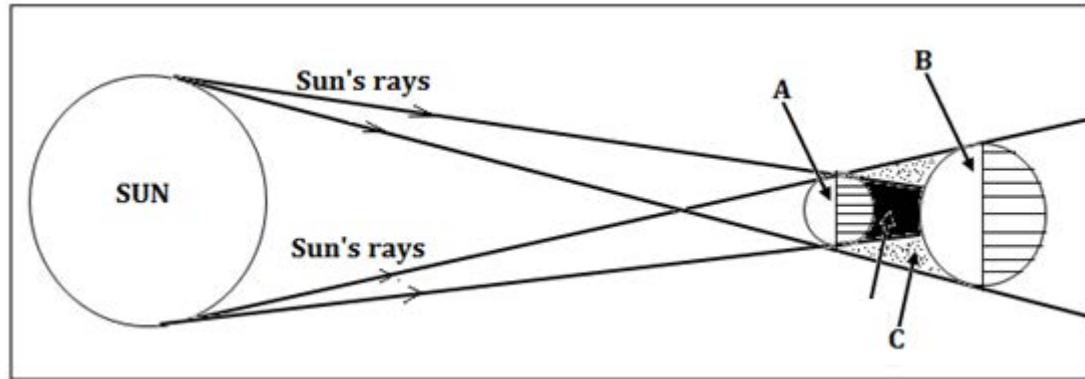


### SECTION A

1. The diagram below shows a type of an eclipse.



- (a) Name the parts marked A, B, and C. (3 marks)
- **A - The moon**
  - **B - Earth**
  - **C - Penumbra**
- (b) Apart from the occurrence of eclipses, state three other effects of the movement of the earth round the sun. (3 marks)
- **Varying lengths of day and night at different time of the year.**
  - **Occurrence of the four seasons in mid and higher latitudes.**
  - **Changes in the position of the midday sun at different times of the year.**

2. (a) What are metamorphic rocks? (2 marks)
- These are rocks formed when original igneous or sedimentary rocks have been altered by intense heat, pressure or both.***

- (b) Give two examples of organically formed sedimentary rocks. (2 marks)
- **Limestone,**
  - **Chalk**
  - **Coral reefs**
  - **Coal**
  - **Diatomite**
  - **Iron stone**

3. (a) List three landmasses that formed from Gondwanaland according to continental drift theory. (3 marks)
- **Africa**
  - **Arabia**
  - **India**
  - **South America**
  - **Australia**
  - **Antarctica**

- (b) Give two types of tectonic plate boundaries. (2 marks)

- *Extensional plate boundary.*
- *Compressional plate boundary.*
- *Transform plate boundary*

4. (a) What is an earthquake? (2 marks)

*An earthquake is a sudden and rapid movement/vibrations of the earth's crust*

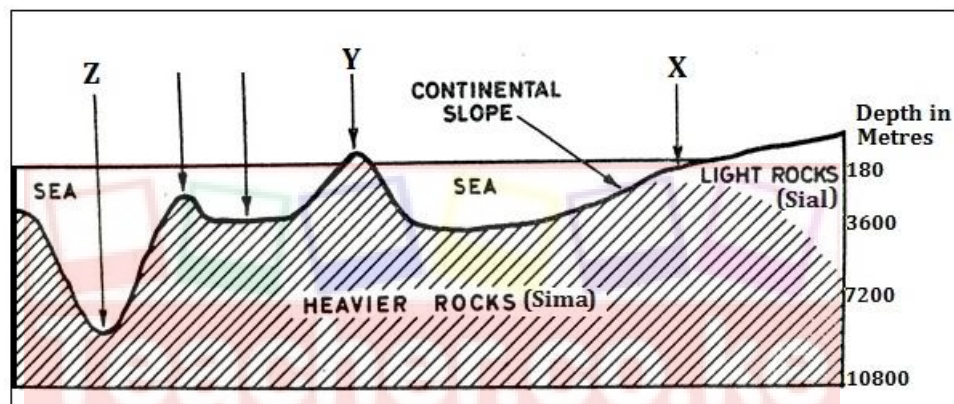
**OR**

*An earthquake refers to the shaking of the ground due to release of energy within the crust.*

- (b) State three natural causes of earthquakes. (3 marks)

- *Movements/collision of tectonic plates.*
- *Major volcanic eruptions/movements of magma within crustal rocks.*
- *Isostatic adjustments of the crustal rocks*
- *Collapsing inwards of rocks due to gravitative pressure.*
- *Energy release from the mantle.*

5. The diagram below shows some features that form ocean relief.



- (a) Identify the features marked X, Y and Z. (3 marks)

- *X - Continental Shelf*
- *Y - Oceanic Island*
- *Z - Ocean trench/ocean deep*

- (b) List **two** main forms of horizontal movements of ocean water. (2 marks)

- *Waves*
- *Ocean currents*

## SECTION B

6. Study the map of Kijabe (1:50,000 sheet 134/3) provided and use it to answer the following questions.

- (a) (i) Determine the six figure grid reference of an air photo principal point near the South Western corner of the map. (2 marks)

**245903**

- (ii) Give two types of scale on the map extract (2 marks)

- *Linear scale*

➤ **Representative ratio scale.**

- (iii) Give the position of the South Eastern corner of the area covered by the map by latitude and longitude. (2 marks)

**(1°00' South, 36°45' East) OR**

**Latitude 1°00' South  
Longitude 36°45' East**

- (b) (i) Citing evidence from the map, give three settlement patterns in the area covered by the map. (3 marks)

- **Nucleated settlement pattern is evident at Maai Mahiu, Kimende and Kinari**
- **Linear settlement pattern along main trucks around Bathi and Kenton.**
- **Dispersed settlement pattern at Kagwe at the South East part.**

- (ii) Identify two relief features at grid square 3099. (2 marks)

- **River valleys**
- **Spur**

- (iii) Explain how relief has influenced the distribution of settlements in the area covered by the map. (4 marks)

- **Kijabe hill has steep slopes on the western side thus no settlements.**
- **Eastern slopes of Kijabe hill have few settlements due to gentle slopes.**
- **The escarpment has no settlements due to steep slopes. At the foot of the escarpment, there are many settlements due to gently sloping land**
- **Regions within river valleys have very few or no settlements due to ruggedness.**

- (c) Citing evidence from the map, give five economic activities carried out in the area covered by the map. (5 marks)

- **Trade due to the presence of shops, petrol stations**
- **Livestock rearing due to the presence of a water trough, cattle dips and a dairy.**
- **Quarrying due to the presence of quarries and murram pits.**
- **Transport services due to the presence of all-weather roads – bound surface such as A104 and a railway line/Kijabe railway station**
- **Lumbering due to the presence of forest guard posts, saw mills and a forest station.**
- **Mining of Carbon (IV) oxide gas due to presence of Kagwe Carbacid plant.**
- **Tourism due to presence of hot springs and an escarpment.**
- **Communication due to presence of a post office.**

- (d) Describe the distribution of natural vegetation in the area covered by the map. (5 marks)

- **There is a forest called Wakagwe forest on eastern parts.**
- **A bamboo forest occurs on near Kinari.**
- **There is a thicket near Maai Mahiu.**
- **The central parts of the area have woodland vegetation**
- **Scrub vegetation covers most of the western parts**
- **Some scattered trees occur around Kinari.**
- **A small part of Nyamweru forest occurs to the south of Wakagwe forest.**

7. (a) (i) Differentiate between weather and climate. (2 marks)

**Weather is the state of the atmosphere of a given place over a short period of time whereas climate refers to the average weather conditions of a place which have been observed over a long period of time such as 30 years.**

(ii) Give **three** types of rainfall. (3 marks)

- **Relief/orographic rainfall**
- **Convectonal rainfall**
- **Frontal rainfall**

(b) Explain how the following factors affect the climate of a place:

(i) Cold ocean currents. (4 marks)

- **Onshore winds blowing over a cold ocean current are cooled from below. This brings a cooling effect which lowers the temperature of adjacent coastlands.**
- **Onshore winds blowing over a cold ocean current are cooled prematurely by the cold ocean surface thus losing/dropping the moisture. Such winds reach the adjacent regions very dry thus very little or no rainfall to adjacent coastlands.**

(ii) Inter Tropical Convergence Zone. (2 marks)

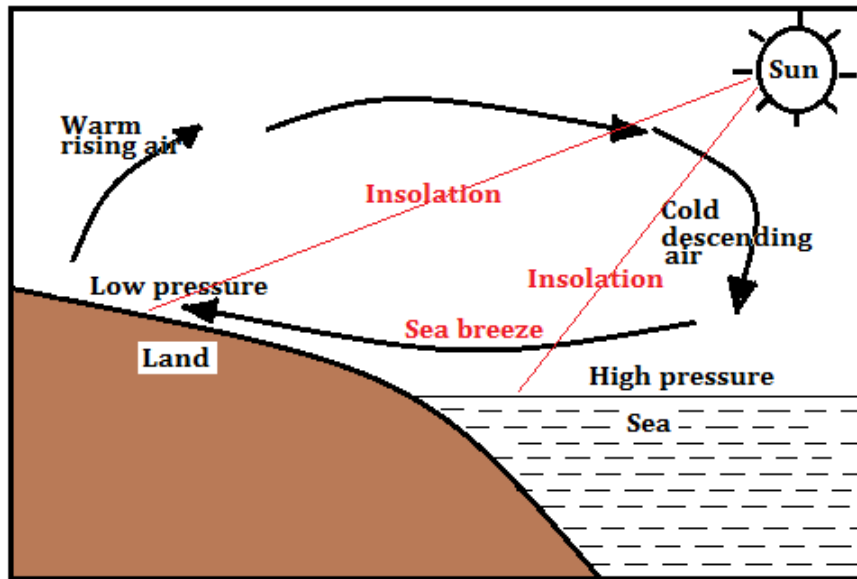
- **Regions around the equator experience the passage of I.T.C.Z twice a year. This causes high rainfall/double maxima rainfall in some areas when trade winds converge.**
- **Some places in the Northern hemisphere experience one season of high rainfall when the sun is overhead at the Tropic of Cancer**

(c) With the aid of a well labelled diagram, describe how sea breeze occurs.

(8 marks)

- **Sea breeze occurs during the day.**
- **The land is heated faster than the sea through insolation.**
- **Heated warm air over the land rises thus creating low pressure.**
- **Over the sea, the air is relatively cooler thus develops high pressure.**
- **As the warm air over the land rises, cool air from the sea blows towards the low pressure zone over the land as sea breeze.**
- **This brings a cooling effect over the hot land**

Development of sea breeze



(d) Suppose you were to carry out a field study at a weather station:

(i) Give **three** methods that they would use to collect data (3 marks)

- **Observation**
- **Interviewing**
- **Photographing**
- **Content analysis**

(ii) State **three** follow up activities for the field study. (3 marks)

- **Writing a report on data collected.**
- **Drawing of graphs to present numerical data.**
- **Analyzing and classifying the data collected**
- **Displaying processed photographs taken during the study.**
- **Conducting group discussions based on data collected.**
- **Giving a lecture to other students.**

8. (a) (i) Define the term folding. (2 marks)

***Folding is the process through which crustal rocks bend upwards or downwards due to compression force.***

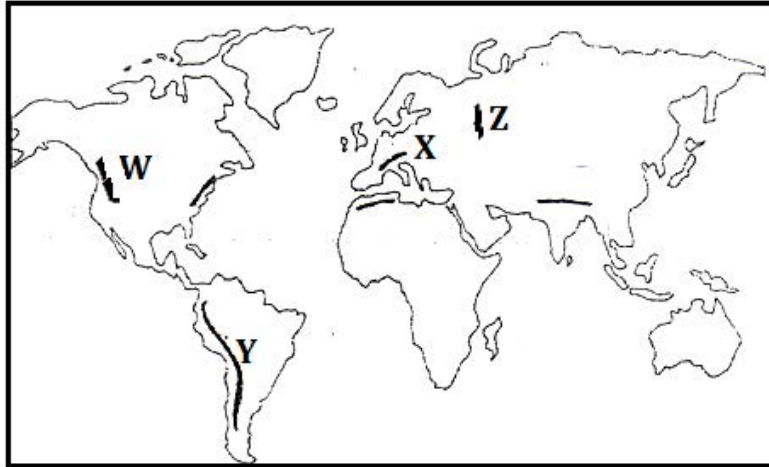
***Crumpling of young sedimentary rocks due to compressional forces***

(ii) Name **three** types of folds. (3 marks)

- **Symmetrical**
- **Asymmetrical**
- **Overfold**
- **Overthrust/Nappe**
- **Recumbent**
- **Isoclinal**

➤ *Anticlinorium – Synclinorium complex*

- (b) The world map below shows the distribution of some fold mountains. Use it to answer question (i)



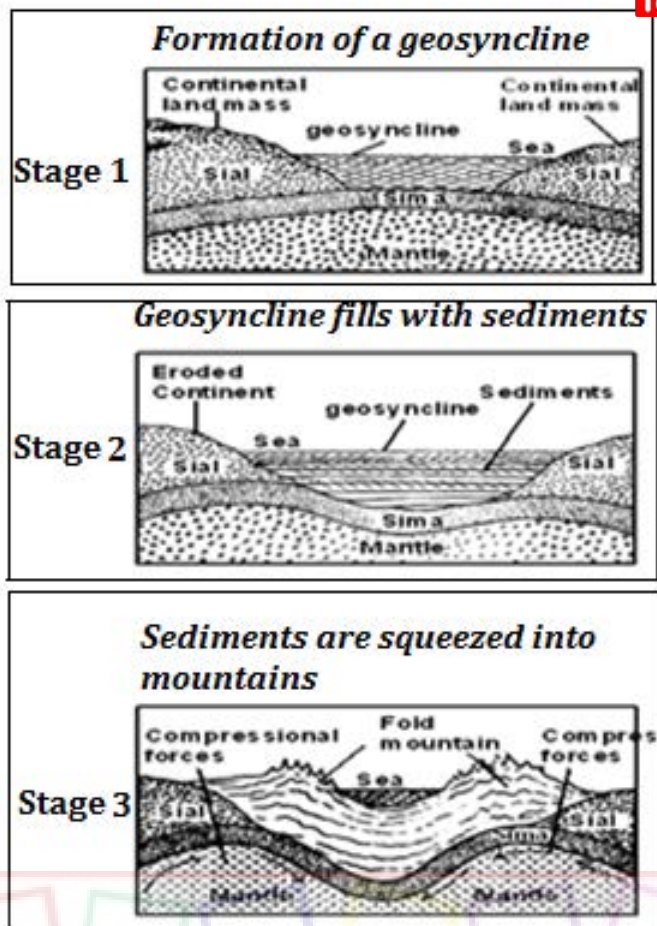
- (i) Identify the fold mountains marked W, X, Y and Z (4 marks)

- *W - Rockies*
- *X - Alps*
- *Y - Andes*
- *Z - Urals*

- (ii) With the aid of well labelled diagrams, how Fold Mountains were formed. (10 marks)

- *Initially, earth movements led to the formation of an extensive depression called a geosyncline.*
- *The geosyncline was filled with water to form an extensive ocean.*
- *The surrounding continental land masses were intensely eroded.*
- *Sediments were transported by rivers and glacier and deposited into the geosyncline in layers.*
- *Over many years of deposition, thick layers developed whose weight caused the geosyncline to sink inwards.*
- *Sinking of the geosyncline triggered compressional forces that drew the surrounding continental land masses towards each other. Compression forces could have also been caused by convection currents in the mantle.*
- *The intense compressional forces squeezed the layers of sediments bending upwards to form Fold Mountains.*





Diagrams - 4 marks

Description - 6 marks

Total - 10 marks

(c) Explain three negative effects of Fold Mountains (6 marks)

- *The topography of some fold mountains discourages human settlement and agriculture due to ruggedness.*
- *Fold mountain ranges act as barriers to easy construction of transport lines/routes such as roads, railways and pipelines thus difficulties in accessing some regions,*
- *Leeward slopes of most fold mountains receive dry winds leading to arid conditions that hinders crop farming*

9. (a) (i) What is a karst scenery? (2 marks)

*A karst scenery is a rugged landscape made of limestone, chalk or dolomite rocks that have greatly been acted upon by carbonation to form many features.*

(ii) State **five** characteristics of karst landscapes. (5 marks)

- *The rock on the surface and underground is limestone or chalk.*
- *Absence of surface runoff due to swallow holes.*
- *Many surface depressions due to solution and carbonation.*
- *Underground network of caves and caverns with features.*
- *Scanty vegetation due to thin poor soils.*

➤ *The surface is rugged due to several residual hills*

- (b) Give **four** sources of ground water. (4 marks)
- *Rain water which infiltrates the ground to lower parts.*
  - *Melt water from ice or snow which also infiltrates through rocks.*
  - *Water from rivers, lakes, swamps and ponds which seeps into the ground.*
  - *Magmatic/plutonic water that is trapped deep in rocks during volcanism*

(c) Explain how the following factors influence the occurrence of ground water:

- (i) Nature of rocks. (2 marks)

*The more permeable surface rocks are, the higher the infiltration rate. Impermeable rocks on or near the surface blocks infiltration resulting in high surface runoff.*

- (ii) Slope of land. (2 marks)

*Infiltration is greater on flat areas since water remains in one place over a long period of time while areas with steep slopes have greater surface runoff.*

- (iii) Vegetation cover. (2 marks)

*Where there is plenty of vegetation cover the surface runoff is obstructed. Its speed is slowed and most of the water has time to sink into the ground.*

*Absence of vegetation cover leads to very little infiltration.*

(d) Explain **four** conditions that favour the development of an artesian well. (8 marks)

- *The aquifer must lie in between two impermeable rocks so that it can retain water.*
- *The aquifer must bend downwards from the intake area and form a broad shallow basin/syncline.*
- *The sides of the aquifer must be exposed in a high rainfall area or lake which is the source of water.*
- *The mouth of the artesian well must be at a lower level than the intake area to allow water to be forced to the surface under its own pressure.*
- *The aquifer must be made of the same material to allow water to pass through it.*

10. (a) (i) What is glaciation? (2 marks)

*Glaciation is the process through which moving ice erodes, transports and deposits materials on the earth's surface OR*

*Glaciation refers to past occupation of ice in an area*

- (ii) Outline four factors which determine the rate at which ice moves. (4 marks)

- *Temperature/season.*
- *The thickness and weight of the ice.*
- *The width of a glacial channel*
- *The gradient of the land.*
- *The degree of friction with the surface rock*

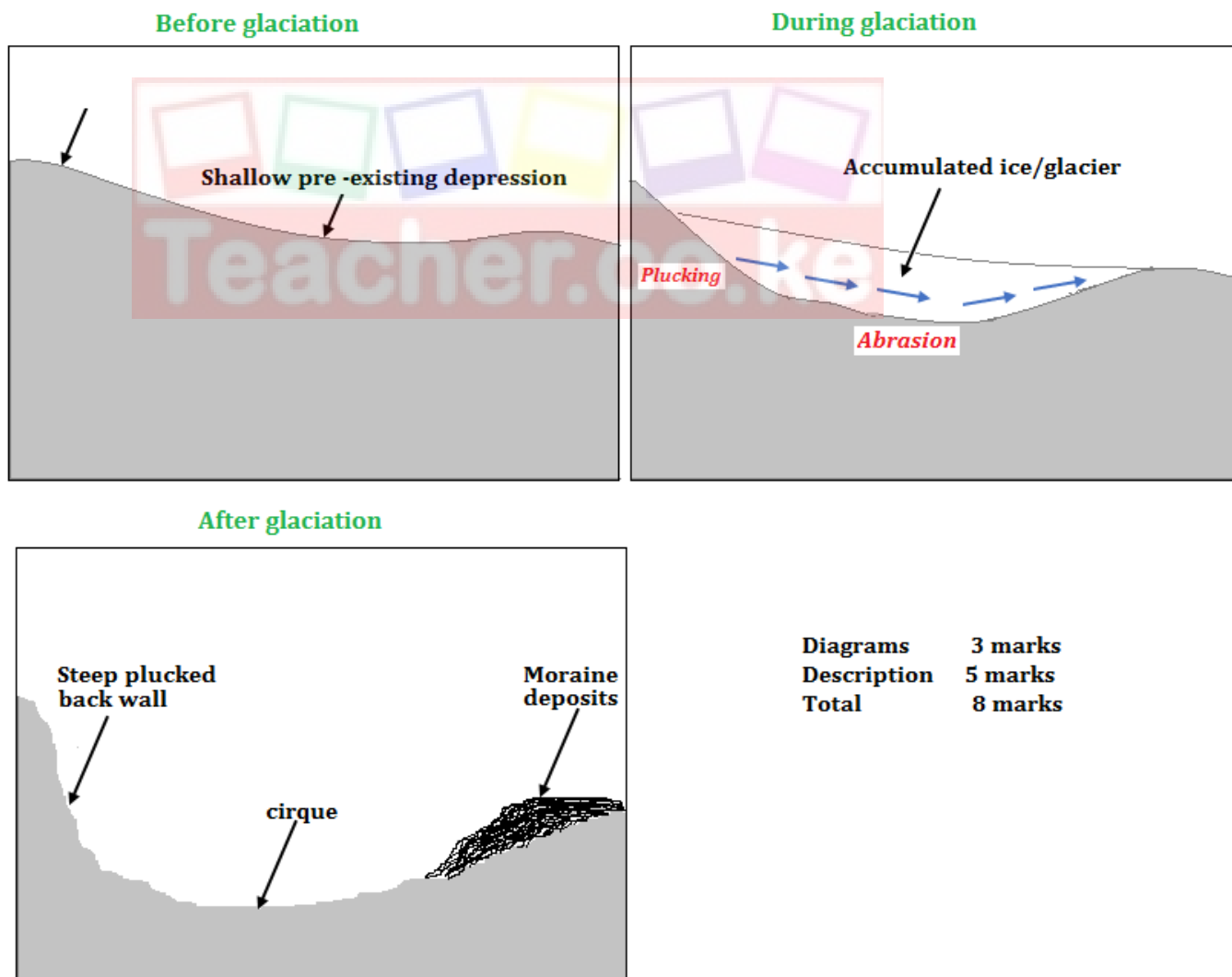


(b) Apart from a cirque, name four other glacial erosional features. (4 marks)

- |                          |                            |
|--------------------------|----------------------------|
| ➤ <i>Arete</i>           | ➤ <i>Rock basin.</i>       |
| ➤ <i>Pyramidal peak.</i> | ➤ <i>Ice eroded plains</i> |
| ➤ <i>Glacial trough</i>  | ➤ <i>Crag and tail</i>     |
| ➤ <i>Hanging valley.</i> | ➤ <i>Roche Moutonnee</i>   |
| ➤ <i>Fiord/Fjord</i>     | ➤ <i>Depressions</i>       |

(c) Using well-labelled diagrams, describe how a cirque is formed. (8 marks)

- *Initially, a shallow pre-existing hollow/depression occur on a high mountain side.*
- *Snow accumulated in the shallow depression during the period of glaciation.*
- *The snow compacted into ice forming a cirque glacier followed by frost action/alternating freeze thaw action*
- *The shallow depression was eroded through plucking and abrasion*
- *Abrasion action at the bottom of the glacier deepened the hollow while plucking process widened the hollow*
- *Plucking action steepened the back wall of the hollow.*
- *When ice melted, melt water washed out some plucked materials. Eventually a deep arm chair shaped depression known as a cirque was formed.*



Diagrams	3 marks
Description	5 marks
<b>Total</b>	<b>8 marks</b>

(d) Students of Nanyuki High School carried out a field study on glaciation on Mt. Kenya

(i) Give three reasons why they conducted a reconnaissance. (3 marks)

- ***In order to prepare a budget for the study.***
- ***To enable them choose suitable methods of data collection and recording.***
- ***To introduce oneself to guides/resource persons***
- ***In order to formulate the objectives / hypotheses for the study***
- ***In order to prepare a route map***
- ***In order to assess the suitability of the area for the study***
- ***In order to identify possible challenges and seek ways to deal with them.***
- ***In order to be able to prepare a good work schedule.***

(ii) State two factors they must have considered when selecting the data collection methods. (2 marks)

- ***The effectiveness of the method***
- ***The method must be cheap to use/ budget - friendly***
- ***One must consider the availability of the respondents and their willingness to co-operate***
- ***One must consider the literacy level of the respondent***

(iii) State two challenges they may have faced during the study. (2 marks)

- ***Rains may lead to muddy routes thus difficulties in walking.***
- ***Some steep slopes may be difficult to climb, hindering data collection***
- ***The low temperatures as one ascends the mountain may cause sickness hindering data collection***
- ***Likelihood of being attacked by wild animals as they make their way through dense vegetation.***
- ***Poor visibility of some parts due to sudden fog.***