

Elective Geography – Topographical Map Reading Skills

Subject content:

Topic 5: Topographical Map Reading Skills

Candidates will be expected to be familiar with topographical maps. Any map provided will contain a key. Questions will be set based at least in part on the topics in the syllabus. However, there will be instances where candidates will be expected to identify and describe other features as itemised in the following table.

Candidates should be able to:

Read	<ul style="list-style-type: none">• grid references (4- and 6-figure grid references)• direction (both compass and bearings from grid north)
Interpret	<ul style="list-style-type: none">• scales (representative fraction, line/linear and statement) • symbols• human activity from map evidence
Calculate	<ul style="list-style-type: none">• distances (straight-line and winding distances)
Identify	<ul style="list-style-type: none">• broad areas of relief (low river valley region, steep sided uplands)• landforms such as mountain, valley and flood plain
Describe	<ul style="list-style-type: none">• relief using contour intervals• nature of relief using geographical terms (broad, flat, steep-sided, deeply cut, gently sloping, convex, concave)• patterns and location of vegetation, land-use and communication• cross-sections (including annotation) for interpretations. (Candidates will not be asked to construct them)
Explain	<ul style="list-style-type: none">• relationship between land use or communications and relief

Grid References, Distances, Directions and Bearings

Grid references

Grid lines:

Eastings	Northings
Vertical lines	Horizontal lines
Numbers increase towards east	Numbers increase towards north

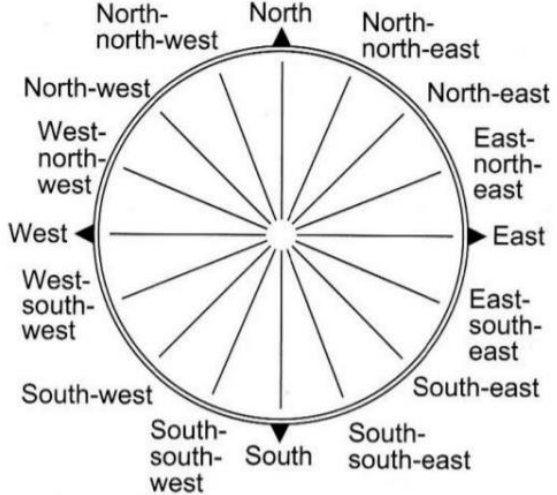
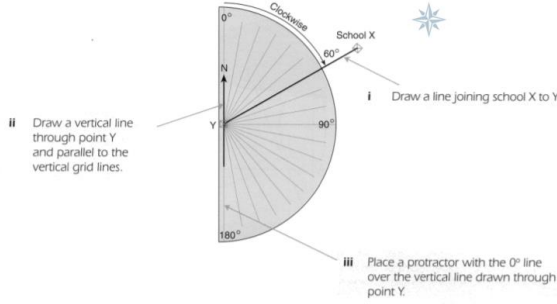
Grid references

Grid reference	Explanation	Example
1. 4-figure grid reference	Provide location of grid square 1) Locate square where feature is situated 2) Take reading at bottom left hand corner 3) Give easting + northing	
2. 6-figure grid reference	Provide precise location of feature (centre of feature) 1) Locate square where feature is situated 2) Divide eastings & northings → 10 equal parts 3) Mark out centre of feature 4) Draw dotted lines 5) Give easting + northing	<p>i After determining the square where the P.O. is located, divide the distance between eastings 21 and 22 into ten equal parts. Do likewise for northings 44 and 45.</p> <p>Fig 2</p> <p>ii Locate the centre of the P.O.</p> <p>iii Follow the dotted line. It will give an easting reading of 216 (6 parts to the right of easting 21) and a northing reading of 445. The 6-figure grid reference is therefore 216445.</p>

Direction


‘from’: point to take direction from

Identify direction:

Direction	Explanation	Example
1. Compass direction	Use compass points 1) Mark out centre of points 2) Draw straight line to join 2 points 3) Draw right-angled cross at start point, indicate north	
2. Compass bearing	Use protractor (measured in degrees clockwise from north, $0^\circ \sim 360^\circ$) 1) Mark out centre of points 2) Draw straight line to join 2 points 3) Draw north arrow from start point 4) Place 0° of protractor on right side of north arrow 5) Read clockwise to obtain bearings	

Scale

Scale: ratio of distance on map to actual distance on ground

Scale	Explanation	Example
1. Representative fraction	Represented as ratio	Scale 1 : 50000
2. Linear scale	Straight line divided into equal parts	
3. Statement	Expressed in words	1 cm on the map represents 0.5 km on the ground

Measuring distances**Distances**

Distance	Steps
Straight-line distance	Draw straight line to join 2 points Measure line using ruler Use scale to calculate distance, express answer in relevant unit
Curved distance	Locate feature on map Place thin string along feature Mark starting point & ending point with pen on string Straighten out string, measure length Use scale to calculate distance, express answer in relevant unit

Physical Features

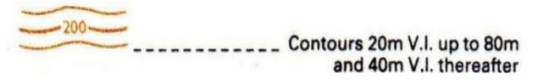
Relief: change in height of land surface (deduced from arrangement of contour lines & intervals)

Feature: a single part of landscape

Contour lines

Contour lines

- Continuous lines joining points of the same height
 - Slope
 - Shape
- Vertical interval (V.I.):** difference in height between adjacent contour lines



Types of slopes

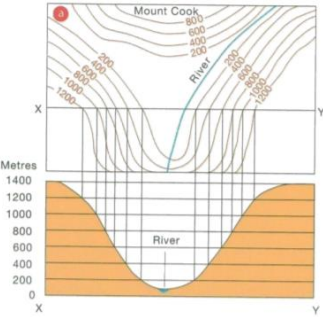
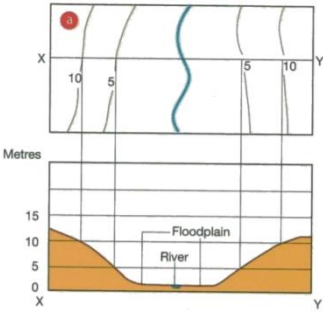
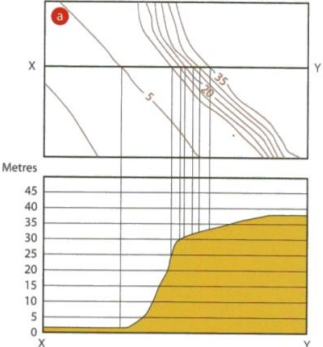
Types

- Steep slope & gentle slope**
- Concave slope & convex slope**
- Uniform slope & stepped slope**

Type	Explanation	Figure
Steep slope	Closely spaced contours	
Gentle slope	Widely spaced contours	
Concave slope	Contours spaced closer together at top, further apart at bottom	
Convex slope	Contours spaced further apart at top, closer together at bottom	
Uniform slope	Contours equally spaced	
Stepped slope	Contours alternately spaced wide + narrow	

Relief features

Feature	Explanation	Figure
1. Hill	<ul style="list-style-type: none"> • Rounded highland (usually) • < 600 m above sea level 	<p>The diagram for a hill shows a plan view with concentric contour lines labeled 200 and 400. A cross-section below shows a rounded, symmetrical landform. The vertical axis is labeled 'Metres' with a scale from 0 to 600 in increments of 200. The horizontal axis is labeled 'X' and 'Y'.</p>
2. Mountain	<ul style="list-style-type: none"> • Large, steep-sided highland (usually) • Ends in summit / peak • > 600 m above sea level 	<p>The diagram for a mountain shows a plan view with contour lines labeled 200, 600, and 1000. A cross-section below shows a steep-sided, triangular landform with a sharp peak. The vertical axis is labeled 'Metres' with a scale from 0 to 1400 in increments of 200. The horizontal axis is labeled 'X' and 'Y'.</p>
3. Ridge	<ul style="list-style-type: none"> • Long, narrow piece of elevated land • Elongated contour lines close to each other 	<p>The diagram for a ridge shows a plan view with elongated, wavy contour lines labeled 200, 600, and 1000. A cross-section below shows a long, narrow landform with a rounded top. The vertical axis is labeled 'Metres' with a scale from 0 to 1400 in increments of 200. The horizontal axis is labeled 'X' and 'Y'.</p>
4. Plateau	<ul style="list-style-type: none"> • Highland with steep slopes (closely spaced) + flat summit (absence) 	<p>The diagram for a plateau shows a plan view with contour lines that are closely spaced on the sides and widely spaced on the top, labeled 200, 600, and 1000. A cross-section below shows a flat-topped landform with steep sides. The vertical axis is labeled 'Metres' with a scale from 0 to 1400 in increments of 200. The horizontal axis is labeled 'X' and 'Y'.</p>

<p>5. Valley</p>	<ul style="list-style-type: none"> • Depression between 2 highlands • V-shaped contour lines (V points towards higher elevation) 	
<p>6. Floodplain</p>	<ul style="list-style-type: none"> • Low-lying land adjacent to river • Flat (contours spaced far apart) • Sediments deposited at lower source from upper course of river (rich in nutrients) → fertile soil + wet rice cultivation → settlements • Flood when river overflow banks 	
<p>7. Cliff</p>	<ul style="list-style-type: none"> • Steep + near vertical (very steep, contours closely spaced) • Usually along coasts 	

Natural vegetation

Natural vegetation: plants grow naturally (NOT by man)

1. Forest vegetation
2. Desert & semi-desert vegetation
3. Grassland vegetation
4. Scrub vegetation

Human Activities

Land use

1. **Industrial activities**
2. **Tourism activities**
3. **Transport and communication**
4. **Agricultural activities**
5. **Settlements**

Industrial activities

Common examples

- (a) Mining
- (b) Manufacturing
- (c) Processing

Map evidence for manufacturing:

Feature	Explanation
1. Large buildings	<ul style="list-style-type: none"> • e.g. 'Mill' and 'Sugar Factory' • In groups
2. Power line	<ul style="list-style-type: none"> • Need constant / large supply of electrical energy • Usually found near plantations → agricultural crops (e.g. sugar cane)
3. Mining	<ul style="list-style-type: none"> • e.g. 'Mining Trench' and 'Mine Dumps'

Transport and communication

Answering technique:

1. Give brief overview
2. Identify specific examples by providing evidence
3. Provide any other observations

Describe patterns & locations:

Step	1	2	3
Vegetation	The figure shows that natural vegetation is quite sparse.	Natural vegetation is sparse and can be found in the northeast of the map area on steep slopes (e.g. grid square ____). They occur in patches among large areas of agricultural land.	Vegetation could have been cleared for cultivation.
Land use	The land has been used for settlements as well as agricultural and commercial activities. The settlements and commercial activities are mostly located near the coast while agricultural activities are located further inland.	<p>A town is located along the coast in the southwest section of the map area. The area has a concentration of buildings and facilities that provide services such as clinics, schools and churches (e.g. in grid square ____).</p> <p>An industrial area is in the north of the town in grid square ____ where a harbour, jetties and factories are located.</p> <p>Away from the coast, agricultural activities can be found in grid squares such as ____.</p> <p>The town also engages in trade or fishing as evident from the deep water harbour located at ____.</p> <p>Tourism is active in the area, as shown by the presence of hotels such as ____ at grid square ____.</p>	The location of settlements and commercial activities near the coast could mean that the people's livelihood depends largely on the sea. Trading and tourism are possible activities people engage in.
Transport & communication	Transport and communication infrastructure is relatively well-developed. This is shown by the fact that almost every grid square contains at least one type of road. The densest networks of transport and communication infrastructure are found near human activities.	<p>The densest network of surfaced roads is located near settlements and commercial activities between eastings ____ and northings ____.</p> <p>The densest network of unsurfaced roads is located near agricultural activities in grid squares ____.</p> <p>The sea is also a major mode of transport as indicated by the jetties found at grid square ____.</p>	Transport and communication infrastructure is located near human activities because the infrastructure supports these activities. Roads are needed to transport cultivated crops to the market, and people need transport networks to move from place to place.

Explain relationship between relief & land use / transport and communication

Step	1	2	3
Land use	Land uses such as settlements, and commercial and agricultural activities are generally found on low and gentle relief. Agricultural activities may also be found on slightly higher relief.	Majority of the settlements and commercial activities are found near the coast, on low relief of about 50 metres. They are located between eastings ____ and northings ____ . On the other hand, agricultural activities in grid references ____ are located on steeper slopes. This is probably because the main focus of human activities in this area is related to the import and export of resources. Hence, the commercial activities are found nearer to the port, while the agricultural activities are found further away. Furthermore, the agricultural crops could also be grown on the slopes to prevent soil erosion in the area.	There are, however, some settlements found on slightly higher relief such as in grid squares _____. These settlements could possibly be the homes of farmers who cultivate crops in these areas.
Transport & communication	Most roads are generally located in areas with low relief. However, unsurfaced roads and footpaths may be found on slightly higher relief.	Majority of the surfaced roads are found on low relief where settlements are most dense, between eastings ____ and northings _____. On the other hand, unsurfaced roads and footpaths are found on slightly higher relief, usually in areas with agricultural activities such as in grid squares _____. As there are probably more human activities in the areas of low relief, a greater number of surfaced roads allow people to move easily from one place to another. It also allows for the smooth transport of resources. However, the roads in the agricultural areas are less built up because fewer people use them.	An exception is the surfaced road found in grid square _____, which is on relatively high relief. This road is probably used for the transport of agricultural products to the port or for people to travel to areas that are further inland.



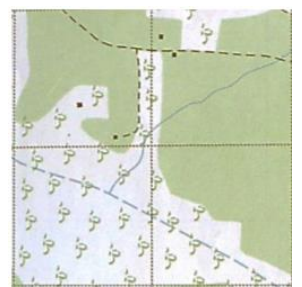
Agricultural activities

Crops grown for plantations / subsistence

Factors	Explanation
1. Availability of water	<ul style="list-style-type: none"> • Dams, rivers and reservoirs • Irrigation • Water tanks, wells, irrigation canals
2. Settlements nearby	<ul style="list-style-type: none"> • Plantation: crops grown commercially → need large workforce (hire workers / labour) • Roads leading to processing factory
3. Gently sloping / flat land	<ul style="list-style-type: none"> • Ease of cultivation • Use machinery for harvest
4. Subsistence farms	<ul style="list-style-type: none"> • Smaller in size (produce food for farmer + family only)

Settlements

Settlements:

Type	Features	Figure
1. Nucleated settlements	<ul style="list-style-type: none"> • Well-developed road network • Buildings clustered together + connected by street formation • Good transport network and accessibility • Develop in areas having favourable site conditions <ul style="list-style-type: none"> ○ good roads ○ water ○ flat land 	
2. Linear settlements	<ul style="list-style-type: none"> • Buildings located along line (straight / curved) feature <ul style="list-style-type: none"> ○ footpath ○ road ○ railway ○ river 	
3. Dispersed settlements	<ul style="list-style-type: none"> • Single dwellings located along roads, without fixed pattern (random distribution) • Rural areas / areas with agricultural land use • Dispersed / isolated settlements <ul style="list-style-type: none"> ○ Farmland → farm houses situated far away from each other ○ Few natural resources, low population, infertile soil → few towns develop ○ Hilly land → settlements far apart from each other (only few buildings built) 	

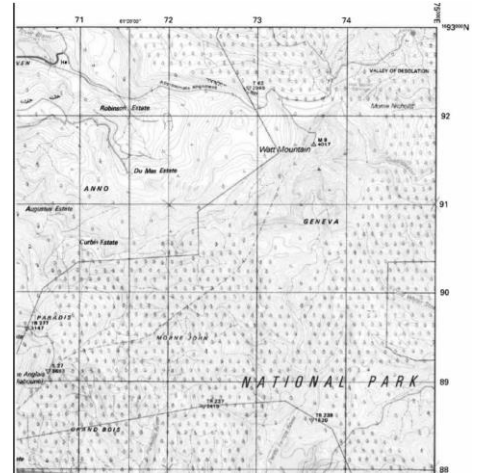
Typical questions

Structured questions

- 1 Give two reasons why the area east of Easting 70 and north of Northing 88 is not densely populated. [2]

- 1) Mountainous area which is a steep and hostile environment that is not suitable for settlement.
- 2) The area has dense forests, there are too many trees that need to be cleared for settlement.
- 3) This is a nature reserve so no development can be carried out.

(Mention evidence from map + explain)



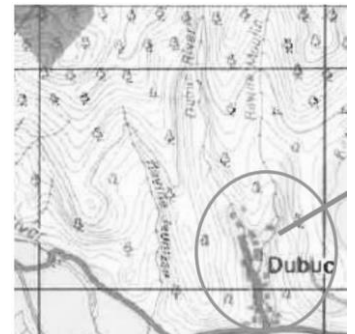
- 2 State and give reasons for the settlement pattern of Dubuc (grid squares 7384 and 7385). [3]

Linear settlement pattern.

Houses are built along the road for easy accessibility and transport.

There are steep slopes on both sides and these do not encourage settlement.

(State + explain)



- 3 Describe and explain the pattern of land use in the part of the map indicated below. [4]



EVIDENCE:

Most of the settlements are found near the sea – in the south-western region.

EXPLANATION:

Undulating / gentle-sloping land at the coastal area makes it easier for people to build industries, transport and houses.

EVIDENCE:

Cultivation and plantation is found mostly on the gentle-sloping land too.

EXPLANATION:

Gentle-sloping type of land is the most preferred type of land for growing crops as the soil will be well-drained. It also facilitates the use of machinery in the farms.

EVIDENCE:

A number of factories (6492) are found near the jetties and Deep Water Harbour.

EXPLANATION:

These factories may require the need for port facilities as they may be importing raw materials or exporting their finished products.

4 Examine the area bounded by Easting 72 to 75 and Northing 88 to 91.

- (a)** Study the natural vegetation present in the area.
What type of vegetation does this area have?

[1]

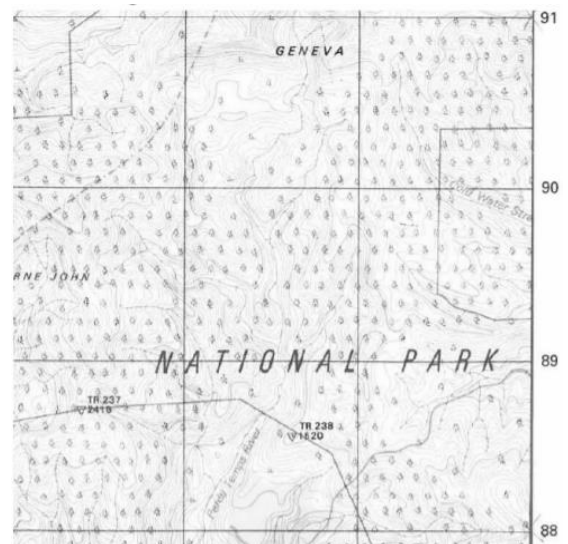
Type of vegetation: Forest

- (b)** Why do you think there is no cultivation in this area?

[3]

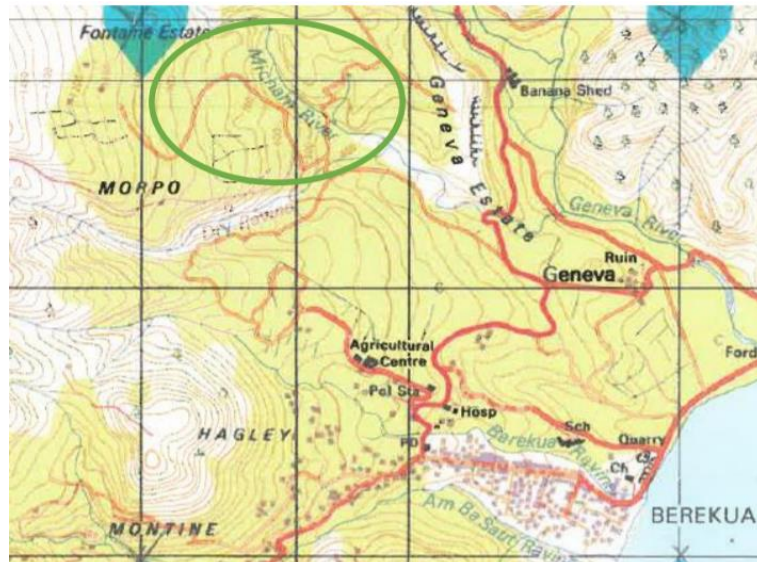
EVIDENCE + EXPLANATION:

- 1) It is a National Park, an area protected by law so no cultivation can take place).
- 2) It has very steep slopes as evidenced by the closely spaced contours, thus making it hard to operate machinery.
- 3) The altitude is very high (e.g. the highest point of the area is 2418m as shown at Grid Square 7388), making it difficult for cultivation to take place.



5 What is the main economic activity at Easting 71 to 73 and Northing 84 to 86? Account for its distribution in the area.

[4]

**STATE:**

The main economic activity is agriculture / cultivation.

EVIDENCE + EXPLANATION:

- 1) Presence of low lying land (200m to 1200m). Easy access to the area.
- 2) Land is gently sloping as evidenced by widely spaced contours. Facilitates the use of machinery, well-drained soils.
- 3) Water is available from the Micham River and Geneva River to support irrigation / provide water for the crops.