	Volta	Ghana
Kaindji	Niger	Nigeria
Kariba	Zambezi	Zambia and Zimbabwe
Inga I and Ii	Congo	Congo, DR
Cabora Bassa	Zambezi	Mozambique
Ghibe I and II	Gilgel Gibe	Ethiopia
Tekeze	Tekeze	Ethiopia

Irrigation

- Africa has tremendous potential for the development of large – scale irrigation schemes.
- The major hindrances for the development of large – scale irrigation projects in Africa are related to technological backwardness, capital scarcity, political unrest, war and lack of reliable irrigations land use studies.
- Among the major irrigations schemes, some are the Gezira and Kenana irrigation in Sudan, Nile Delta and lower Nile irrigation in Egypt; fish river, orange and pongola irrigation in RSA.

Fishing

- Africa's rivers and lakes are rich in fish resources.
- There are about 2,000 difference species of fish in the continent
- Most of the rivers provide fish for home consumption. Commercial fishing is not yet developed due to backward

techniques of fishing; lack of fishing equipments, lack of market and lack of Capital etc.

Navigation (Inland Water ways)

- Most of the rivers in Africa are characterized by waterfalls, rapids, steep profiles deltaic mouths and seasonal volume fluctuation. These conditions hinder their navigability.
- The Nile, Niger, Senegal and Gambia Rivers are navigable along parts of their courses, especially in summer.

Tourism and recreation

- Many rivers in Africa are scenically beautiful and therefore they attract tourists.
- The waterfalls along the rivers and the birds of the lakes are attractive.
- The Nile in Egypt, Vitoria Falls on the Zambezi river, and Lake Nakuru in Kenya and Lake Malawi in Malawi and Tis Abay on the Abbay river, and Awash Falls in Ethiopia are good examples.

Fresh Water Supply

- Most towns and eities, rely on local rivers for the supply of water to domestic and industrial uses.
- The piped water supplies for Urban Africa and the water supply for the rural population, are all dependent on the rivers and lakes of the continent.
- Good examples are Gaborane Dam in Botswana, and the Gefersa, Legedadi lakes in Ethiopia high supply water for their capital cities respectively.

Source of Minerals and Construction Materials

- Rivers and lakes carry various rocks and their, fragments that are good sources, of minerals and construction materials.
- Construction materials such as sand and gravel are dug out from many rivers of the content.

The hydro politics of the Nile River

Nile

- It is one of the most politically significant rivers in Africa.

- It is a large international river, which drains some ten counties of northeast and eastern and central Africa.
- The countries that are found in the Nile basin are Ethiopia, Egypt, Kenya, Sudan, Uganda , Rwanda, Burundi, Democratic Republic of Congo, Eritrea and Tanzania.
- The Nile basin counties are categorized in to two as lower course (Sudan and Egypt) and upper course (Eth, Kenya, Uganda, Rwanda, Burundi) DRC, Eritrea and Tanzania.
- Nile has two principal source rivers white Nile (15%) and Blue Nile (85%).
- The Hydro – politics of the Nile is, therefore, related with the degree to which the Nile river is utilized in its upper and lower courses.
- Egypt and Sudan have been the most benefited of all the counties in the Nile basin. Contrary to this, the upper course countries have been the least benefited. This unbalanced and unfair, utilization of the river between the upper and lower course countries has been a great area of interest.
- Countries of the basin are now in a situation where by they are working together to bring about equitable utilization of the river. To facilitate this issue, Nile Basin Initiative (NBI) was established by the Nile riparian counties in 1999. The initiative envisages achieving sustainable socio – economic development through multifaceted activities focused on the Nile Bain.

Illustrative Question

47. Which of the following rivers is believed to have the highest potential for the production of hydroelectric power.
    A. The Nile river
    B. The Niger river
    C. the Congo river
    D. The Zambezi river

Explanation: The Congo river has the highest HEP potential in the continent

Answer: C

fluctuation, Deltaic Mouths and Mangrove swamps and Exotic Nature of the rivers.

56. Why does the Congo basin experience low annual fluctuation in its discharge/ volume

Explanation: Because Congo drains much of tropical (equatorial) Africa thus receives many tributaries from different regions fed by permanent equatorial rains.

3.5. NATURAL VEGETATION OF AFRICA

- Africa has a variety of climates. These, diverse climates have resulted in a large variety of natural vegetation in the continent.

3.5.1. Major Vegetation Zone of Africa

- In Africa, five different vegetation zones can be identified. They includes
  - → Tropical rainforest
  - → Tropical grassland (savanna)
  - → Desert and semi – desert vegetation
  - → Afro – montane (Afro – alpine) vegetation
  - → Mediterranean vegetation

Tropical Rainforests

- It is also known as equatorial rainforest, tropical lowland forest or tropical evergreen forest.
- It develop in areas with equatorial climates.
- They are confined to central and western Africa, and eastern Madagascar.
- The largest continuous rainforests area is found in the Congo Basin.
- The climate is typically tropical, with high rainfall and high temperatures throughout the year.

Nature of the tropic forests

→ Tallest trees reaching up to 60m in height.

→ Most of the trees are hardwood, like mahogany, ebony, iron wood, rosewood and green heart;
→ They contain broad – leaved evergreen trees (green throughout the year);
→ They have little undergrowth, as the canopies of the tall trees prevent light penetration.
→ They have high species diversity and thick growth.

Tropical Grassland (Savanna)

- It covers extensive areas between the equatorial forests and the desert areas north and south of the equator.
- It develops in areas of seasonal rainfall
- They are extensively developed in areas that have wet summers and dry winters.
- They exist in Northern and Southern Africa, and they encircle the equatorial rainforests.
- Savannas are plant association composed of both grasses and trees.
- Africa savanna can be classified as parklands grass lands (High savanna) and thorn scrublands.

i) Park (Wetter) Savanna

→ It is the transitional zone between the tropical rainforest and the true savanna grasslands.
→ They made up of many trees and grasses,
→ It is found in western Africa, northern Congo, Southern Sudan and central Malawi.

ii) High (True) savanna

→ It is developed between the wetter and drier savannas
→ It is made up of more grasses than park – savanna areas, and consist scatered trees only.
→ It is found in Zimbabwe, Malawi, Southern Kenya, eastern Tanzania, west Africa etc.

iii) Thorn scrub (Drier) Savanna

→ It is the transitional zone between the true, savanna land and the hot deserts.

→ It is developed along the desert margins

→ It consists of very short grasses with widely scattered trees.

→ It is common in the semi – arid areas of the Sahel region that extends from Senegal to Ethiopia, Northern Kenya, Angola and Botswana.

Main features of Savanna Vegetation

→ They have tall grasses that are often as tall as 2m

→ These are common in areas bordering the forest, and grasses are more common in areas bordering the desert.

→ Most of the grasses wither and turn brown in the dry season and regain in the wet season.

→ The trees survive the dry season by shading their leaves, storing water, having long roots, thorny leaves, and only a small number of leaves.

Desert and Semi Desert Vegetation

- It developed in areas where rainfall is scant
- It is found in the driest areas of the continent.
- This vegetation belt coincides approximately with the Sahara, Sahel, Karroo – Namib and Kalhari – High Veld regions
- The two major arid regions are the Sahara and Namib deserts.
- They have high species diversity, more than 3,000 species of plants (about 20% endemic) are found in the desert and semi – desert zones of Northern Africa)
- The Most prominent vegetation type is called xerophytes. Cactus is a good example of xerophytes.

Main features of desert and semi – desert vegetation

→ In order to adapt the harsh climatic condition (Low rainfall, extremely high evaporation and low humidity) such plants

develop; long root, store water in their spongy leaves, stems, roots, fruits, waxy or needle – shaped leave to reduce water loss through transpiration, produce seeds that lie dormant for several years during extreme dry seasons until rainfalls, small in size and few in number reducing water loss through transpiration; and thorny leaves to protect them from being eaten by herbivores.

Afro – Montana (Afro – Alpine Vegetation)

- It develops over the tropical highlands of Africa, mainly over the Ethiopian and Eastern African highland.
- The vegetation consists of high land (temperate) forests and temperature grasslands.
- **Examples**:
  - → Afro mountain forests (up to 300m in the equatorial zone);
  - → Alpine plants such as asta and gibera (over 300m);
  - → Bambao forests (2000 -2500m);
  - → Temperate evergreen (coniferous) forests at more moderate altitudes;
  - → Mountain grasslands and heath land;

Mediterranean Vegetation

- It develops in the north western and southwest extremes of the continent;
- It grows in areas with a warm, dry summer alternating with a cool, rainy winter.
- The most common plant types in the region are corkoak, maquis and wild olive.

Mangrove vegetation

- It grows in the swampy areas of Africa, especially along lake shores, deltaic mouths and flood plains of the Congo and Niger rivers, tropical coasts and the Okavango swamps.
- They includes both trees and grasses.

Factors Affecting the Natural Vegetation of Africa

- The major problems affecting natural vegetation in the continent are deforestation, overgroting, burning (wildfire), and the expansion of settlements and farm lands. But, all the challenges deforestation is the most serious one.

Deforestation

- It is in discriminate cutting or over – harvesting of tees.
- Africa's present forest cover differs greatly from its original distribution and is consistently changing even today.
- Africa's forest area has declined due to three extensive impacts or natural forests – deforestation, impeded forest regeneration and forest degradation.
- Clearance of tropical forests for various reasons is a common practice in many African countries. The major reasons are.
  - → For shifting cultivation
  - → The need for land for permanent agriculture
  - → The increased need for fuel wood
  - → Extractive forest uses, such as selective forestry, to get logs for industries.
- Deforestation has multifarious impacts such as climatic change, resulting in problems like desertification and soil loss through erosion and extension of some of the wild animals and plants of the continent.

Possible conservation Measures

Human interventions against deforestation risks (hazards) aim at replacing or land restoring forests by.

Reforestation: trees must be replaced where

Afforestation: new forests must be planted where none existed before

Agro forestry (Agro ecosystem): is forestry, combined with farming. It is a practice of integrating the planting of trees in to farming to provide fuel, fruit, forage, shelter

for animals or crops. and other benefits. It is also associating crop production with forest development.

Social Forestry: refers to planting trees in urban areas in association with human settlements.

Awareness: raising the people's awareness of the importance of forests in crucial.

Illustrative Question

57. Which of the following vegetation types is characterized by low grassland with occasional patches of individual trees?
    A. Mediterranean
    B. Coniferous forest
    C. steppe
    D. Lithosphere

Explanation: Steppe vegetation types in characterized by low grassland with occasional patches of individual trees. It may be semi – desert covered with grass or shrubs or both depending on the season and altitude

Answer: C

58. Which one of the following types of natural vegetation covers the largest land area in Africa?
    A. Tropical rain forest
    B. Semi desert vegetation
    C. shrubs
    D. savannah

Explanation: Savannah natural vegetation covers the largest land area in central west and South Africa.

Answer: D

59. Which of the following is NOT a major objective of conserving forest resources?
    A. Protection of wild life resources
    B. Conservation of medicinal plants
    C. The development of ecotourism
    D. Provision of charcoal of ecotourism

Explanation: The major objective of conserving forest resources included protection of wild life resource, conservation of medical plant and the development of ecotourism

Answer: D

Explanation: The temporal or permanent clearance of forests for agriculture some other land uses called deforestation.

Answer: A

3.5.2. Wild Animals of Africa

- The different vegetation zones of Africa, together with the varied climate and topography of the continent, create an ideal situation for world – animal diversity.
- Africa is the refuge (home land) of a large number and many different species of wild animals.
- Africa is rich in wild animals because of the following reasons:
  - → The equatorial rainforest contains a variety of dense trees and under growth. This forest region hosts the largest number of wild animals. These animals include tree climbing (arboreal) animals like monkeys, apes, baboons, gorillas, as well as birds. And also aquatic environment such as hippopotamus and crocodiles.
  - → The savanna grasslands of Africa are also the natural habitat of a large variety of wild animals compose with herbivores and carnivores. Most of them are herbivores including antelopes, giraffes, buffaloes, Zebras, elephants. The common carnivore are lion, leopard and hyena.
- African desert and semi – desert areas sustain burrowing animals. Some of the desert animal include the desert fox, hares, gazelles, jerboa, the wild ass and different reptiles like snakes, lizards and tortoises.
- The major rivers, lakes and swamplands of Africa are the habitat of diverse species of aquatic world life, such as the Nile crocodiles, hippopotamuses, fish (about 2,000 different species) and different species of birds like the guinea fowl (the leading game bird in Africa), pelicans, goliath, herous, flamingos,

storks, egrets, and the ostrich, mainly in Eastern and southern Africa.

Importance of wild – animals

- Source of animal protein
- Help to maintain the balance of Nature by feeding on each other and plants
- Source of income
- Provide inputs (industrial raw materials such as skins and excreta) for varies industries;
- Add aesthetic value to the environment

Problems of wild Animals

Wild animals in Africa are falling different challenges. The following are the most serious ones.

- **Illegal Hunting (poaching)**: people hunt wild animals for economic and other socio – cultural reasons.
- **Human Encroachment**: is the result of the increased need of human populations for farm and grafing lands, settlement areas, fuel wood and the like. Such increased needs result in:
  - → Deforestation
  - → Burning of vegetation cover
  - → Overgrazing
  - → Desertification
  - → Drought

Conservation Measures

The following actions (measures) should be undertaken to protect and ------- the wild animals of Africa.

- **Protection and conservation of natural forests and grasslands;**
- **Establishing national parks, game reserves and sanctuaries**
- **Controlling illegal hunting**

- Public environmental awareness educating the people about environmental resource conservation and management.
- Changing the economic condition of the people through good and applicable policies and programs.

Important national parks

The wild life of Africa is a major forest attraction. The animals can easily be seen in the great parks of Africa such as.

- The kruger National park in R.S.A
- The Murchison falls and queen Elisabeth parks – in Uganda;
- The Serengeti – in Tanzania; and
- The omo, Nechsar, Bale, Semien Parks in Ethiopia

Illustrative Question

70. Where do you find the richest and most diverse wild life concentration in Africa?
    A. In the tropical rainforests
    B. In the savannah grasslands
    C. In desert and semi – desert areas
    D. In river valleys, lakes and swamplands.

Explanation: In Africa, Tropical rainforests in the richest and most diverse wild life concentration.

Answer: A

71. Which one of the following strategies will NOT help to conserve wild life resources?
    A. The protection of natural vegetation
    B. Establishment of national parks and game reserves
    C. Controlling illegal hunting
    D. Expansion of crop cultivation

Explanation: The strategies help to conserve wild life resources includes the protection of natural vegetation, establishment of natural parks and same reserves and controlling illegal hunting.

Answer: D

72. Which of the following is a wrong pair of combination

A. Arboreal – leopard C. Kruger national park – RSA

B. Carnivores – lion D. Serengeti – Tanzania

Explanation: The equatorial rainforests of Africa are hosts different kinds of tree climbing (arboreal) animals like monkeys, apes, baboons, and gorillas, as well as birds.

Answer: A

73. What are the major problems of wild animals in Africa?

Explanation: the major problems of wild animals in Africa are illegal hunting (poaching) and human Encroachment includes deforestation, burning of vegetation cover, over grafing, desertification and drought.

3.6. SOILS OF AFRICA

- It is a loose and un consolidated material that overlies the crust of the earth.
- It is Africa's most important resource.

3.6.1. Major soil types of Africa

- The different soil types of Africa as a result of diverse climatic conditions, natural vegetation and geology.
- According to UN (FAO) soils of Africa has classified in to several groups, of which the following are the most important
  - Pedalfers (the largest group in Africa)
  - Pedocals
  - Hydromorphic soils
  - A zonal soils

A. Pedalfers

- They are soils with aluminum deposits.
- They are soils without a layer of accumulated calcium carbonate.
- They have high content of iron and aluminum.
- It is the largest group of soils in Africa

- Central Africa is predominated by this type of soil.
- They are sub – divided in to the following types of soil.

1. Ferrasols

- They are found in the central parts of Africa around the equatorial forests and savanna lands.
- Red and yellow in color.
- Found in areas of heavy rainfall, they are affected by leaching,
- Characterized by high concentrations of iron, clay and aluminum.

2. Nitosols:

- Develop in humid climatic regions
- Deep profile and are rich in humus content
- The most productive soils in Africa. As a result, they are ideal for crop production.

3. Acrisols:

- Develop in hilly areas with wet tropical and monsoon climates.
- Weathered, acidic and shallow.
- They are unproductive
- They found in western Africa and the Lake Region of East Africa.

4. Lixisols:

- They are found in the savanna and semi – arid areas.
- They are reddish and sometimes yellowish in color.
- They are abundant in the plains of western Africa, Eastern Africa and east – central Africa.
- They are more fertile than ferrsols and acrisols.

5. Plinthosols:

- They exist on plains and gently – sloped areas.
- They are soft and laterife

- They also develop in rainforest areas and the savanna regions, where marked dry and wet seasons characterize the climate.

6. Luviosls:

- They are developed in the Mediterranean climatic regions of the continent.
- They have high mineral reserves and are fertile.

7. Planosols:

- It dominate the High Veld of south Africa, particularly the water logged plains of the country.
- They are used mostly for grafing.

8. Fluvisols:

- They develop in seasonally flooded plains, valleys and tidal marshes.
- They are found in the Nile and Zambezi River Deltas, and the coasts of western Africa and Lake Chad.
- They have a brown color
- They are young and fertile soil.
- They are suitable for large – scale irrigation

B. Pedocals

There are different types of pedocals soils. These are

1. Vertisols

- They are black basaltic soils with clay character.
- They become sticky during the rainy season and crack during the dry season.
- They are found in the Sahel region at the southern border of the Sahara.
- They are used for grafing.

2. Calcisols:

- They are found in the Sahara and Namib deserts of Africa.
- They are potentially fertile in terms of mineral content

- They are poor in humus
- They are used mostly for grafing.

3. Solonchaks:

- They are found in inland river basins, bottoms of ancient lakes, depressions and coastal areas.
- They are saline and not very productive.

C. Hydromorphic Soil:

- They are found in depressions and low – lying areas of shallow ground water.
- They are extensively found in the Niger Delta, the Congo Basin and interior parts of Angola.
- They are used for the production of rice, sugarecane, yam and vegetables.

D. A zonal Soil:

- They are weak in nature. They are shallow – because of recent development. They are not matured A zonal soils are sub divided in to

1. Arenosols:

- They are found in the humid tropical parts of Africa, the semi – arid zones of the southern Sahara, South West Africa and Africa's coastal plains.
- They are used mainly for grafing and dry farming.

2. Regosols:

- They are found in arid areas extending from west Africa of Ethiopia and Somalia
- They are used for pastoralist grafing

3. Leptosols:

- They are young, shallow and stony soils that are highly susceptible to erosion and drought.

- They are found in the strongly dissected uplands of Northern Africa, the Sahara, and in southern, central and Eastern Africa.

3.6.2. Problems and conservation Measures of soils in Africa

Problems of soils in Africa

- Soil erosion and environmental degradation are among the major problems concerning soils in Africa

Soil Erosion

- **Erosion – Prove areas** of Africa include.
  - → Large tracts of the Sahel region of western Africa covered with sand dunes and affected by wind erosion
  - → The Sahara and Namib deserts;
  - → Sub humid or Savanna region; where water is the principal agent of erosion;
  - → Tropical rainforest where severe erosion occurs when the forest is removed for intensive crop cultivation;
  - → Tropical highlands and mountains of Africa, like Ethiopia and other East African countries

Causes of soils erosion

- Traditional farming practices
- Over grafing
- Deforestation and over – exploitation of vegetation for domestic uses.

Impacts of soil erosion

- Deterioration and depletion of agricultural land (soil) and range land (pasture land);
- Decline of productivity of the major cereal crops;
- The collapse of agriculture and there by the migration of people;
- Downstream pollution, sedimentation, floods and damage to settlements, irrigation and farmlands;

- Consumption of national economic resources to control erosion.

Conservation measures

Major soil conservation measures that could be taken to increase soil fertility in Africa include the following

- Terracing
- Agro forestry
- A forestation
- Reforestation
- Wind breaks and shelter – belt plantations
- Check dams
- Strip cultivation
- Contour plowing
- Crop rotation
- Green manure
- Mulching
- Fallowing
- Rising the awareness of people

Illustrative Question

74. Soils of Africa, which potentially fertile but currently less utilized because of their location in desert areas are

A. Fluvisosls C. planosols

B. Calcisols D. solonchaks

Explanation: A type of soil that are potentially fertile in terms of mineral content, they are poor in humus refers to calcisols.

Answer: B

75. Which one of the following soils are salty, acidic desert semi-desert in character and are unsuitable for cultivation even if they are irrigated?

A. Vertisols C. Xerosols

UNIT FOUR

Population, Economy and Natural Resources of Africa

4.1. ASPECTS OF POPULATION, ECONOMY AND NATURAL RESOURCES OF AFRICA

4.1.1. Population size, Growth and Distribution

A. Size

- According to the mid of 2009, the continent had a total population of 999 million (nearly I billion).
- The continent (Africa) is the world's second most populous next to Asia.
- Nearly 14.7% of the world's population

Table 4.1. World population distribution

No	Region	Population (in million)	Percentage of world total
1	Asia	4117	60.4
2	Africa	999	14.7
3	North America	341	5.6
4	Latin America/ Caribbean	580	8.5
5	Europe	738	10.8
6	Oceania	36	0.5
7	World Total	6811	99.9

Source: Un world Population Data sheet, 2009

B. Growth

- Africa has one of the world's fastest growing populations.

- The continent has been experiencing rapid changes in its population size as a result of many factors including the interactions between fertility and mortality.
- The continent continues to experience high rate of population growth.
- The continent's population had almost been quadrupled between 1950 and 2000.
- The population growth rate of Africa is the fastest in the world.
- According to the 2009 world population date sheet, the continent had a rate of natural increase of 2.4%.
- The general growth rate, was 2.3%
- The continent has the world's shortest doubling time of about 29 years
- Rate of natural increase (RNI) – is the difference between Birth rate and Death Rate expressed in percentage.
- General Growth Rate – is the difference between RNI and Net – migration rate expressed in percentage.
- The doubling time of a population is calculating by dividing 70 by the growth rate of the population.
- Between 1650 and 1880 Africa's population remained constant. Such a situation is demographically, called population stagnation.
- Stagnant population = occur when a population zeros its number. This happens when birth and death rates become equal. In other words, when the quantity of a population remains unchanged over time, then it is known as stagnant.
- The major factors responsible for the stagnation of the Africa population between 1650 and 1850 include slave trade, intertribal wars, widespread of epidemics, poor hygiene, in adequate food intake and colonization

C. Distribution

- It refers to the way people inhabit and occupy the earth's surface
- Africa's population distribution is un even.
- There are areas of high and low population density. For instance, the vast Sahara, have few permanent residents on the other hand, the Nile valley of Egypt, the Atlantic coastal area that stretches from cote d'Ivoire to Cameroon, Rwanda, Burundi and south Africa's province of Kwazulu, Natal are among the most densely populated areas in the continent.
- The continent's average crude population density during the mid of 2009 was about 33 people 1 km^2.
- In Africa, also a significant regional variation in population density. Eastern Africa has the continent's highest crud density of 49 P/km^2followed by Western Africa with 48 p/km2. Contrary to this, central Africa has the continent's lowest crude density of 19 P/km^2 followed by southern Africa (22 p/km^2) and Northern Africa (24 P/km^2).

Table 4.2. Population density by Major regions of Africa

No	Region	Crude population Density/km^2
1	Sub- Saharan Africa	34
2.	Northern Africa	24
3	Western Africa	48
4	Eastern Africa	49
5	Central Africa	19
6	Southern Africa	22
7	Africa	33

Source – Un world population Date sheet, 2009

- On country level, the most populous countries are Nigeria, Egypt, Ethiopia, the Democratic Republic of the Congo (DRC) and the Republic of South Africa (RSA)

- The above countries all together account for about 43% of the continent's total population.

Table 4.3. The ten – top densely and sparsely populated countries of Africa.

Ten Top Densely Populated countries		Ten Top Sparsely Populated countries	
Country	Density/km^2	Country	Density/km^2
Mauritius	625	Western Sahara	2
Mayotte	503	Mauritania	3
Seychelles	375	Botswana	3
Reunion	324	Namibia	3
Comoros	302	Libya	4
Burundi	298	Gabon	6
Rwanda	191	Central Africa Republic	7
Saotome and Principle	169	Chad	8
Gambia	165	Mali	10
Nigeria	142	Congo	11

Source = UN World population Data Sheet, 2009

Factor Affecting population Distribution

The unevenness population distribution of Africa is caused by the combined effects of the following two independent but interrelated physical and human factors.

Physical Factors

Among the physical elements whose role is most clearly marked are relief, climate, soils, vegetation, availability of water, fertility of soil and distribution of minerals.

Human Factors

Human factors that determine the extent to which humans inhabit a certain place include economic conditions, political situations and other social factors.

Illustrative Questions

1. The doubling of a given population is directly a function of its ___
   A. Size
   B. Rate of in – migration
   C. Population policy
   D. Average annual rate of growth.

Explanation: The doubling time of a given population is directly a function of its average annual rate of growth.

Answer: D

2. What is the effect of a high rate of natural increase on the length of the doubling time of population?
   A. It will reduce the doubling time of the population
   B. It will increase the doubling time of the population
   C. It will have no impact on the doubling time of the population
   D. It will freeze the doubling time of the population at a fixed rate.

Explanation: Africa had a rate of natural increase of 2.4%. It will reduced the doubling time of the population.

Answer: A

3. Which of the following statements about the growth rate of the population of Africa is correct?
   A. Its rate of natural increase is the highest in the world
   B. Its population has the longest doubling time in the world
   C. Its population growth rate is presently above 3.5% per annum.
   D. Its population growth rate has shown no sign of moderation in the recent past.

Explanation: The general growth rate of Africa was 2.3%. This revealed that the highest rate in the world and twice as fast as the world's average growth rate.

Answer: A

4. Which of the following statements is correct about population in Africa?
   A. The continent has about one billion people.
   B. The rate of population growth is decreasing radically science the past decade
   C. Africa ranks fourth among the continent in terms of population size
   D. Two – thirds of the population lives in urban areas

Explanation: According to the world population Data sheet, 2009, the continent had a total population of 999 million (nearly I billion)

Answer: A

5. What are the factors that affect the distribution of population?

Explanation: Human and physical factors are responsible for such spatial variation in the distribution of population. Among the physical factors such as climate, relief, availability of water etc, on the other hand human factors such as economic condition etc.

4.1.2. Determinants of Population change in Africa

- The major determinants of the size and composition of Africa population are birth, deaths and migration.
- Population change in a given country is affected by:
  - → The difference between deaths and births (natural change)
  - → The balance between in migration or coming in and emigration or going out also known as migration.

- Africa's migration pattern is highly related to political instabilities and natural catastrophes.

Fertility patterns in Africa

- Africa has the highest fertility rate in the world.
- It refers to the occurrence of birth in the human population
- It is a natural positive factor that tends to increase the human population size.
- The average birth rate for Africa is estimated at 36/1000. This is the highest even for the standard of developing countries, which is (22/1000)
- Fertility levels and stage of economic development are negatively related. In Africa, regions of better socio-economic changes are areas of lower fertility index, while those with poorer situation are centers of fertility level.

Causes of High Fertility Index

The following major factors could be taken as the underlying causes for the prevailing high birth rates in Africa today.

- Low (early) age at marriage
- High percentage of married women.
- People have less access to contraceptive
- Religion Beliefs
- People are backward and poverty stricken
- Desire for son or daughter (sex) preference
- Women are of low status
- Low educational back ground
- Many children are needed to work on the land
- Low level of urbanization
- Children are considered as symbol of virility
- Attitude of people towards large number of children

Therefore, any measure towards making a meaningful reduction of fertility in Africa should consider the above mentioned problems.

Mortality patterns in Africa

- It refers to the occurrence of death in the human population
- Africa's mortality rate is the highest in the world.

Table 4.4. Patterns of rates and life expectancy by major regions in Africa (2009)

Region	Crude Birth Rate per 1000 population	Crude Death rate per 1000 population	Rate of Natural increase (%)	Infant mortality rate per, 1000 live birth	Life expectanc of birth (years)
World	20	8	1.2	46	67
Developed	12	10	0.2	6	74
Developing	22	8	1.4	50	65
Africa	36	12	2.4	74	53
Northern Africa	25	7	1.8	38	67
Western Africa	40	14	2.6	80	50
Eastern Africa	40	13	2.7	76	50
Central Africa	42	14	2.8	95	49
Southern Africa	24	15	0.9	48	50

Source = Population reference Bureau, UNO (2009)

- In Africa, fertility varies from country to country or region to region.
- African countries having birth rates below 30/1000 include
  - Mauritius 14/1000
  - Tunisia 17/1000
  - Morocco 21/1000
  - South Africa 23/1000
  - Seychelles 18/1000
  - Reunion 18/1000
  - Libya, 24/1000
  - Namibia 25/1000

- Botswana 24/1000
- Egypt 25/1000
- Algeria 23/1000
- Lesotho 27/1000
- Other Africa countries comprise rates ranging from 31/1000 in Swaziland to 50/1000 in Guinea Bissau and Nigeria.
- The natural change for Africa is 2.4%.

Mortality Patterns in Africa

- It refers to the occurrence of death in the human population.
- It is the highest in the world.
- The continent had a crud death rate of 12 death per 1000 population.
- The continent had acrude death rate of 12 deaths per 1000 population
- Africa's average death rate used to be 14/1000 while those of Northern and southern Africa ranged from 7/1000, respectively.
- Infant mortality rate, which is the death of infants under one year per 1000 live births, the continent still has the world's largest rate of 74 deaths per 1000 live births.
- The lowest infant Mortality rate is in Northern Africa which only 38/1000.
- Africa's high death rate is attributed to the following major factors including.
  - → Low standard of living
  - → Low access to health facilities
  - → Poor sanitary practices
  - → Civil war and political instability
  - → In adequate clothing and housing
  - → Wide spread of famine caused by recurrent drought
  - → Poor nutrition
  - → High incidence of disease and infectious, etc
- Africa's death rate is declining world war II due to;
  - → Development in medical technology

→ Sanitary practices and

→ The discovery of medicines and vaccines for tropical diseases

Life expectancy

- It is the average number of years a newborn infant can expect to live under current mortality levels.
- There is disparity in life expectancy between rich and poor counties.
- Africa's life expectancy is the lowest in the world;
- The average life expectancy for the whole continent is 54 years.
- In regional level, ranging from 69 years for northern Africa to 49 years for Eastern and Western Africa.

Migration

- It is a socio components of population change.
- It is both negative (reduce the population of region) and positive (increase population size) impacts based on its net effect.
- It is the movement of people from their home place to another one.
- The point action of the following conditions has made migration a common aspect of life in Africa

→ The large size of the continent

→ Diverse climatic zones

→ Different natural resources

→ Varying economic activities and divergent levels of economic and social developments.

4.1.3. Characteristics of African Population

- The characteristics of the population of a given area can be broadly divided in to two categories: biological and cultural characteristics.

- Biological characteristics include race, ethnicity, sex and age.
- The cultural characteristic comprise education, health, nutrition, religion, occupation, and the like.

Biological Characteristics

- Africa is characterized by a predominantly young population. This can be indicated by the median age.
- If the median age is low, it implies that the population is predominantly young, eg. the median age for Africa is 18 years. Contrary to this, if the median age is high, the population is largely made up of adult and old age groups
- Median age = is the age diving the population of a country or continent in to two equal parts with one half of the people above that age and the other half below it.
- The adverse consequence of high fertility rate results high dependency ratio and low economic development.

Table 4.5 Africa's population by age and Major regions

No	Region	0-14	15-64	65^{+}	ADR
1	Sub-Sahara Africa	43	54	3	85.19
2	Northern Africa	33	62	5	61.29
3	Western Africa	44	53	3	88.68
4	Eastern Africa	44	53	3	88.68
5	Central Africa	45	52	3	92.31
6	Southern Africa	33	62	5	61.29
7	Africa	41	56	3	78.57

- Africa is the only continent which compress high young population, but very low old age population.
- High rate of population growth constantly dwarfs whatever is achieved in the economics sector.
- High fertility persists, the pressure on scarce resources for development increases. The demand for food, education, health facilities, employment opportunities, housing and other services also increases.

- For any country (region), demographic structure is best represented by a population pyramid.
- A population pyramid shows the proportions of male and female abroad base with a large proportion of male and female population in different age groups.
- In many African counties, the population pyramid has a broad base with a large population of the total population in the lower age groups. The pyramid tapers, with relatively few people, in the upper age groups.

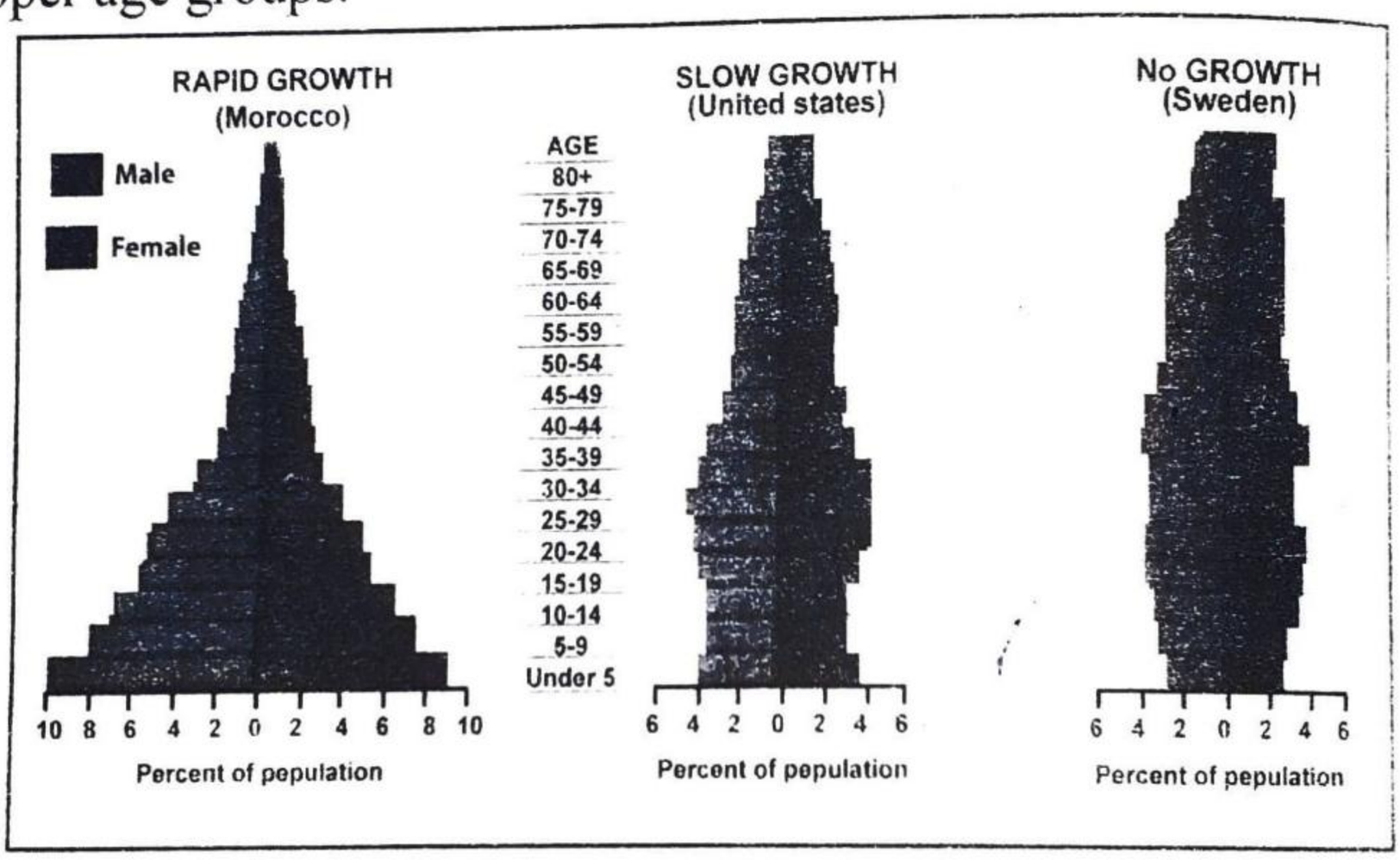


Figure 4.1. Population pyramid

- Morocco represents the typical age pyramid of African counties. Its broad base, reflects obviously a young population resulting from high fertility index.
- The latter two have a relatively old population characterized by a narrow base pyramid, whose shape approaches that of a rectangle.
- The predominance nature of young age population group in Africa adversely affects the laboor productivity of the people. In other words, as a developing region, Africa's dependency ratio is very high.

$$\text{Age Dependency Ratio} = \frac{\text{No. of dependents (under 15 and over 65}}{\text{No. of independen s (15 to 64 yeras)}} \times 100$$

- Example = Calculate the age dependency ratio using the following data.

  Dependents under 15 years = 344,000,000 youths
  Dependents over 65 yrs = 24,000,000 old persons
  Independents 15 to 64 yrs = 432,000 adults

$$\therefore \text{Age Dependency Ratio} = \frac{344,000,000 + 24,000,000}{432,000,000} \times 100 = 85.5$$

- This means that for every 100 active (productive) people in the population there are nearly 85 persons who have to be supported. This dependency ratio is the highest in the world.
- In regional level age dependency ratio of Africa highest in central Africa 92.31% followed by western and eastern Africa each of which having (88.68%) and northern and southern Africa having 61.29% each.
- The overall ADR of Africa was 78.57% and that of sub Saharan Africa was 85.19% in 2009.

Major characteristics of the African Population

- High fertility and mortality rates;
- Generally young population;
- Triangular population pyramid indicating the prevalence of high fertility and mortality rates;
- High age dependency ratio, and youth dependency ratio and low old dependency ratio;
- Low life expectancy; and
- High population growth ratio.

Sex structure

- It refers to the proportion of males to females in the overall population of a given area.
- It is expressed in terms of the number of males for every 100 females

$$\textbf{Sex Ratio} = \frac{\text{Male population}}{\text{Female population}} \times 100$$

- The proportion of the two sexes in the population of a region has impact on other demographic elements such as marriage rate, occupational structure,
- Sub – Sahara Africa sex ratio is below the world's average which is less than 100.
- A few countries such as Uganda, Equatorial Guinea, Gambia and Kenya have sex ratios of over 100 for all ages combined, because of the prevalence of a large number of in migrants.
- The Biological attributes of the African population, i.e. age – sex compositions strongly affect not only its demographic but also its social, economic and political structures, i.e. they influence birth and death rates, migratory movements of all types, human power, social services, such as education, health and entertainment, housing and employment

Illustrative Question

6. Which of the following factors, contributed Less to the rapid spread of HIV/AIDS in the African continent than, for instance, in Europe (EHEEC 2002/2010)
   A. Public recognition of same – sex marriage
   B. Violent practices like abduction and rape
   C. Cultural practices like wife in heritance
   D. Poverty

Explanation: factors that contributed for the rapid spread of HIV/AIDS in Africa are violent practices like abduction and rape, cultural practices like wide inheritance and poverty

Answer: A

7. The fertility rate of the African population is
   A. Slightly higher than that of Europe

C. Return (urban to rural) migration
D. Intra continental migration

Explanation: All are belong to internal migration where as intra – continental migration related to international migration.

Answer: D

11. Africa's high death rate is not attributed by
    A. Poor nutrition
    B. Political instability
    C. High access to health facilities
    D. Poor sanitary practices

Explanation: Africas high death rate is not attributed by high access to health facilities.

Answer: C

12. Which one of the following has the most profound impact on the recent demographic characteristics of African population?
    A. Conflict
    B. HIV/AIDS
    C. poverty
    D. Drought

Explanation: In recent time HIV AIDS has its own impact on demographic characteristics of African population especially mortality.

Answer: B

4.1.4. Migration and urbanization in Africa

Migration

The two major types of migration which bring about population change and effect its distribution are:

1. Internal migration
2. International migration

1. Internal migration

- They are a response mainly to economic necessities.
- In many parts of Africa, people, move from relatively poor to relatively rich areas so as to improve their incomes and living conditions.

- They are of two types, namely,
  - → Permanent and
  - → Temporary

Permanent migration:

- It refers to peoples movement from their original place of residence to another where they establish a new residence on a permanent basis
- It include urban to rural migration (return migration). Much of this migration is the return migration of people unable to find jobs in the city and people who have retired from civil service or have worked for a long time in the urban centers.

Temporary migration

- It involves the movement of people whereby they leave their original residence for another for a short period of time, and then come back to their original place.
- It is often practiced only periodically.
- People move from one area to another to find seasonal job.
- It can also take place an annual or diurnal basis.

- Internal migration is related to rural – rural one. This type of migration is attributed to pushing factors.
  - Examples of pushing factors includes:
    - → Social upheaval
    - → Natural climatic condition
    - → Adverse climatic condition
    - → Intolerance
    - → Low employment opportunities
    - → Low income
    - → House shortage
- Examples of pulling factors;
  - → Attractive environment
  - → High standard of living

→ Amenities

→ Job prospects

→ High wages

→ Improved housing

→ Tolerance

- In general, internal migration takes into four forms such as

→ Rural – urban

→ Rural – rural

→ Urban – rural

→ Urban – urban

2. International Migration

- It is the movement of people move from one, country to another
- The most important movements were accompanied by slave trade where by Africans were enslaved and taken to the America's and Middle East.
- Brain – drain is the movement of highly educated people such as engineers, researchers, lawyers, university instructors, medical doctors, etc from their country to countries abroad (overseas) where working conditions and payments are thought to be better.
- International migration in Africa has two forms. One is intercontinental migration and the other is intra – continental migration.

Intercontinental migration

- It is the type of external migration which takes place between Africa and other continents of between Africa and Europe
- In this regard the most important movements are associated with the slave trade and colonial period.

- They have been politically significant, movements of people in to and out of Africa have not been substantial until the end of the 1950's.
- The first major type, in this regard, has been the emigration of white people out of the continent.
- A second type has been the emigration of Africans from Africa to other continents.
- A third type of intercontinental migration after independence in Africa has been the movement of technical experts and entrepreneurs in to the continent.

Intra – continental

- It is movement of people within the same continent in the present case, with in African countries.
- It is usually done by labourers and is known as labour migration
- The introduction of certain economic crops to different parts of the continent has influenced labour migration.
- The phenomena coupled with the need to exploit the mineral deposits in some locations has led to unbalanced economic growth in different countries of Africa,
- The most important plantations and food crops production areas which attract large numbers of people from different parts of Africa are located in the:
  - → Cocao belt of Ghana and Western Nigeria.
  - → Citrus and vine plantation of Algeria, Tunisia and Morocco
  - → Tobacco plantation of Zimbabwe and Zambia
  - → Sisal, Coffee and tea regions of Kenya and Tanzania
  - → Copper belts of shaba (DRC) and Zambia.
  - → Gold and diamond mines of the Republic of south Africa.

→ Oil fields of Nigeria and North Africa.

→ Cotton region of the Gezira plain of the Sudan.

- Generally the various types of migration in Africa have important and diverse effects in population dynamics, civilization and economic growth.

Advantages and disadvantages of migration to the losing and receiving countries

Losing country

Advantages = • Reduces pressure on jobs and resources (example food).

• Loses people of child bearing age causing decline in birth rate.

Disadvantages = • Loses people in working age group

• Loses people most likely to have some education and skills

• Mainly males leave causing a division in families

• Left with an elderly population and so a high death rate.

Receiving country

Advantages = • Pressure as jobs but most likely to be the first un employed in a recession.

• Prepared to do dirty unskilled jobs

• Prepared to work long hours for low salaries

• Cultural advantages and links

• Some highly skilled migrants

• In a developing country these migrants could increase the number of skilled workers.

Disadvantages = • pressure on jobs but most likely to be the first un employed

• Low quality over crowded housing lacking in basic amenities

- Ethnic groups tend not to integrate
- Racial tension
- Limited skilled/educated group
- Lack of opportunities to practices their own religion, culture, etc.
- Language difficulties

Illustrative Question

13. Define the term Brain – drain?

Explanation: Brain – drain is the movement of highly educated people such as engineers, researchers, lawyers, university instructors medical doctors, etc. from their country to countries a broad (overseas) where working conditions and payments are thought to be better

14. What are the main influenced factor of labour migration?

Explanation: The introduction of certain economic crops to different parts of the continent has influenced labour migration.

15. Why do people migrate internally?

Explanation: people migrate internally; because of economic necessities, and political unrest

16. Write the disadvantages of migration in Losing country?

Explanation: Limitations like loses of people in working age group, loses educated sand skilled people etc.

17. Mention the advantages of migration in receiving country?

Explanation: Solve labour shortage, cheap labour force; cultural advantages and links are some of the advantages.

18. Compare and contrast permanent and temporary migration?

Explanation: From the name indicate permanent migration is the movement of people from one area to another on a permanent basis on the other way hand, temporary migration is practiced periodically or seasonally.

19. What does push and pull factors mean?

Explanation: Both are responsible factors in the movement of people push factor means a factor that un attractive conditions that stay people at a certain place where as pull factors are attractive condition in a given environment.

20. List the major forms of Internal (domestic) migration?

Explanation: Rural to rural, Urban to Urban, Urban to rural and rural to Urban are the major forms of internal migration.

21. Which of the following is the main reason behind large scale intra – continental migration in Africa? (EUEE, 2002/2009)
    A. Displacement caused by war or political instability
    B. Labor migration to economically better off areas
    C. Rapid development of intra – continental trade and tourism
    D. A and B are correct

Explanation: The main reason behind large scale intra – continental migration in Africa was displacement caused by war or political instability and labour migration to economically better off areas.

Answer: D

Urbanization

- Urban is relating to town or city
- Urban centers are settlements where the majority of the population is engaged in non – agricultural occupation.
- Urbanization refer to an increase in the proportion of people living in towns and cities.
- It is a major aspect of socio – economic change
- In Africa, urbanization out raced industrialization there by resulting in economic and social problems in the urban counters.
- Africa is the least urbanized of the worlds major regions. This is in terms of both the number of urban

centers and the total population living in towns and cities.

- On average, it is only 38% of the continent's population that lives in urban areas.
- High rate of rural – urban migration and high fertility in the urban areas, the continent has the world's highest rate of urbanization which is 5.4% per year.
- The low level of African urbanization could be attributed to the emergence of urbanization in its modern context has only a short history and back ward nature of the general socio – economic build up of the continent.
- In regional level, southern Africa is the most urbanized region with 56% of its population living in urban areas in 2009 followed by Northern Africa (50%).
- Eastern Africa is the least urbanized region having only 22% of its population residing in the urban areas,
- In terms of rate of urbanization, eastern Africa is the highest (6.8%) followed by western Africa (5.5%).

Table 4.6: Percentage of Urban Population in Africa by Major Regions (2009)

No	Region	Percentage Urban
1	Sub – Saharan Africa	35
2	Northern Africa	50
3	Western Africa	42
4	Eastern Africa	22
5	Central Africa	41
6	Southern Africa	56
7	Africa	38

Urban Growth and Major Urban Centers in Africa

- The movement of people to cities in Africa began in early 20th century. Since then, many cities have expanded at a rate of 25 percent every ten years (decade).
- The movement from rural areas to towns and cities is dubbed as rural – urban migration.
- Most African countries movement to the cities is partly due to rural push and partly due to urban pull.

Urban problem

Rapid urbanization is causing several challenges in Africa. It creates problems includes;

- Employment opportunities
- Housing conditions
- Provision of social services such as education and health services, and social security.
- Un planned development
- Poor road networks, sewerage channels and unplanned settlement which resulted in the development of slum or squatter settlement
- Expansion of social evils like crime, prostitution etc.
- Unreliable food security
- Shortage of water
- Scareity of shelter and in efficient waste disposal etc.

Illustrative Question

22. Which of the following had seriously depopulated Africa (EUEE – 2001/2009)
    A. Extended slave trade in the past
    B. Rural – Urban migration in each country
    C. Current out – migration in each country
    D. International migration with in African countries.

Explanation: Cairo became the first million city in Africa during the time of the 1927 census.

Answer: B

27. All are adverse effects of Urbanization in Africa except
    A. Scareity of shelter
    B. Unreliable food security
    C. Efficient wast disposal
    D. Absence of employment opportunity

Explanation: The adverse effects of urbanization in Africa includes absence of employment opportunity, unreliable food security shortage of water, scareity of shelter and in efficient waste disposal etc.

Answer: C

28. Which of the following regions in Africa is the least urbanized?
    A. Northern Africa
    B. Southern Africa
    C. Eastern
    D. Western Africa

Explanation: Eastern Africa is the least urbanized region having only 2% of its population residing in the urban areas.

Answer: C

4.2. CONCEPTS OF ECONOMIC GROWTH AND DEVELOPMENT

4.2.1. What is Economic Growth and Development?

- Economic growth may be one aspect of economic development but is not the same.
- Both are refer to the sate of economic conditions in a certain society.
- Economic growth – is a measure of the value of output of goods and services within a certain period of time.
    → It is used to describe the increase in the total amount of production and wealth of a given
    → It is related wealth of a country.
    → It is quantitative aspect.

- Economic Development – is a measure of the welfare of human beings in a certain state.
  - → It refers to growth in structural and technological change.
  - → It is both quantitative and qualitative aspect.

Characteristics of Economic development

- The increased utilization of the natural resources of a state.
- The production of more and more goods and services that enter in to markets for scale.
- The growth in GDP
- Division of Labor
- Significant changes in the technical and institutional arrangement by means of which output is produced and distributed.
- Based on the level of development the world is divided in to two major groups. These are:
  - → Developed counties, and
  - → Developing countries. Both have different socio – economic features

Developed Countries

Basic features

- They are highly industrialized
- The majority of the national labour force is engaged in industrials activities.
- They are scientifically and technology advanced.
- They are highly urbanized, as a result the larger percentage of the population lives in urban centers.
- They use, sophisticated modes of transport and communication.
- They achieve high per capita income and high standard of living.

- They consists of almost 20% of the world population.

Developing Counties

Basic features

- Industries are extensively light in nature.
- They are largely depend on agriculture/
- Low production due to scientific and technological backwardness.
- The majority of the society live in rural,.
- Lack of modern modes of transport and communication.
- Both per capita and living standard of the people are extremely low
- They consists of 80% of the world population.

4.2.2. Economic Growth and Development Trend in Africa

- Africa is generally regarded as a developing continent.
- The quality of both the physical and human environments of the continent is degraded due to rapid population growth.
- Many countries in it have very low GDP and per capita income.
- Africa economy which is under developed and is largely traditional.
- The continent's economy highly depends on traditional (subsistence) agriculture. Industrialization is not only recent but also highly backward.
- Long – distance trade networks that promoted the exchange of raw materials and some specialized local goods between a few African states were developed in pre – colonial times.
- As overseas demand for certain African agricultural and mineral products increased during European colonization.
- One – way trade systems in which Africa's wealth of raw materials were exported to enrich foreign assets
- After independence, African governments began to take development initiative to improve the standard of living of their population.
- The continent's raw materials continue to be produced primarily for export.

Utilization of Natural Resources in Africa

- The level of the environmental and human resources base is always the most decisive factor of development. Abundant and diverse resource base is an important factor for sustainable socio– economic development.
- The presence of abundant resources alone cannot bring inspired development achievements. More importantly, resource types their location, reserves and proper utilization must be given due attention.
- The continent is rich in terms of all sorts of resources ranging from varied soil types to diverse climate, enormous mineral wealth, energy, source, wild life and huge human power.
- The continent's richness in resource potential, Africa falls far behind from fully exploiting its resources.
- The wealth is rather more of a cause for conflict and civil war than for development.

Indicators of Development

The level at which a certain economy is said to be developed is directly linked with three most important conditions that are considered as major indicators of development these are:

1. Gross domestic product (GDP)

- It refers to the total value of goods and services produced in a country over a period of time.
- It can be calculated by either adding up the value of all goods and services produced, or the expenditure on goods and service s at the time of scale, or producers' incomes from the sale of good or services.
- It measures a country's economic activity regardless of who owns the productive assets in that country.
- GNP refers to the total annual flow of goods and services in the economy of a nation in monetary value. It includes from within and outside of the state.

2. Per capita income

- It refers to the average amount of money that an individual is expected to have as a result of the state's GNP.

- It is computed by dividing the GNP of a country by the total number of its people.
- It indicated how much each individual in a state can potentiality get if the total GNP of the state is evenly distributed among all people.

3. Standard of living:

- It is the best measurement of the quality of life of people in a given society.
- It is directly related to both GDP and per capita income.
- Higher GDP means higher per capita income a higher per capita income means better living condition.

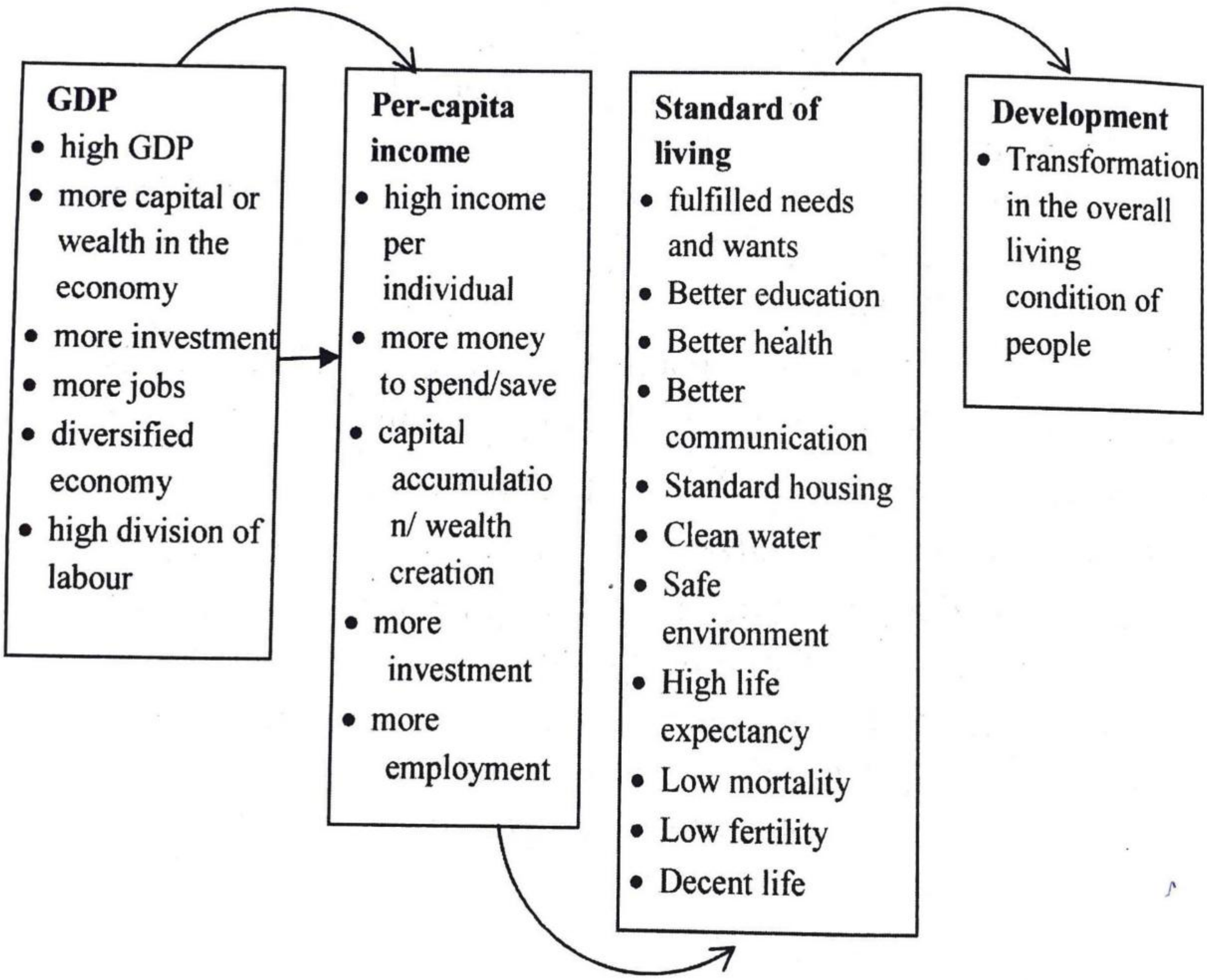


Figure 4.2. The major indicators of Development.

Table 4.7. Characteristics of Developing and Developed countries

Developing	Developed
Per capita incomes are low, and capital is scarce	Per capita incomes are high and capital is readily available.
Wealth is un evenly distributed within individual countries, Example, Colombia, 2.6% of population owns 40% of the national wealth	Wealth is comparatively evenly distributed, Example, Canada, 10% of population owns 24% of national wealth
Primary industries dominate national economics	Manufacturing and service industries dominate national economics.
High proportion of population engaged in subsistence sibilance agriculture	Farming is commercial, efficient, and mechanized
Populations are rural; but cities are growing rapidly	Populations are urban, cities growing slowly
Birth and death rates are high and life expectancy is low. There tendes to be a high proportion of children.	Birth and death rates are low and life expectancy is high. High proportion of people over 60 years old.
In adequate or unbalanced diets resulting from a low consumption of protein; hunger and mal nutrition is common	Adequate supplies of food and balanced diets; overeating some times a problem.
Diseases, especially infections and public services, bad, sanitation and poor social conditions	Social conditions generally good;
Poor educational facilities, high levels of illiteracy and low levels of scientific and technological development	Education opportunities excellent, high level of literacy, advanced science and technology
Women may be held in an interior position in society.	Women are increasingly treated on equal terms with men.

4.2.3. Characteristics of African Economy

- Africa is the least developed of all the continents in the world.
- Its economy is primarily dependent on the primary economic sector especially agriculture.
- The lion's share of the continent's population earns its livelihood from such activities as shifting cultivation, crop production and animal husbandry
- Agriculture is the most important economic activity in the continent employing the majority of the labour force and being the main source of food stuffs, industrial raw materials, and exportable items which provide the main source of foreign currency.
- The secondary and tertiary economic sectors are less developed in the continent, scince these are recent developments.
- The manufacturing industries are cottage types; the majority of the moderate manufacturing industries are light industries that focus on the production of consumer goods.
- Heavy industries are not well developed in the continent, except a few.
- Transport and communication networks are under developed

Major Characteristics of the economy of Africa

- It is largely dependent on the agricultural sector.
- Fishing, forestry, mining, bee keeping and poultry, are less developed.
- Industrialization is less level of development and confined to few urban centers.
- Intercontinental, intra – regional and intra – continental trade is at low level.
- Communication facilities are poor and causing low level of social economic and political interconnections among the countries and peoples of the continent.

- The various economic sectors of the continent run short of capital, skilled human power and efficient technology.
- Low GDP and meager per capita income, the majority of the people live in poverty.

4.2.4. Present Features of Africa's Socio–economic Development

- The overall socio-economic development conditions in Africa seem to be vague and unpredictable.
- The majority of the states are characterized by very low socio-economic conditions. While few countries of Northern and Southern Africa such as Egypt and the Republic of South Africa have better levels of socio-economic development.
- GDP is very low as the economy of the majority of the states in the continent is based mainly on the primary sector the outputs of which fail to be far from subsistence.
- Poor and substandard quality of life in general.
- Tropical location coupled with intermittent inter and intra-state conflicts, poor governance, corruption and poor infrastructure have made the region's backward socio – economic conditions.
- The continent is believed to have huge potential of natural resources but, little of these resources has actually been utilized to improve the existing socio – economic conditions.
- The dependency of the colonies on their ex-colonizers in terms of trade relations and other socio – economic and political issues is exerting a lot of impact on their development.
- In general, because of the above facts Africa stands at the fore front of low level of socio – economic development in the world.
- Fertility is high and population is growing rapidly despite the relative decline in mortality rates in many countries.

- Adult illiteracy rates are high and even most school age children fail to get access to primary education.
- Clean water, adequate power supply and safe and healthy environments are far placed from the people.
- Lack of capital, lack of skilled human power and lack of advanced technology together with conflicts and civil war. corruption bad governance and high foreign debt are the factors that negatively influence socio – economic developments in Africa.

4.2.5. Challenges and prospects of Economic Development in Africa.

Challenges of Economic Development in Africa

Africa has been suffering from serious challenges includes

- Lack of capital
- Lack of skilled human power and modern technology
- Political instability and civil war
- Lack of good governance
- Poor infrastructure
- Poor regional inter – connectedness, poor export performance, and declining industrial outputs.
- Environmental degradation
- Cultural factors – negatively affect the work habit of the population.
- Poor saving habit.
- High dependency on foreign aid and debt.
- Rapid population growth

Prospects of Economic Development in Africa

The future socio – economic development of Africa promising by:

- Establishments of regional and sub regional organizations for instance;

OAU (organization of African Unity) – is meant to promote peace, unity and cooperation in the continent. It is also to resolve conflicts between nations and to pacify hostilities.

IGAD, NEPAD, SADC, COMESA and ECOWAS are the prominent and striving hard to improve socio-economic conditions in Africa.

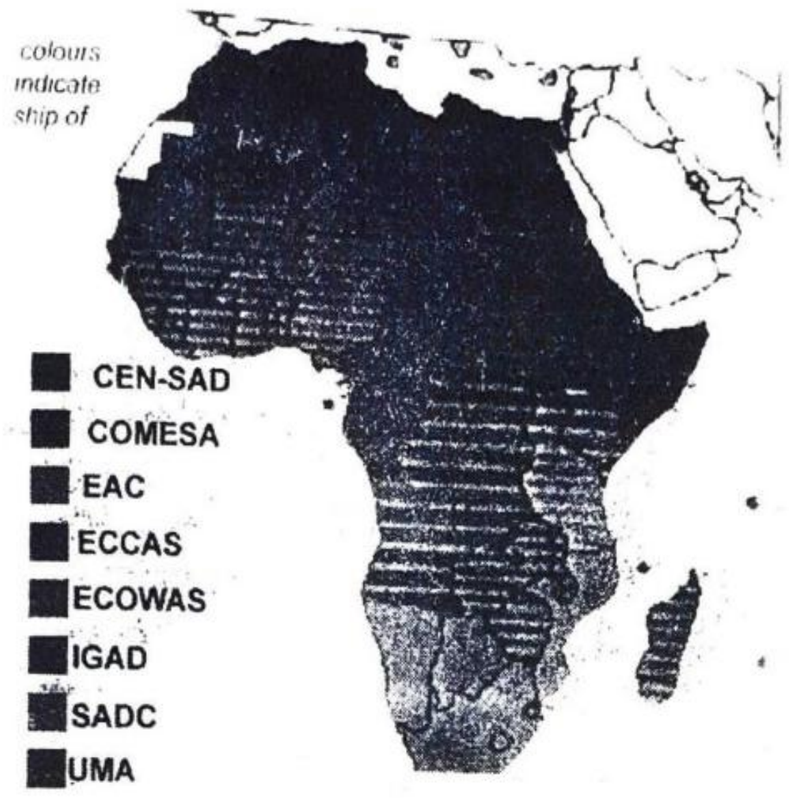


Figure 4.3. Member countries of the different regional organization in Africa.

- **CEN – SAD** = community of sahel – Saharan states
- **COMESA** = common Market for Eastern and southern Africa
- **EAC** = East African community
- **ECCAS** = Economic community of central African states
- **ECOWAS** = Economic community of western African states
- **IGAD** = Inter governmental authority on Development
- **SADC** = southern African Development community
- **UMA** = Arab Maghreb Union.

UN, ECA, UNESCO, UNICEF, WHO, ILO and FAO are international organizations working to improve over all development in areas including education, health, employment, agriculture, science and technology. Through financial and technological assistance, these organization are promoting the socio – economic development of the continent.

- Another prospects is minimizing population growth
- Increase resource exploitation and wise utilization to further economic growth and development.

Illustrative Question

29. What were the main concerns of the Inter – Governmental organization IGAD?
    A. Conflict resolution and peace keeping.
    B. Prevention of the effects of drought, and promoting development
    C. Democratization and defense
    D. Regional political and economic integration

Explanation: The main concerns of the Inter – Governmental organization IGAD is prevention of the effects of drought, and promoting development.

Answer: B

30. One of the following is not an regional organization?
    A. SADC C. COMESA
    B. ECOWAS D. WHO

Explanation: In addition to regional (continental) organization, international organization like world health organization (WHO) working to improve overall development in Africa

Answer: D

31. Africa is the least developed of all the other continents except Antarctica, which is not habitable. To change the economic status Africa what measures should be taken?
    A. States of Africa need to encouraged to produce more raw materials and agricultural products for export so that they fast accumulate capital which may be used for industrialization
    B. Agricultural products produced should be subsidized so that African producers may compute in international markets.

integration has been disappointing because the very low progress towards this aim.

Answer: A

4.3. NATURAL RESOURCES OF AFRICA AND ITS POLITICS

- Africa possesses huge reserve of different kinds of minerals.
- Its varied topography makes the continent rich in terms of climatic resources and biodiversity
- The geology of the continent is also a cause for the presence of various soil types with varying degree of fertility.
- Water resources are abundant in forms of rivers, lakes and swamps, though there are still many areas with serious shortage of water.
- The continent is also a source of huge human power and possess tremendous solar energy.

4.3.1. Major Resources of Africa

Africa major resources includes mineral, agricultural, water and human resources

Mineral Resources of Africa

- Africa rich in mineral resources.
- Geographically, Northern Africa, west and central Africa and southern Africa rich in petroleum reserves and metallic minerals and other gem stones respectively.
- Africa has 90% of the world's cobalt and platinum, 50% of the world's gold, 98% of the world's chromium, 70% of the world's tantalite, 64%of the world's manganese and one – third of the world's uranium.
- The DRC alone has 70% of the world's coltan (are of tantalum) and more than 30% of the world's diamond reserve.
- Guinea is the world's largest exporter of bauxite (ore of aluminum)

- North African countries constitute one of the world's major centers of oil production.
- Libya, Algeria and Nigeria are among Africa's leading producers of crude petroleum.
- Algeria has a huge reserve of natural gas, and also North Africa rich in phosphate deposits and production, Morocco being the world's leader in its output
- Oil reserve is also found in Western and central Africa.
- Nigeria being Africa's top petroleum producer.
- Southern Africa is one of the world's richest sources of gold, diamond and several other rare metals. It is a leading producer of gold and uncut (raw) diamonds.
- Zimbabwe is also an important producer of gold.
- Minerals account for about half of the export earnings of 12 African countries.
- Nearly 90 percent of the exports in Angola, Nigeria, Algeria, Libya, and Zambia come from minerals.
- Africa plays a significant role in the world's mineral economy. It produces about:
  - → Three – quarters of the world's cobalt.
  - → Half of the global supply of platinum, chromium, and diamonds;
  - → One – third of all gold, manganese, and uranium;
  - → One – fifth of all bauxite; and
  - → One – tenth of the world's petroleum

Mineral	Africa's Global Share	Leading Producers in Africa
Diamonds	77%	Zaire, Botswana, RSA
Gold	55%	RSA, Ghana, Zimbabwe
Copper	20%	Zambia, DRC, Zimbabwe, RSA
Bauxite	19%	Guinea, Ghana and Sierra Leone

Iron ore	4%	Liberia, Mauritania, Morocco, Tunisia, RSA, Zimbabwe and Swaziland
Chromites	41%	RSA and Zimbabwe
Manganese	27%	RSA, Gabon
Petroleum	10%	Nigeria, Libya, Algeria, Egypt and Angola
Tin	13%	DRC (Katanga area) and Algeria
Cobalt	26%	DRC and Zambia
Coal	6%	RSA, Zimbabwe, Nigeria, Zaire, Zambia, Mozambique, Malawi and Tanzania.

Table 4.8. Major Minerals produced in Africa and the leading producers of the continent.

Agricultural Resources

- Agriculture is the backbone of many African counties.
- It is a dominant source of agricultural outputs that enter in to world market.
- The continent is rich in terms of certain tropical crops such as coffee, cocoa, tea, sugarcane, rubber, palm, oil sisal, cotton and ground nuts.
- The economy of many African countries is primarily agriculture and dependent on the expectation of these tropical crops.

Table 4.9: Leading Producers of Tropical crops in Africa and Africa's share to the world's production

Crop	Leading producers in Africa	Africa's Global share
Cocoa	Ghana, Cote D'Ivoire, Nigeria, Liberia, Togo, Cameron	53%
Coffee	Cote D'Ivoire, Ethiopia, Uganda, Kenya, Cameroon, Tanzania, DRC, Angola	20%
Tea	Tanzania, Kenya, Ethiopia,	13%

	Mozambique, Zimbabwe, Congo, Mauritius	
Palm oil	Nigeria, Iroryceast, and Zaire	16%
Sugar cane	Sudan, Kenya, Uganda, Ethiopia	7%
Rubber	DRC, Ghana, Cote D'Ivoire, Cameroon Gabon, Sierra Leon. Kenya and Tanzania.	6%
Sisal	Tanzania, Kenya and Madagascar	29%
Cotton	Sudan, Nigeria, Ethiopia, Mali, Congo and Egypt	7%
Ground nuts	Nigeria, Senegal and Zaire	29%

Water and Associated Resources

- Africa, the continent is rich in terms of water resources.
- The rivers and lakes have tremendous potential in terms of fishing, hydroelectric power generation, irrigation and mineral extraction.
- The rivers and lakes of Africa, as well as the adjacent seas and oceans makes the continent rich in terms of resources.
- Major grounds for marine fish such as tuna, sardines, and hake are found some distance off from west African coasts stretching from Morocco to Senegal, and Angola to Namibia.
- Morocco is leading in fish processing industries, producing more canned fish, fish oil, and fish.
- Africa's many large rivers provide the continent with a vast hydroclectric power potential.
- Irrigation is another potential to be exploited from Africa's rivers and lakes. Eg the Awash River in Ethiopia makes such a benefit available to the people of this country.
- The shores and beds of lakes and banks of rivers are of substantial source of mineral. Eg. Sand, gravel etc.

Human Resources

- Africa is the world's second most populations continent and also it is a home for about 1 billion people.
- Africa figrative data revealed that 56% of the total population is currently actively productive and the future potential of labour is relatively high.
- The human resource potential for the continent has never been exploited to its full extent.

4.3.2. Natural Resources Exploitation and Mineral Extraction Methods in Africa

- Africa has tremendous potential of natural resources. However, the degree of exploitation of these resources of the continent appears being very low.
- Factors such as lack of good governance, corruption, lack of citizens' participation in resource development programs, lack of capital, skilled human power and technology have contributed for the limited development of the resource exploitation sector in the continent.
- Most resource extraction techniques are traditional in their nature this is turn affects the level of productivity

4.3.3. Resource utilization and Conflict Management

- The huge mineral potential of the continent is untouched.
- In Africa the resource is becoming more of a cause of conflict than of a socio-economic development.
- Africa is the only continent that is well characterized areas of Africa is related to in appropriate use and allocation of resources.
- The civil wars in southern Sudan, Liberia, Democratic republic of Congo, Angola, and Rwanda are fought because of in appropriate resource utilization and allocation, besides seeking political power.

Table 4.10 Conflicts associated with natural resources in Africa

Country	Duration of conflict	Resources
Angola	1975-2002	Gems, Opium
Angola, Cabinda	1975	Oil, Diamonds
Congo	1997	Oil
DRC	1996-97,1998-2002	Copper, cotton, Diamonds, Gold, Cobalt
Liberia	1996 – 1998	Timber, Diamonds, Iron, palm oil, cocoa, coffee, rijuana, Rubber, Gold
Morocco	1975	Phosphates, oil
Sierra Leone	1991 – 2000	Diamonds
Sudan	1983 – 2005	Oil

Illustrative Examples

36. Northern Africa is known to be richer in nonmetallic materials such as oil gas, potash and salt than southern Africa. This is due to _____

A. Its proximity to the middle east
B. Extensive marine deposits
C. Extensive coverage of Precambrian rocks
D. The desert climate of Northern Africa.

Explanation: Northern Africa is known to be richer in non-metallic minerals due to extensive marine deposits.

Answer: B

37. Throughout tropical Africa fresh water fishing is much more important than marine fishing both in terms of the size and value of each. The factors responsible for the large catch are ____.

A. The higher heat at sea and the salty waters of the oceans
B. Africa's lack fast for ocean fish.
C. Unfamiliarity of Africans with marine fishing
D. The availability of excellent breading grounds in the great lakes of Africa.