3. WEATHER AND CLIMATE

1. -population pressure leading to clearing of forest
   - climatic changes/global warming/destruction of ozone layer
   - accidental fires
   - poor methods of farming /overgrazing

2. a i) Aridity refers to a state of dryness or deficiency of rainfall in an area while desertification refers to the encroachment of desert like conditions into productive or arable land √√

   ii) Weather atmospheric condition of a place over a short period of time
   Climate- Average weather condition of a given place over a long period

   b)- Moist warm air meets dry cold air mass
   - Mountain slopes adjacent to a valley cause anabatic and katabatic winds

   c) - Sea heats faster than the land during the day
   - Air over the sea rises creating low pressure over the sea
   - Cooler air over the land blows towards the sea
   - Cool air from the land is called land breeze

3. a) - Zone of low pressure
   - High temperature
   - High convectional rainfall
   - Trade winds converge here
   - Moves with movement of the sun

   (b)i) -Variation of solar output
   - Volcanic eruption
   - Variations in the earth's orbital characteristics
   - Variation in atmospheric carbon dioxide

   iii) - Increase in temperature causing rise in sea level due to melting ice
   - Changes in wind speed causing erosion
   - Changes in seasons leading to severe drought
   - Increase in precipitation causing flooding of large areas

   c) - Relief features such as high mountains influence temperature and rainfall pattern
   - Presence of large water bodies that modify temperatures of the surrounding lands through breezes
   - Continentality- many regions are in the interior of the continents making them receive low amounts of rains
   - Winds- some areas are influenced by cold onshore winds that lower temperature of the surroundings

4. (a) - Temperature varies between 17C to 24C
   - Lower slopes have higher temperatures than upper slopes
   - Mean annual range of temperature is between 3C to 5C
   - Rainfall is received throughout the year
   - Rainfall is high 1000 -15000 mm
   - Rainfall is double maxima
   - Rainfall is relief- orographic
   - High rain on the wind ward slopes
   - Rainfall is caused by S.E trade
   - Coolest months are between June and August

   (b - Fold mountains receive heavy rainfall/ snow falls give rise to many rivers for HEP, irrigation, water for domestic and industrial use
   - Wind wards sides receive high rainfall which promote agriculture/ forest growth
   - Leeward side have violent wind which destroy crops
   - Folding leads to exposer of some minerals or bring minerals near surface for mining
   - Folding hinders construction of communication
   - Folding acts as barriers during wars

- Folding offer sceneries which attract tourists hence foreign exchange
- Folds mountains make visibility poor hence hindering air transport

5. a) Weather is the daily condition of atmosphere taken in short period usually 24hrs while climate is the average weather condition taken for a period of 30 – 35 yrs

b) - High rainfall/ no marked dry season/ (1500mm – 2000 mm)
- High temperatures throughout the year/ (24º– 27º)
- High humidity throughout the year with relative humidity about 80%
- Rainfall throughout the year
- Small temperature range/ 4ºC
- Double maxima (March – May and Oct – Nov)
- Major winds are South East and North East
- Low pressure all the year/ Doidrums/ Equatorial low
- Rainfall mainly convectional falling in the afternoon accompanied with lightening and thunderstorm
- Thick cloud cover all the year/ thick cumulonimbus clouds

6. (a) i) - Warm ocean currents raise temperature of the adjustment land/ warm current increase rainfall
- Cold ocean current lower temperature of the regions/ lower rainfall/ create dryness

ii) High areas have low temperatures/ Mt areas receive high rainfall
Mountain sides facing sun are warmer than sides facing away from sun (Aspect)

b i)- Rainfall of double maxima
- High temperatures throughout the year about 270°C
- Low temperature range
- Rainfall falls throughout the year
- Rainfall is high average 2000mm
- Low pressure due to over head sun
- Rainfall is mainly convectional
- High humidity content

7. a) - Air should be calm so that it can remain in contact with the ground long enough to be cooled below dew point
- Day time should be warm to speed up evaporation and provide a lot of water in the air
- There should be cloudless nights

b) - To increase precipitation in the area
- To regulate in the area
- Forest to help air purification

8. a) i) A fog is a mass of water droplets suspended in the lower atmosphere which limits visibility to less than a kilometer

ii) - Air must have abundant moisture
- The night should be clear/cloudless to facilitate terrestrial radiation
- The air should be clam/gentle air currents to help the water droplets in suspension

b) - Troposphere
- Stratosphere
- Mesopause

9. a) -it is a large volume of air whose temperature and humidity are fairly uniform and covers an extensive surface area

b) -it experiences high temperature
-it is a zone of low pressure and the doldrums
-the zone migrates to the north and south of the equator with apparent movement of the overhead sun
-it is a zone where the S.E and N.E trade winds converge
-it is associated with convectional rain and thunderstorms

10. a) - Temperature decreases with increase in altitude.
- Rainfall increases with height upto 300m then it starts to decrease

- Windward slopes are wetter than leeward slopes.
- Atmospheric pressure decreases with increasing altitude.
- Local winds are common, they blow up slope during the day and down slope during night.
- In temp. regime slopes facing the equator are warmer than those facing the poles

b) i)- Increases air pollution from industrial activities.
- Deforestation /uncontrolled logging.

ii) - Widespread changes in the natural ecosystem with grasslands and deserts areas expanding as forested areas shrinks.
- Possible rise in temp. may increase evaporation rates leading increased rainfall in some areas.
- Increased rainfall will cause flooding of low lying areas.
- Water stored in polar glacier will melt leading to rise in sea levels and flooding of coastal lands.
- In temperate regions, winters are likely to be wetter and summer drier.
- Wetter & warmer conditions may increase pests & diseases thereby affecting humans, crops & livestock.
- Change in climate is likely to cause extinction of various plants and animal species.
- Possible drought might increase in most parts of the world.
- Cause in change in agricultural activities & massive crop failure leading to food shortage.

c i) - A rain gauge consists of a funnel, metallic cylindrical container and a collecting jar.
- When it rains, water from direct rain drops collects into the jar through the funnel
- The water collected is then poured into a graduated (in mm) measuring cylinder.
- The readings taken & recorded.

c ii) - Thermometers /√six thermometers.
- Hygrometer.

11. a i) - This is climatic conditions in a restricted area due to small differences of aspect slope, vegetation and human landscapes

ii) It is a condition where the incoming solar radiations pass through the atmosphere while the outgoing terrestrial radiation is blocked by gases/ clouds/ atmosphere making the earth retain the terrestrial radiation/ re-radiation. (This makes earth to be warmer than it would have been)/ it is a condition where the atmosphere balances the incoming and outgoing terrestrial radiation making the earth to retain optimum heat

b) - A thermometer / maximum and minimum/ six's thermometer
- A hygrometer/ wet and dry bulb thermometers

12 a) -body of air/wind with uniform conditions moving in a given direction

b) -same temperature
-air pressure-move from H.P to L.P
-earth's movement

13. (a) Tropical convergence zone is a low pressure belt that lies between the tropics where the North East and South East trade winds converge

b) - The forest is evergreen due to high rainfall and abundant sunshine
- The trees grow tall to complete for sunlight
- Trees have broad leaves to encourage water loss through evapo-transpiration / transpire excess water due to high rainfall
- these are mainly hardwoods due to abundant sunshine
- Trees have buttressed roots to support their great heights and large trunks in the wet soils.
- Tree roots go deep into the ground for anchorage
- There are many tree species due to the tropical conditions.
- The forest has little underground because the canopies block sunlight from reaching the

ground
- The forests have numerous lianas/climbers which twine around the tall trees to reach sunlight in the dense forest.
- Trees grow rapidly due to the high temperatures and high rainfall

14. a) It is large volume of air/ wind with similar/ uniform temperature humidity and covers over a large area and flows over along distance

b) A- North East polar winds
B- South West westerlies/ S. West winds
C - North east trade winds
D - South East trade winds

15. a i) - Global warming is the increase of average temperatures on earth as result of green house effect/ gases reflecting back to earth part of heat radiation

ii) - The orbital position of the earth or effect of the distance of the earth from the sun
- High amount of carbon dioxide in the air from industries
- The volcanic emption raise heat/ temperature
- High amount of solar radiation reaching the earth due to depletion of Ozone layer

iii) - Carbon dioxide (CO_2)
- Chlorofluorocarbons (CFS)
- Methane
- Nitrous oxide (N_2O)

b)(i) - Change in the ecosystems with grass land and deserts expanding while forests shrink
- Rise in the sea level due to thawing of glaciers that leads to flooding of coastal low lands
- Rise in global temperatures leading to increased rainfall due to increased evaporation
- Wetter winters and dry summers in temperature regions
- Shrinking water bodies e.g. lakes, rivers and drying up of streams
- Reduced animal and plant species due to adaptation difficulties
- Extinction of some species of flora and fauna
- Low production of food due to failing soil fertility and absence of rain/ too much of rainfall in other areas

(ii) - High rainfall evidenced by many permanent rivers
- Cool temperatures from high altitudes e.g. 2000m

16. a) Aridity is dryness/ insufficient rainfall, while desertification is the expansion/ encroachment of desert conditions

b) - Use off defective instruments√
- Personnel my have inadequate /limited skills√
- Vagaries of nature such as earth tremous√

c) - painted white to prevent over heating√
- raised to a height of 121m to prevent contact with direct radiation from the earth's surface√
- it has louvers at the side to allow free air circulation√

17. a)- 2-modified tropical climate of the highland
- 3-modified equatorial climate of the lake basin

b) - it receives very low rainfall of less than 250mm annually
- the mean annual temperature are high above 29ºc
- large diurnal range of temperature
- day temperature are high
- humidity is low
- sand storms are common occurrence
- there are occasional floods caused by sporaduram
- the region is under the influence of dry north east trade winds

19. a i) X – Mediterranean

Y – Equatorial climate

ii) - Rainfall is low/ below 250mm per year
- Rainfall is erratic/ unreliable
- Occasional flash floods
- Temperatures are high throughout the year
- Intense solar radiation
- Diurnal range of temperature is large/ extreme hot days and cold nights
- High rates of evaporation
- Skies are clear/ high terestial radiation
- Low humidity
- Strong dusty winds

b i)- Green house effect is general increase of the temperatures of the globe due to increase in the level of CO_2 and other green houses gases. This result into a condition where the incouncy solar radiation passes through the atmosphere while the outgoing terrestrial radiation s blocked by the gases and the clouds

ii) Increase in temperature

Effects
- Rainfall increase
- Melting of ice caps
- Rise in sea level
- High evaporation
- Abnormal growth of plants

Change in rainfall pattern

Effects
- Floodings
- Rise in sea level
- Drought
- Soil erosion by water

Change in seasonal patterns

Effects
- Severe winter/ short summer
- Drought
- Shifting of vegetation zones
- Extinct of some species

Change in winds

-More frequent & more destructive
- High waves
- Flooding
- Wind erosion/ wind storms

c i) - Temperature decreases with increasing height above sea level. This is because atmospheric air at low altitude is denser than high above. Heat loss is greater at high altitude than at lower altitude
- Rise in altitude cause fall in temperature and a cooling effect that causes condensation of moisture in the air. This leads to precipitation forming at high altitude
- Atmospheric pressure is higher at low altitude and lower at high altitude. This is because the weight of the atmospheric air at low altitude is more than at high altitude

ii) In summer, coastlands are relatively cooler than in land areas. This is because the winds bring the cooling effect of the sea to the land, by the time winds reach inland they are heated by warm land resulting in higher temperature over the interior of the land

In winter the onshore winds bring the warming effect of the sea into the land causing a rise in temperature. By the time these winds reach the interior of the land, they are cooled by cold land thus enhancing the low temperature

Onshore winds cause a lot of rain in the coastal areas throughout the year. This is because the wind picks up moisture over the sea and drop it on the nearby land. The continental interiors receive less rain, mainly in summer, because the winds have dropped mot of the moisture in the coastal lands

iii) Ocean currents

- Cold ocean currents bring about the cooling effect in the temperature
- Also bring a dry effect because the cold air is not able to rise

Warm ocean currents

- Bring a warm effect (rise in temperature)
- Heavy rainfall because the warm air is able to rise and condense to form rainfall