

(b) **Physical features**

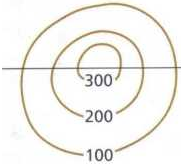
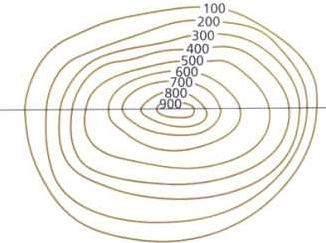
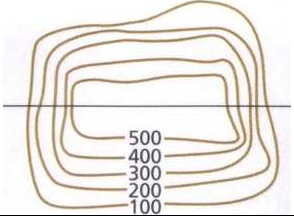
Why study physical features? How does it help me during the course of studying Geography Elective?

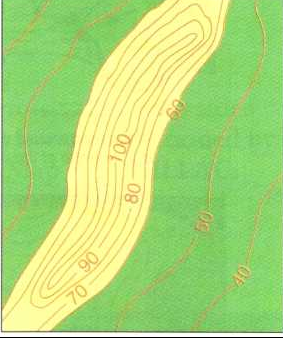
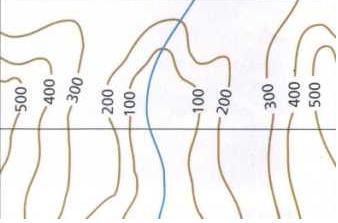
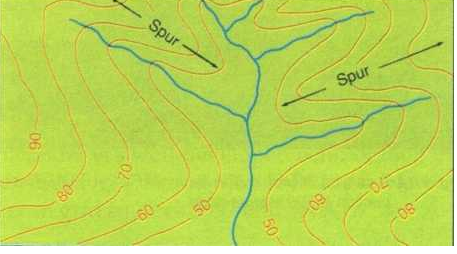
- ✓ Physical factors influence the distribution of agricultural systems. Some factors include relief and drainage.
- ✓ Physical features (relief) obstruct the development of roads and railways. In view of this, the roads and railways have a meandering layout (shape). Transport is important to the growth of industries and tourism.

(a) Relief

- **Relief** is a general term describing the shape of the land, including height and steepness.
- It describes the physical terrain and landforms on the earth's surface.
- The relief of an area affects the type of human activities that can take place.
 - Flat **floodplains** suit **wet rice cultivation**; gently sloping.
 - **Undulating** land may suit **rubber plantations**

Definitions and characteristics of common relief features

Relief feature	Definition	Description of contours
<p>Hill</p> 	<p>↓ A small area of highland</p>	<p>↓ Round or oval contours</p> <p>↓ < 600 m</p>
<p>Mountain</p> 	<p>↓ ≥ 600 meters in height</p>	<p>↓ Narrow spaces between contours</p> <p>↓ Oval at the peak of the landform</p>
<p>Plateau</p> 	<p>↓ A flat-topped hill with steep sides</p> <p>↓ ≥ 200 m height</p>	<p>↓ Narrowly spaced contours</p> <p>↓ No contour at the top → flat</p>
<p>Ridge</p>	<p>↓ A long, narrow and steep-sided highland.</p>	<p>↓ Elongated, oval-shaped contours</p> <p>↓ Tend to be U-shaped or V-shaped.</p> <p>↓ The closed end of the contour line points away from high ground</p>

		
<p>Valley</p> 	<p>↓ A large narrow, v-shaped and steep sided in the upper-course of a river</p>	<p>↓ Arrowheads pointing towards highland ↓ Often cut by the river</p>
<p>Spurs</p> 	<p>↓ A short, continuous sloping line of higher ground, normally jutting out from the side of a ridge. ↓ A spur is often formed by two rough parallel streams, which cut draws down the side of a ridge. The ground sloped down in three directions and up in one direction.</p>	<p>↓ A spur with the U or V pointing away from high ground</p>

Some obvious ways of distinguishing relief

<p>Mountain</p> <p>✓ More than 600 m</p>	<p>Hill</p> <p>✓ Less than 600 m</p>
<p>Mountain</p> <p>✓ Not elongated</p>	<p>Ridge</p> <p>✓ Elongated</p>
<p>Ridge</p> <p>✓ Several narrow-spaced peaks</p>	<p>Plateau</p> <p>✓ Usually 1 broad-spaced peak</p>
<p>Valley</p> <p>✓ Point to highland</p>	<p>Spur</p> <p>✓ Point to lowland</p>

Description of relief

Candidates are reminded that any information taken from the map such as height of the relief, relief features must be supported by 4 figure grid references.

- Give the average height (or the range of height) of the relief of an area and state the height of the highest point and the lowest point.
- Describe the relief of the area:
 - ✓ State whether it is mountainous or hilly, or whether it is part of a plateau.
 - ✓ Point out and describe any feature that stands out in the area and state its location on the map.
 - ✓ Describe the slopes in the area. State whether they are concave, convex, uniform, steep or gently sloping.

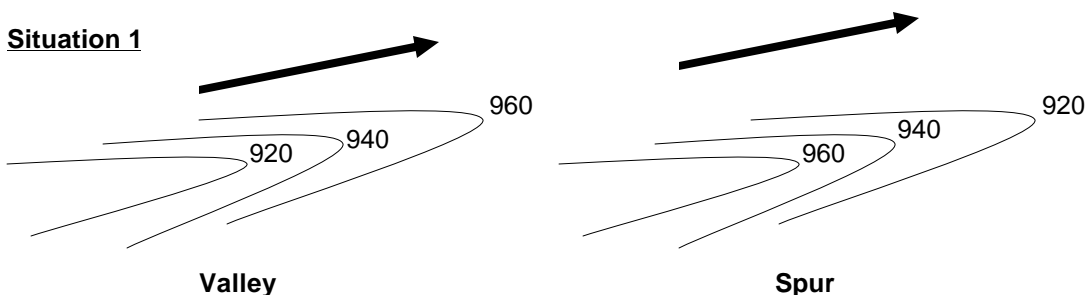
Some Pointers to note when describing relief:

- ✓ Identify and describe relief features
 - Low river valley regions
 - Well-drained plateau
 - Steep-sided (deeply eroded) upland
- ✓ Use geographical term
 - Lowland, highland
 - Hill, mountain, ridge, plateau
 - Valley, floodplain
- ✓ Use simple adjectives
 - Broad, flat, deeply-cut
 - Gently-sloping, steep-sided

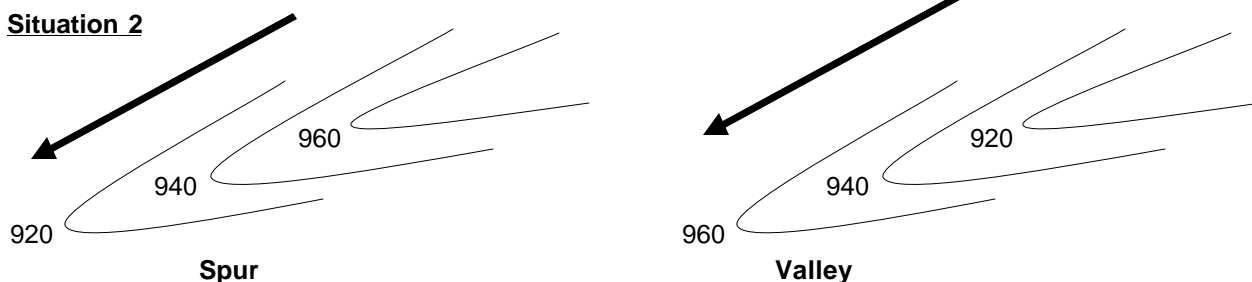
Some pointers to note regarding spur and valley:

1. Candidates have the misconception that the direction where the v-shaped contour lines are 'juttering' out determines whether it is a spur or valley.

Situation 1



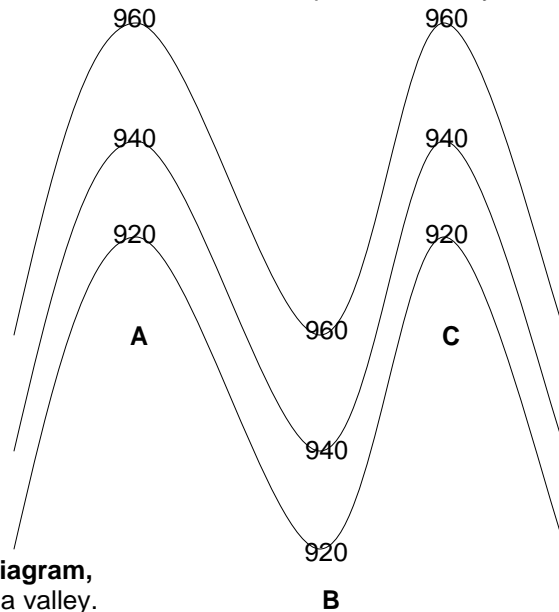
Situation 2



From the above illustration, one can observe that the direction where the v-shaped contour lines are 'juttering' out does not determine whether it is a spur or valley.

E.g. In situation 1, there are 2 v-shaped contour lines jutting out in rightward direction. However, the one on the left is the valley because it is pointing to the highland while the one on the right is the spur because it is pointing to the lowland.

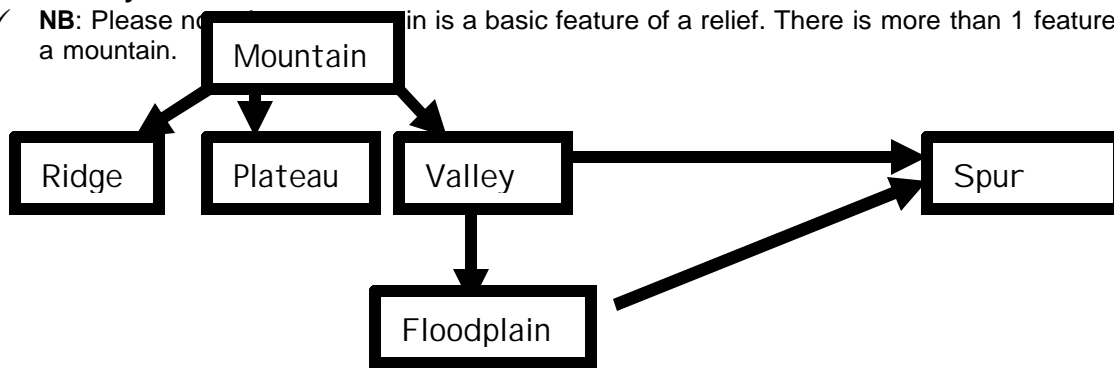
2. A V-shaped contour lines can have both spurs and valleys occurring simultaneously.



- From the above diagram,**
- ✓ At point A, it is a valley.
 - ✓ At point B, it is a spur
 - ✓ At point C, it is a valley

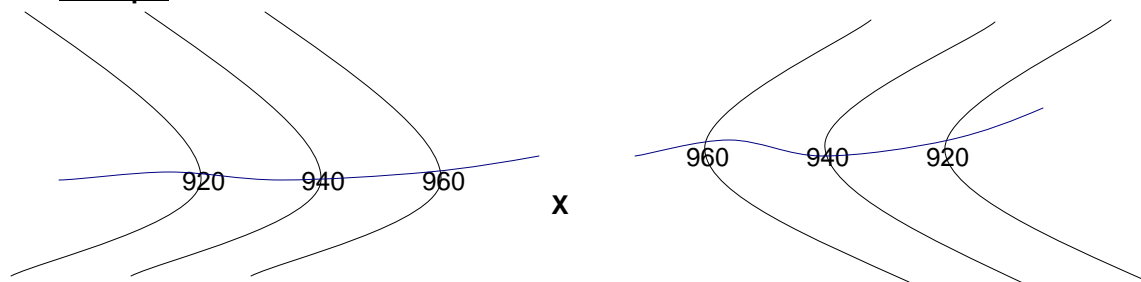
In summary

- ✓ **NB:** Please note that a mountain is a basic feature of a relief. There is more than 1 feature in a mountain.



- ✓ For those candidates who manage to locate valley when describing relief, they are advised to check if there is spur or floodplain occur simultaneously with the valley.

Example

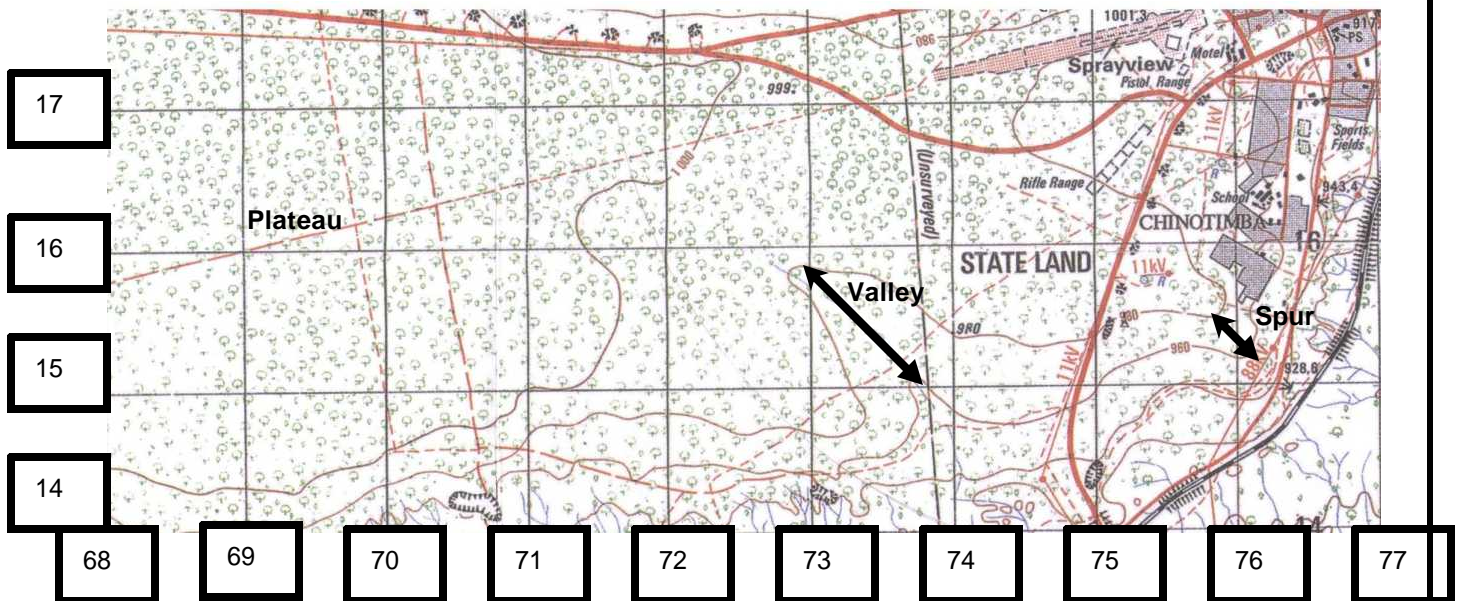
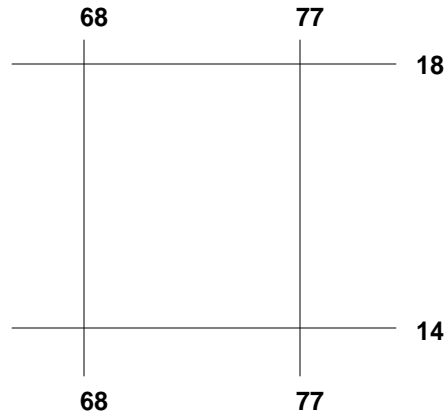


The region X is a floodplain as it is a flatland in between the two river valleys.

Sample 1 : Describing relief

Refer to Map 8: Victoria Falls Q35,

Describe the relief of the area found in the area below. [3]



Suggested solution:

Steps	Description
<ul style="list-style-type: none"> Give the average height (or the range of height) of the relief of an area and state the height of the highest point and the lowest point. 	<ul style="list-style-type: none"> The highest height in this region is 1000 m at grid square 7216. The lowest height in this region is 920 m at grid square 7614.
<ul style="list-style-type: none"> State whether it is mountainous or hilly, or whether it is part of a plateau. 	<ul style="list-style-type: none"> This region is mountainous as the height is greater than 600 m. The plateau is part of the mountain which is found at grid square 6915. <ul style="list-style-type: none"> It is a plateau as it is a flat land at its peak. This is so as there is no contour line found on the peak. Medium bush lies on the plateau.

<ul style="list-style-type: none"> Point out and describe any feature that stands out in the area and state its location on the map. 	<ul style="list-style-type: none"> There is a valley found in grid square 7315. <ul style="list-style-type: none"> This is because the contour is 'juttering' / pointing from lowland at a height of 960 m to highland at a height of 980 m. It is noted that it is a river valley as there is a river flowing to the valley at grid square 7315. There is a spur found in grid square 7515. <ul style="list-style-type: none"> This is because the contour is 'juttering' / pointing from highland at a height of 980 m to lowland at a height of 960 m.
<ul style="list-style-type: none"> Describe the slopes in the area. State whether they are concave, convex, uniform, steep or gently sloping. 	<ul style="list-style-type: none"> The region is relatively gentle. This is supported at grid square 7014 and 7515. <ul style="list-style-type: none"> The spacing of the contour lines is quite broad.

Sample 2: Comparing relief

- ✓ They are more challenging than the describing relief questions.
 - Reason: If Candidates fail to phrase their sentences (points) correctly when comparing their relief, their point(s) become(s) wrong.

Examples

Answer A:

- ✗ The lowest height of the west of the parish boundary is 1750 m at grid square 7191. The highest height of the west of the parish boundary is 3100 m at grid square 7189. The lowest height of the east of parish boundary is 2300 m at grid square 9174. The highest height of the east of parish boundary is 4017 m denoted by the trigonometrical station at grid square 9173.

Answer B:

- ✗ The lowest height of the west of the parish boundary is 1750 m at grid square 7191. The lowest height of the east of parish boundary is 2300 m at grid square 9174. The highest height of the east of parish boundary is 4017 m denoted by the trigonometrical station at grid square 9173. The highest height of the west of the parish boundary is 3100 m at grid square 7189.

Answer C:

- ✗ The lowest height of the west of the parish boundary is 1750 m while the lowest height of the east of parish boundary is 2300 m. The highest height of the east of parish boundary is 4017 m but the highest height of the west of the parish boundary is 3100 m.

Answer D:

- ✗ At the west of the parish boundary, the lowest height is 1750 m at grid square 7191 while the highest height is 3100 m at grid square 7189.
- ✗ At the east of the parish boundary, the lowest height is 2300 m at grid square 9174 but the highest height is 4017 m denoted by the trigonometrical station at grid square 9173.

Answer E:

- ✗ Both River Claire and River Blanc flow through the river valleys. Both Cold water river and Perdu Temps River flow through the river valleys.

Answer F:

- ✗ In general, the tributaries of the river Claire seems to be longer when they are flowing in the gentle slope while one of the tributaries of Cold water seems to be shorter as it flows through the steep regions.

Answer G:

- ✗ Forest in the west of the parish boundary can be found in the steep sloping mountains while the forest in the east of the parish boundary cannot be found in the steep sloping mountains. This can be shown by grid square 7189 found in west of the parish boundary where forests can be found on the flat land of the steep sloping mountain.

Answer H

- ✗ There are only 2 transport networks found in the west of parish boundary while there is only 1 transport network found in the east of parish boundary. At the west of the parish boundary, there is footpath found in grid square 7192 aligned in the flat land of the gentle sloping mountain. Another is the unsurfaced road found in grid square 7191 aligned in the flat land of the gentle sloping mountain. At the east of the parish boundary, there is the footpath aligned in the flat land of the concave sloping mountain.

Answer I

- ✗ Cultivation and plantation is found in grid square 7191 at the west of the parish boundary but there isn't.

Refer to Lesser Antilles map,

Study the area north east of easting 71 and northing 89. **Compare** the relief of the area to the east and west of the parish boundary. [4]

- ✓ Before attempting the compare relief questions, please read the question carefully.
- ✓ In this question, candidates are supposed to identify
 1. The boundary (restrictions) given from the question

Clues: north east of easting 71 and northing 89

In other words, the boundary is north of northing 89 and east of easting 71.

- Easting 89 to 93
- Northing 71 to 75

Hence, easting 89, 93 and northing 71, 75 are boundaries.

2. The boundary line or object

- Please check carefully the symbol used to denote the boundary line or object in the **legend**.
- Candidates must be able to distinguish between parish boundary and national park boundary by referring to the legend in this question.

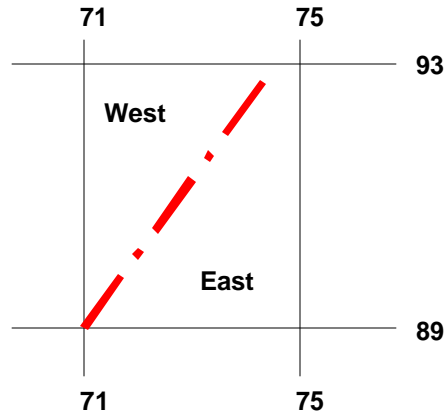
Forest Reserve and National Park Boundaries _____



Parish Boundaries _____



A sketch of the boundary and boundary line



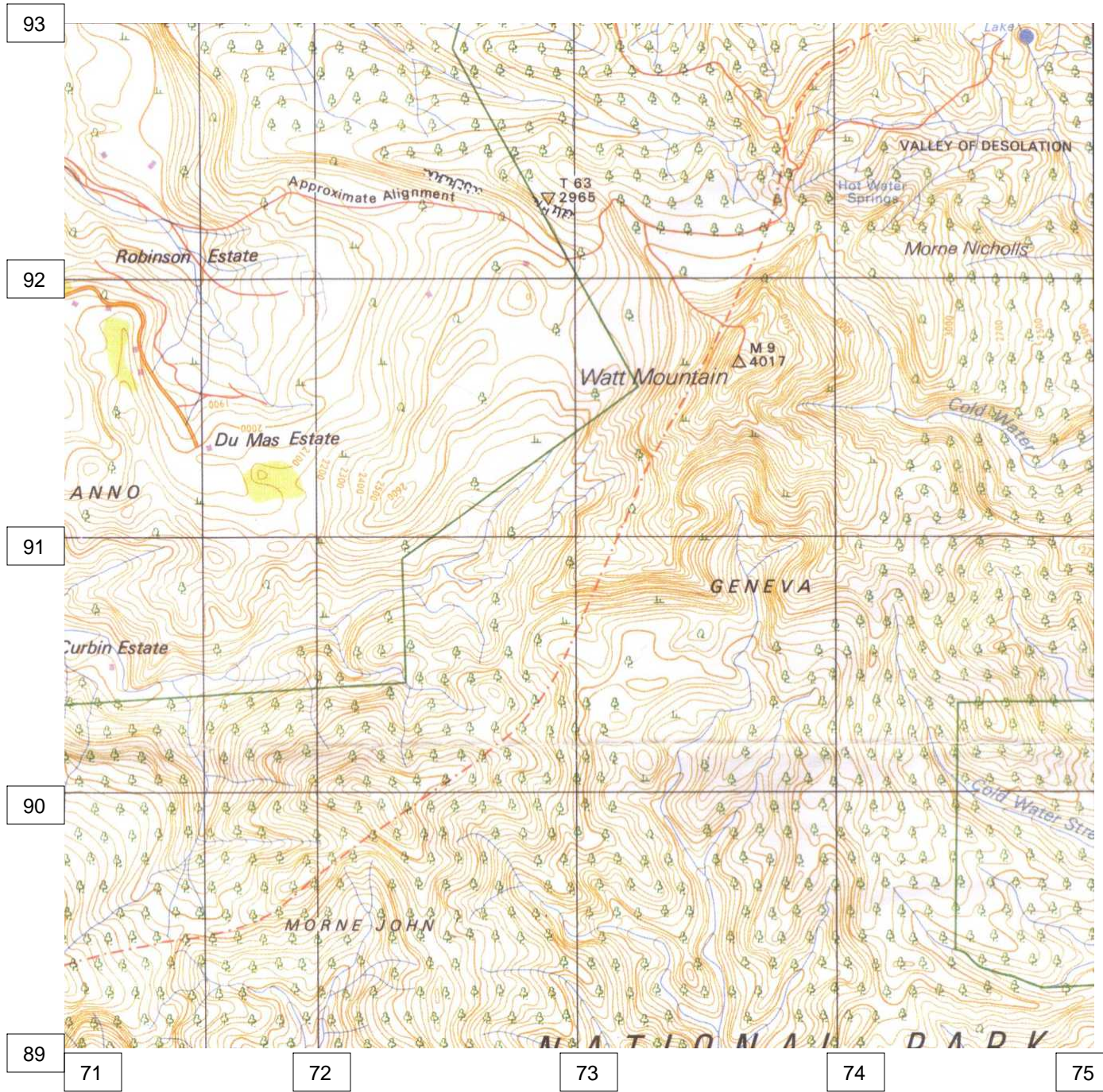
Suggested Approach

- ✓ Candidates should understand the meaning of 'compare' before attempting this question.

The meaning of compare

Write about what are **similar** and **different** about two things.
 For a comparison, two elements or themes are required.
 These two themes or elements must be related to relief.

- ✓ NB: You have to compare relief **point by point**.
- ✓ Candidates should compare in terms of:
 - Height
 - Basic feature (mountain or hill)
 - Slopes
 - Other relief features



From the map, candidates can deduce that

West of parish boundary	East of parish boundary
<ul style="list-style-type: none"> ✓ The lowest height of the west of the parish boundary is 1750 m at grid square 7191. ✓ The highest height of the west of the parish boundary is 3100 m at grid square 7189. 	<ul style="list-style-type: none"> ✓ The lowest height of the east of parish boundary is 2300 m at grid square 9174. ✓ The highest height of the east of parish boundary is 4017 m denoted by the trigonometrical station at grid square 9173.
<ul style="list-style-type: none"> ✓ At the north of national park boundary of the west of parish boundary, the mountainous region is relatively gentle than the south of the national park boundary of 	<ul style="list-style-type: none"> ✓ At the east of the parish boundary, the mountainous region is relatively steep at all sides.

the west of parish boundary.	
✓ Both River Claire and River Blanc flow through the river valleys.	✓ Both Cold water river and Perdu Temps River flow through the river valleys.
✓ In general, the tributaries of the river Claire seems to be longer when they are flowing in the gentle slope.	✓ One of the tributaries of Cold water seems to be shorter as it flows through the steep regions. ✓ The rest of the tributaries of Perdu Temps River is longer as they flow through the relative gentle regions.
✓ Forests are found on the flat land of the gentle and steep sloping mountain. ✓ Some forests are located at grid square 7292 on the flat land of the gentle sloping mountain while some are located at grid square 7189 on the flat land of the steep sloping mountain.	✓ Most of the forests are located ONLY on the flat land of the gentle sloping mountain. ✓ This can be seen from the dense forest being located at grid square 7490 while there is no forest located at grid square 7391.
✓ There are only 2 transport network found in the west of parish boundary. One is the footpath found in grid square 7192 aligned in the flat land of the gentle sloping mountain. Another is the unsurfaced road found in grid square 7191 aligned in the flat land of the gentle sloping mountain.	✓ There is only 1 transport network found in the east of parish boundary. It is the footpath aligned on the flat land of the concave sloping mountain.
✓ There is cultivation and plantation found at the spur at grid square 7191.	✓ There are no cultivation and plantation.

Suggested Answers

Similarities:

- ✓ Both the west and the east of parish boundary are mountainous region.
- ✓ All the four rivers namely River Blanc, River Claire, Cold water river and Perdu Temps flow through river valleys found in the east and west of parish boundary.
- ✓ Most of the forests are found on the flat land in the east and west of parish boundary. This can be supported from the west of parish boundary where some forests are located at grid square 7292 and the east of parish boundary where forest is located at grid square 7490.

Differences:

- ✓ The highest height in the west of parish boundary is 3100 m at grid square 7189 while in the east of parish boundary is 4017 m denoted by the trigonometrical station at grid square 9173. The lowest height in the west of parish boundary is 1750 m at grid square 7191 but in the east of parish boundary is 2300 m at grid square 9174.
- ✓ At the north of national park boundary of the west of parish boundary, the region is relatively gentle than the south of the national park boundary of the west of parish boundary while at the east of the parish boundary, the mountainous region is relatively steep at all sides.
- ✓ In general, the tributaries of the river Claire found in the west of parish boundary seems to be longer when they are flowing in the gentle slope while the tributaries of Perdu Temps River found in the east of parish boundary is longer as they flow through the relative gentle regions.
- ✓ Forests are found on the flat land of the gentle and steep sloping mountain. Some forests are located at grid square 7292 on the flat land of the gentle sloping mountain while some are

located at grid square 7189 on the flat land of the steep sloping mountain. Most of the forests are located **ONLY** on the flat land of the gentle sloping mountain. This can be seen from the dense forest being located at grid square 7490 while there is no forest located at grid square 7391.

- ✓ At the west of the parish boundary, the transport network is aligned on the flat land of the gently-sloping mountains while at the east of the parish boundary; the transport network is aligned on the flat land of the concave-sloping mountains. This can be illustrated from grid square 7192 at the west of the parish boundary where the footpath is found. At the east of the parish boundary, the footpath is aligned on the flat land of the concave sloping mountain.
- ✓ Cultivation and plantation is found in grid square 7191 at the west of the parish boundary but there is no cultivation and plantation at the east of the parish boundary.

[9 points]

[Any 4 points, 4m]

(b) Drainage

- ✓ Symbols for water features such as rapids, waterfalls give us information on drainage features.
 - Examples:**
 - Rapids indicate fast-flowing river.
 - Green symbols show that the tributaries flow through forested highlands.
- ✓ Drainage is an important concept for farmers as they are concerned of drainage patterns and drainage of soils.
 - Gently-sloping land suggests the presence of well-drained soil which is favourable to the cultivation of most crops.
 - Farming is seldom carried out on steep slopes as the water runs off the land too quickly.

Direction of flow of river

Requirements

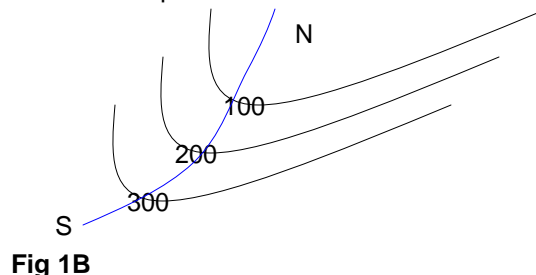
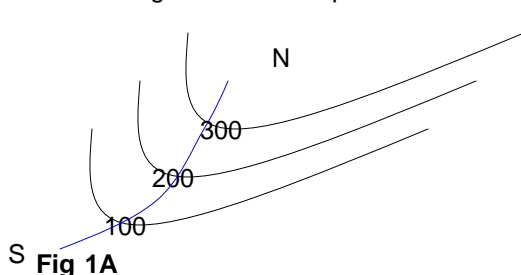
At this level, candidates are required to identify the direction of flow of river and explain how they achieve the direction of flow of river.

One of the easiest ways to identify direction of flow of water is to use the decreasing / increasing contour reading method.

Step:

Read the heights along the course of the river

- ✗ NB: A river flows from a higher altitude (height) [highlands] to a lower (altitude) [lowlands].
- ✗ Look for the highest point of the contour lines where the river intercepts with the contour lines.
- ✗ From the highest point of the contour lines, write down the compass direction of the river is flowing to the lowest point of the contour lines that intercepts the river.



In fig 1A, the river flows from North to South while in fig 1B, the river flows from South to North.

Other ways of locating direction of flow of water

- a) Note if there is a sea or a lake → Indicate the presence of river mouth
 - ✗ From the river mouth, trace the source of the river by following its course.
 - ✗ From the source of the river, write down the compass direction of the river is flowing to the river mouth.
- b) Observe the volume of water
 - ✗ NB: The volume of water flow usually increases downstream.
 - ✗ Look for the broadest size of the river. → Indicates near to the river mouth
 - ✗ From the river mouth, trace the source of the river by following its course.
 - ✗ From the source of the river, write down the compass direction of the river is flowing to the river mouth.
- c) Observe if there is a dam
 - ✗ Water that collects behind the dam wall shows that the river is flowing **from** the body of water behind the dam.

Common mistakes

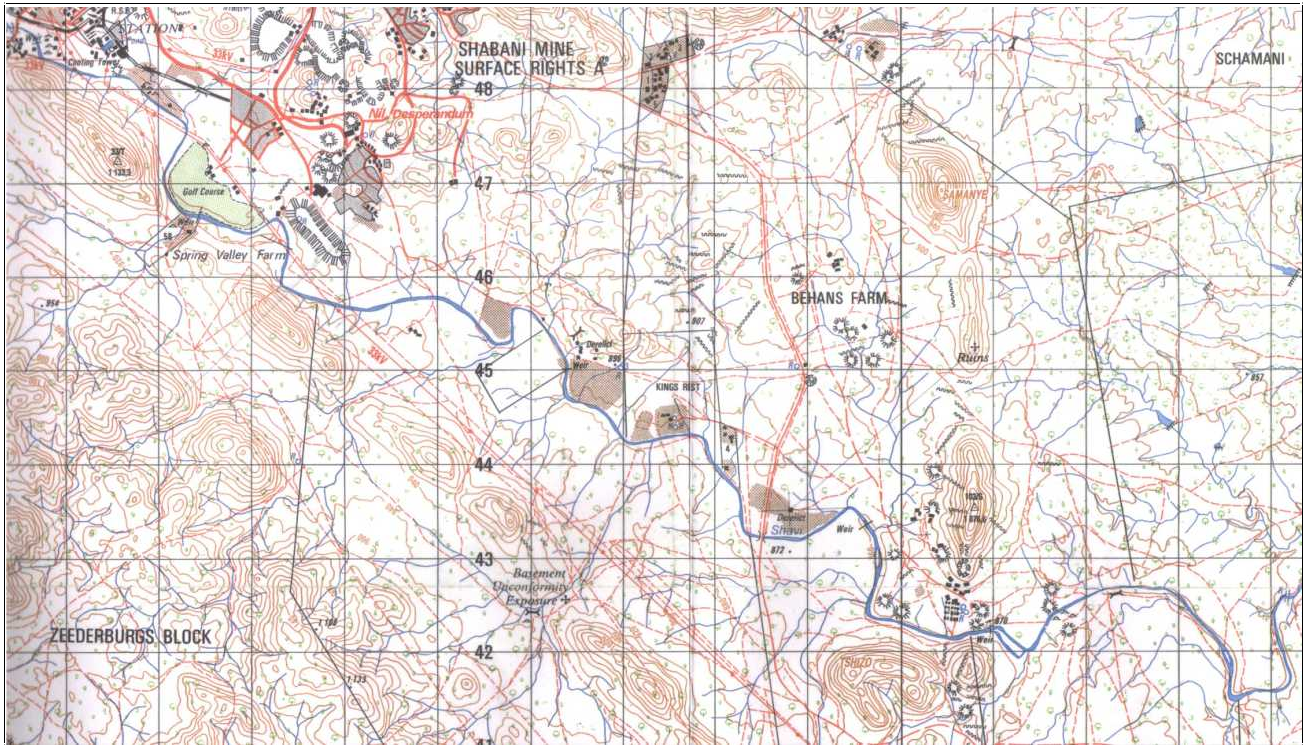
1. Candidates use terms like contour lines become smaller /bigger and get less/more to explain how they get the direction of flow of water.
 - This does not make sense at all as contour lines do not literally become bigger or smaller.
 - In fact, it is the height that becomes bigger or smaller OR there is decreasing / increasing contour **reading**.

Instead,

- ✗ Candidates should use the term '**altitude**' or '**height**' **decreases/ increases**
2. A river with contour line coming very close to the bank of the river is **not a sure indication of high altitude** BUT it is a sure a indication of the **steepness of the valley through which the river is flowing at that particular section**.
 3. A question that asked for DIRECTION requires a respond using the cardinal point as a guide. Hence a North, SouthEast ...West.... North East, South West... is required in a map reading and **Not to the right or left** which will not get any mark.
 4. A river does not necessary flow in a fixed direction. Sometimes, it flows in 2 directions.

E.g. In **which direction** is River Shavi flowing?

From Zvishavane map,

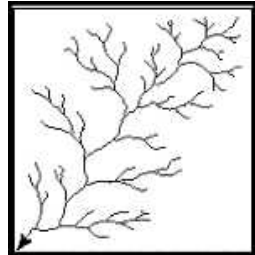


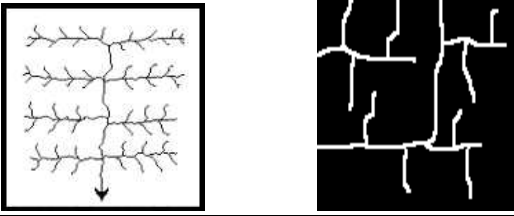
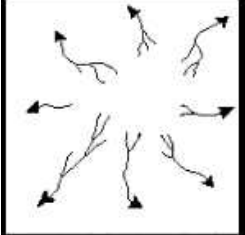
91 92 93 94 95 96 97 98 99 00 01 02 03 04

- ✗ It is noted that candidates fail to mention **at grid square 0042 River Shavi began to flow EAST.**
- ✗ Instead, many candidates mention that River Shavi flows from North West to South East **only.**

Drainage pattern

- ✓ Rivers form different types of drainage patterns.
- ✓ Drainage pattern is essentially a network consisting of a main stream and its numerous tributaries.
- ✓ The drainage pattern of a river is determined by factors such as the relief and the underlying geographical features of the land over which the course of the rivers runs.

Drainage	Diagram	Description
Dendritic		<ul style="list-style-type: none"> ✓ Tributaries flow into the main river at acute angles. <p>Relation to relief:</p> <ul style="list-style-type: none"> ✓ Develops where the underlying rock type is the same and erosion take place uniformly.

Trellis		<ul style="list-style-type: none"> ✓ Tributaries joining at almost right angles. <p>Relation to relief:</p> <ul style="list-style-type: none"> ✓ Usually occurs where hard and soft rocks alternate or where faults cross the region.
Radial		<ul style="list-style-type: none"> ✓ The rivers flow down in all directions from a central high point. <p>Relation to relief:</p> <ul style="list-style-type: none"> ✓ Often found on conical hills or volcanoes

Common mistake

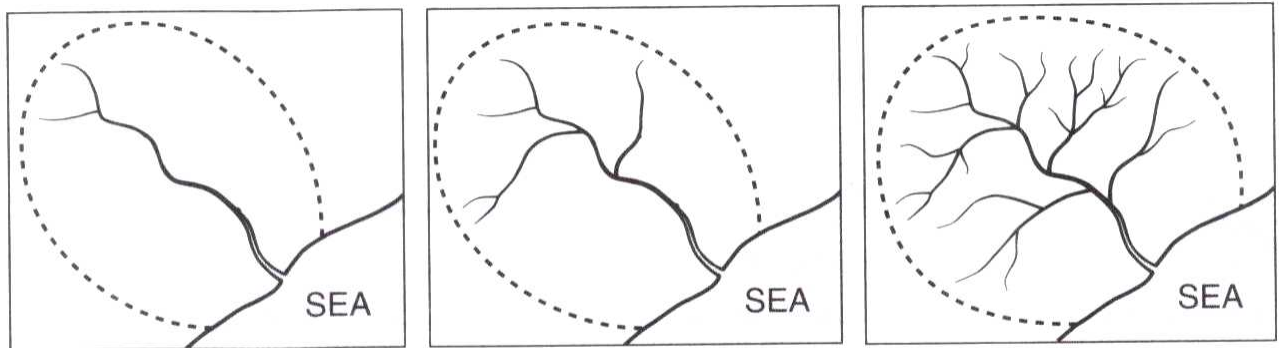
- ✓ Candidates often write the rivers and the tributaries form a dendritic/ radial / trellis pattern.

In fact,

5. It is the tributaries that join the (main) river to form a dendritic/ radial / trellis pattern.

Drainage density

- ✓ It is the total length of rivers including its tributaries per unit area.
- ✓ Drainage density ranges from low to high.



Low

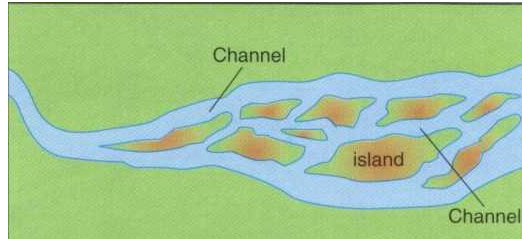
Medium

High

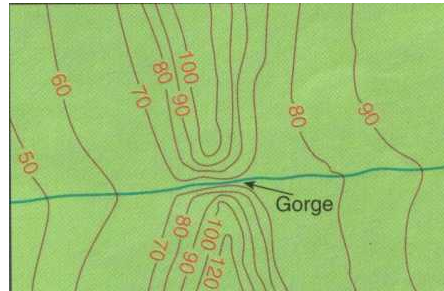
- A low drainage density means that the area is poorly drained.
- A high drainage density means that the area is well drained.
- ✓ Recognising the differences of drainage density allows us to say which grid square has the highest or lowest drainage density in a specified boundary (area).
- ✓ Human settlements tend to concentrate in areas with high drainage density.
- ✓ Drainage density is high in steep slopes (relief).

Common drainage features

- ✓ Braided river
 - A river that is separated into many channels.
 - The channels separate and join up many times.

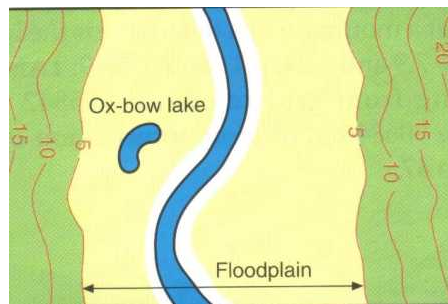


- ✓ Gorge



- A deep and narrow valley with sides which are almost vertical.

- ✓ Floodplain



- ✓ A lowland bordering a river.
- ✓ It is usually a flat piece of land between valleys.

Description of Drainage

Candidates are reminded that any information taken from the map must be supported by 4 figure grid references.

- Describe the river and its tributaries in terms of :
 - ✓ **Drainage pattern** (i.e. dendritic, trellis or radial)
 - ✓ **Area drained** (i.e. drainage density)
 - ✓ **Direction of flow** (i.e. from source to mouth)
 - ✓ **Course of river** (i.e. straight or meandering; braiding; width)
 - ✓ **common drainage features (if any)** (i.e. braided river)

Usefulness of river

- ✓ A river can be both useful and harmful at the same time.

Here is a list of how river is useful and harmful with the aid of **map evidences**.

	Map evidence(s)	Elaboration
Useful	Weir ¹	✓ Regulates the water level to serve the needs of the

		people near it. ✓ Irrigation purposes → agriculture
	Rapids	✓ Rafting and shooting rapids → tourism
	Waterfalls	✓ Appreciate beauty of nature → tourism
	Dam / Reservoir (As dam / reservoir has dual function, candidates will have to find the exact function used in the river on the map with the help of additional map evidences.)	<ul style="list-style-type: none"> • Irrigation → agriculture → Any pump houses? • Human consumption → Any settlement nearby? • Generate hydroelectric power for homes and factories → any power line or electric line nearby?

¹Weir : A low dam which is built across a river in order to control or direct the flow of water.

	Map evidence(s)	Elaboration
Harmful	Rapids and waterfalls	✓ Swift-flowing River with many rapids and waterfalls obstruct navigation as it hinders boats from traveling up the river. OR ✓ Swift-flowing river with many rapids and waterfalls obstruct navigation as it pushes down the boat.
	Narrow valley	✓ The river has a winding narrow valley. ○ Hence, big boats could not bypass the river.
	Gorges	✓ The residents find it difficult to use waters or domestic or agricultural purposes. OR ✓ Steep and deep gorges pose a hazard to tourists who may stray from well-designated paths. ✓ Narrow steep gorges would mean the river is not navigable as the waterflow is probably swift and hazardous.
	Braided river	✓ Deposition is taking place in braided river. ○ Thus, there will be river silting. ○ As the capacity to hold water is low, more rainfall causes flooding. OR ✓ River silting cannot take big boat. Thus, it is poor for navigation.
	Seasonal Marsh	✓ Seasonal Marsh along the river indicates that floods tend to occur during stormy seasons, which can affect the hotels, chalets located near the river as tourists can enjoy the sea breeze. ✓ Occasional floods lead to infesting mosquitoes which cause dengue fever for people.

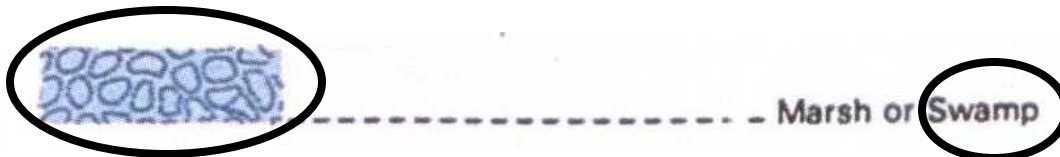
Natural Vegetation

- ✓ The presence of natural vegetation in any part of the world depends on climate, relief and soil.
- ✓ On a topographical map, this can be identified on low mountainous areas where settlements are few and on lowlands where the soil and relief favour their existence.
- ✓ Swamp vegetation can be recognised on low-lying areas near the coast or some inland locations.
- ✓ Although topographical maps do not show that land has been cleared of its natural vegetation, evidence like cultivation of crops, mining, roads and railways and settlements on the map could indicate that natural vegetation was cleared to make way for these human activities.
- ✓ Topographical maps often show forests which have been set aside as nature reserves.

Recognising Natural Vegetation using Symbols

- ✓ The legend on a topographic map gives you the symbols to identify natural vegetation.
- ✓ Note: The symbols vary from different topographical maps.

Port Louis topographic map



Lesser Antilles topographic map



Examples of natural vegetation:

Port Louis



Zvishavane

Very Dense Bush, Dense Bush-----



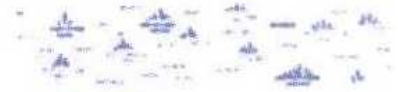
Medium Bush-----



Sparse Bush-----



Seasonal Marsh-----



Lesser Antilles

Forest-----



Low Forest, Woodland-----



Scrub-----



Swamp-----



Mangrove-----



Identify the natural vegetation using symbols and then describe and explain them.

Common mistake

- ✓ Please note that forest is natural vegetation while a forest **plantation** is not natural vegetation.

Example: **In Savanna La Mar's map**



----- **Forest Plantation**