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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2022

GEOGRAPHY: PAPER II

EXAMINATION NUMBER

Time: 1½ hours 100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

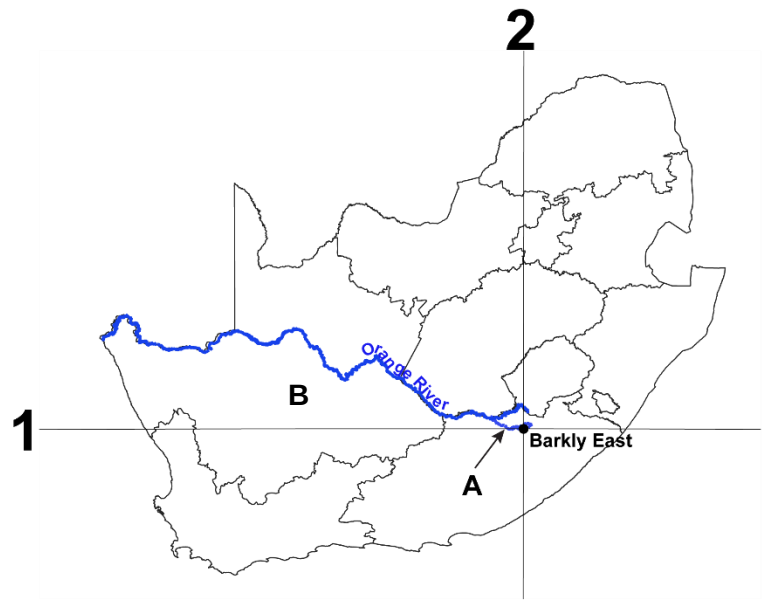
1. This question paper consists of 26 pages, a topographic map extract, an orthophoto map extract and a yellow equipment sheet. Please check that your question paper is complete.
2. Write your examination number in the blocks provided above.
3. Read the questions carefully.
4. Answer ALL the questions in the spaces provided on this question paper.
5. Carefully study the 1:50 000 topographic map extract 3027 DC BARKLY EAST and the orthophoto map extract. The area covered by the orthophoto map extract is marked with a pink block on the topographic map extract. **The conventional symbols are not on the map extract but included on page 23 for reference purposes.**
6. The topographic map extract has grid lines with markings A to F and 1 to 10 that can be used to identify locations by grid reference.
7. The completed question paper must be handed to the invigilator at the end of the examination. The topographic map extract and the orthophoto map extract may be retained by the school for future use.
8. The yellow equipment sheet can be used in lieu of equipment not brought to the examination by the candidate. It may also be used for rough work. There is a fold mark indicating where it should be folded. A magnifying glass and calculator may be used.
9. It is in your own interest to write legibly and to present your work neatly.
10. Three blank pages (pages 24–26) have been included at the end of the paper. If you run out of space for an answer, use these pages. Clearly indicate the number of your answer should you use this extra space.

FOR MARKER'S USE ONLY

Question	1	2	3	4	**Total**
Marks	28	28	29	15	**100**
Obtained					

QUESTION 1 FLUVIAL GEOMORPHOLOGY, MAP SKILLS

Figure 1 – Location map



Fact File: Barkly East

- Barkly East is a small service town in the Eastern Cape at the southern tip of the Drakensberg on the Langkloofspruit, a tributary of the Kraai River, which in turn is a tributary of the Orange River. The town is at an elevation of 1 790 m.
- It has a population of less than 10 000 and the economy is dominated by the tertiary sector. Sheep farming and mining contribute a very small percentage to GDP.
- Tourism along the Maloti Route is seen as a possible growth sector, with the ski resort of Tiffindell being close by.

[Source: Examiner]

Refer to the location map above, the topographic map extract 3027 DC BARKLY EAST and the orthophoto map extract to answer the questions that follow.

1.1 Name the province labelled **B** on the location map in Figure 1.

Northern Cape	
Free State	
Eastern Cape	
KwaZulu-Natal	

(1)

1.2 The point at which the Kraai River (**A** in Figure 1) meets the Orange River is known as a ...

watershed.	
confluence.	
interfluve.	
rejuvenation.	

(1)

1.3 The Orange River is an example of a(n) … river.

non-perennial	
periodic	
episodic	
exotic	

(1)

1.4 The Orange River drains into the (1.4.1) Ocean in a(n) (1.4.2) direction. Choose from the options below.

Indian	Atlantic	Pacific	easterly	westerly	northerly

1.4.1 _____

1.4.2 _____ (2)

1.5 The Orange River forms the international border between South Africa and …

Botswana.	
Mozambique.	
Namibia.	
Zimbabwe.	

(1)

1.6 The major watershed of the Orange River is the ...

Witteberg.	
Drakensberg.	
Magaliesberg.	
Roggeveld.	

(1)

1.7 1.7.1 The Kraai River is in its upper course. Choose THREE pieces of evidence from the topographic map extract to prove this. Circle the correct options.

waterfalls	braiding	floodplain	gorge
parallel drainage	oxbow lake	marshland	alluvial fan

(3)

1.7.2 Study the section of the Kraai River at grid block reference C/D 1/2 labelled **G–F**.

(a) Draw a simple cross profile from **G** to **F**. Identify the following:

- slip-off slope, undercut slope, slowest flow, fastest flow. (4)

One mark will be awarded for correct orientation. (1)

Cross profile **G** to **F**

(b) Provide a reason for the presence of cultivated land on this bend.

_____

_____

_____

(2)

1.8 Study Figure 2.

Figure 2 – Drainage basin of river system E (indicated by red polygon on the topographic map extract)

1.8.1 Complete the stream-ordering table below of these rivers as they drain towards **E**.

Stream order 1	Stream order 2	Stream order 3

(3)

1.8.2 The dam is missing in Figure 2. Using the correct conventional symbol (do not worry about colour), draw the dam in the correct place on Figure 2.

(2)

NOTE: THIS QUESTION MUST BE COMPLETED ON FIGURE 2 ABOVE.

1.8.3 How could the law of stream ordering have helped the owner choose the correct location for the dam?

_____

_____

_____

(2)

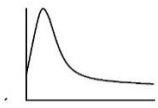
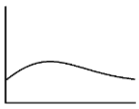
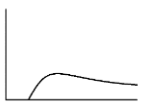
1.8.4 The estimated area of this drainage basin is …

1 800 000 m^2	
3 600 000 m^2	
6 120 000 m^2	
9 000 000 m^2	

Calculations:

(2)

1.8.5 This drainage basin could be described as long and narrow. A gauging station records data during a summer thundershower and a flood hydrograph is produced. Choose the most appropriate hydrograph from the options below.

Option	Hydrograph	Indicate your choice below (write only 1, 2 or 3)
1		
2		
3		

(1)

1.8.6 Provide a possible reason for building the dam in B8.

_____

(1)
[28]

Q1 subtotal

QUESTION 2 SETTLEMENT, MAP SKILLS

2.1 Study Photograph 1.

Photograph 1 – Farm in E5

[Source: Examiner]

2.1.1 Name the farm found here.

_____

(1)

2.1.2 This is an isolated farmstead. Provide ONE reason from the topographic map extract to support this statement.

_____

_____

(1)

2.1.3 Explain ONE situational factor the owners considered when establishing their farm.

_____

_____

(1)

2.1.4 Circle the correct option.

This farm in an ***extensive / intensive*** operation and would be classified as a ***commercial / subsistence*** farm.

(2)

2.1.5 This farm has a windpump as seen by the conventional symbol in E5 and in Photograph 2 below. Photograph 3 shows a sign on a road as you enter Barkly East.

Photograph 2 – Windpump

Photograph 3 – Sign on road

[Source: Examiner]

(a) Give TWO pieces of topographic map extract evidence (other than the windpump and non-perennial water) to prove that the mapped area is generally 'water scarce'.

- _____
- _____ (2)

(b) How is the water that is drawn by the windpump stored?

_____

(1)

(c) What evidence is there on the topographic map extract (besides the indication of a windpump and a non-perennial river) that water is available here for pumping?

_____

(1)

(d) Give co-ordinates of this windpump.

(i) Choose the correct latitude.

30° 57' 30" S	
30° 57' 34" S	
30° 57' 38" S	
30° 57' 42" S	

(ii) Choose the correct longitude.

27° 34' 11" E	
27° 34' 15" E	
27° 34' 19" E	
27° 34' 23" E	

(2)

2.2 Study Photograph 4 below.

Photograph 4 – Nkululeko (E6)

[Source: Examiner]

2.2.1 What type of settlement is evident in Photograph 4?

_____

(1)

2.2.2 Using photographic or topographic map extract evidence, describe TWO service delivery issues people in Photograph 4 may face on a daily basis.

- _____

_____

- _____

_____

(2)

2.2.3 Explain ONE possible reason for the location of this settlement.

_____

_____

_____

(2)

2.2.4 Study photographs 5 and 6 below.

Photograph 5 – Road in Barkly East residential area (F6)

Photograph 6 – Graveyard (E7)

[Source: Examiner]

(a) Describe the street pattern evident in this area by studying Photograph 5 and the topographic map extract (F6).

_____

_____

(1)

(b) What dangers will the residents of Barkly East (F6) face if the Commonage Dam wall should fail?

_____

_____

(1)

(c) The graveyard in Photograph 6 is an example of an apartheid-style buffer. Give topographic map extract evidence to justify this statement.

_____

_____

(1)

2.3 Study Photograph 7 below.

Photograph 7 – Photograph taken from R56 in E4

[Source: Examiner]

2.3.1 What is this feature labelled **F** in Photograph 7?

_____

(1)

2.3.2 (a) From which position (1 or 2) along the R56 (in E4 on the topographic map extract) was Photograph 7 taken?

1	
2	

(1)

(b) Provide a reason for your answer to (a) using topographic map evidence.

_____

_____

(1)

2.3.3 (a) The approximate bearing of feature **F** from where Photograph 7 was taken is …

30°.	
135°.	
210°.	
325°.	

(2)

(b) The magnetic declination for 2022 is ...

26° 01' W.	
26° 12' W.	
26° 23' W.	
26° 34' W.	

Calculations:

(2)

(c) Calculate the magnetic bearing using your answers to (a) and (b). Complete the table using the formula below.

True bearing + magnetic declination = magnetic bearing		

(2)
[28]

Q2 subtotal

QUESTION 3 ECONOMY, MAP SKILLS, GIS

3.1 Study the fact file below and answer the questions that follow.

Fact File: Tourism in the area

- Tiffindell's state-of-the-art snowmaking equipment allows us to make snow throughout the winter season.
- In summer, spring and autumn, Tiffindell becomes one of the best off-the-beaten-track adventure lands in South Africa.
- Tiffindell Ski Resort is approximately 100 km from Barkly East on the R396. This is a potholed dirt road suitable for high-clearance vehicles.
- The Aliwal North–Barkly East railway line was arguably the most scenic route in South Africa with eight switchbacks (Photograph 8 on page 14) but was closed in 2001 after a disastrous accident claimed many lives.

Hint: a switchback is a zigzag-shaped bend in the rail route

[Source: <http://www.tiffindell.co.za>, Examiner adapted]

3.1.1 Choose the correct economic sector for each activity or place (tick the correct box).

Activity / Place	Economic sector			
	Primary	Secondary	Tertiary	Quaternary
Tiffindell Ski Resort				
Transport of agricultural products to urban areas and industrial commodities to rural areas, which was the main function of the old rail route.				

(2)

3.1.2 By studying the 'old rail route' that starts in E5 and runs north towards Aliwal North, and Photograph 8, explain TWO possible difficulties engineers building this rail route in 1903 would have faced. Use specific topographic map or photographic evidence.

Photograph 8 – Switchbacks (A3 and A4)

[Source: Examiner]

- _____
- _____

(2)

3.1.3 Some of the switchbacks on the old rail route are visible in A3 and A4. Tierkrans Bridge (A4/5) is shown below in Photograph 9.

Photograph 9 – Tierkrans Bridge (A4/5)

[Source: Examiner]

Calculate the gradient the train would have had to climb from the Tierkrans Bridge to position **X** in A3. Select an appropriate answer.

Distance from Tierkrans Bridge to position **X** (A3): 4 250 m

(a) Difference in height

80 m	
100 m	
120 m	
140 m	

(2)

(b) Gradient

1:53,1	
1:42,5	
1:35,4	
1:30,3	

(2)

Calculations:

3.2 Tourism is seen as an economic sector that could boost the local economy of Barkly East. Create a simple webpage for Barkly East Tourism showcasing Tiffindell.

What makes Tiffindell so attractive to visit?		(2)
How to get there from Barkly East? (Use at least ONE piece of topographic map evidence.)		(1)
Activities on offer? (at least 3)		(3)
Possible road conditions?		(1)

3.3 ER24 and Tiffindell Ski Resort want to build a helipad in the area to provide emergency services for road accidents and to airlift people to the Cloete Joubert Hospital (F6). A site needs to be chosen. You have been asked to suggest a suitable location. Use your GIS knowledge to do this.

The requirements for the siting of the helipad are:

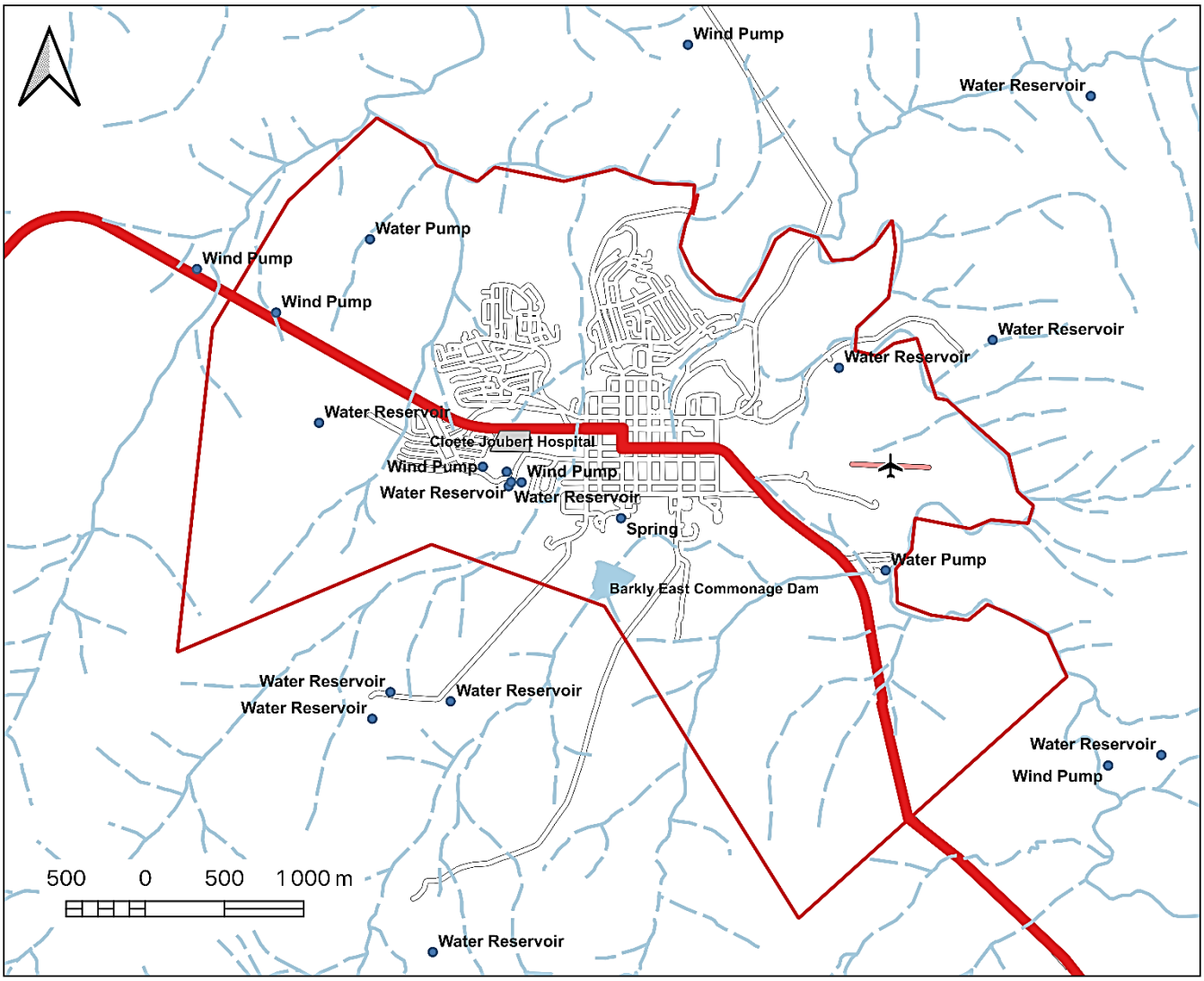
1. It must **not be in** the city limits but it must be within 500 m of the limits of the city.

2. It must be located within 500 m of any source of water.

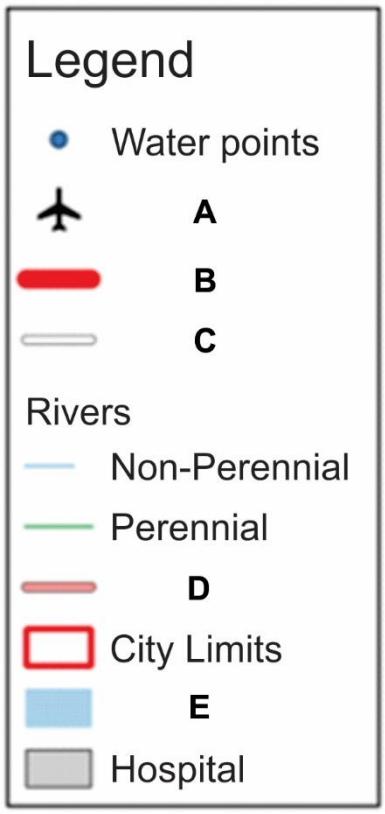
3. It must be within 250 m of a national or main/other road.

4. In addition to meeting the criteria above, it should be as close to the hospital as possible.

Figure 3 – GIS-generated map of Barkly East



3.3.1 Complete the legend for the GIS-generated map, listing all the layers shown on the map.



A – _____

B – _____

C – _____

D – _____

E – _____

(5)

3.3.2 Indicate on Figure 3 (page 17) the site that would satisfy all the requirements for developing the helipad. (Use the letters 'HP' to indicate the site.)

(3)

3.3.3 (a) What geoprocessing technique would be used if a computer had been used to determine the best site for the helipad?

Manipulation	
Buffering	
Integration	
Resolution	

(1)

(b) The geoprocessing done in (a) above would be an example of …

manipulating global data.	
manipulating spatial data.	
manipulating local data.	
None of the above.	

(1)

3.3.4 (a) The layer showing rivers has two legend entries. Filtering data in an attribute table based on specific content of a field refers to the following:

Attribute query	
Spatial query	
Locational query	
Cartographic query	

(1)

(b) Give TWO examples of data that would be found in an attribute table containing fluvial information on the Barkly East area.

_____ _____

(2)

3.4 When generating this GIS map using appropriate software, the layers were arranged in the following order from top to bottom …

line, polygon, point.	
polygon, line, point.	
point, line, polygon.	
polygon, point, line.	

(1)
[29]

Q3 subtotal

QUESTION 4 CLIMATE

4.1 The Barkly East area experiences an afternoon thunderstorm. An expected rainfall map for Southern Africa is shown below as well as a rainfall graph for Barkly East.

Figure 4 – Expected rainfall map of Southern Africa

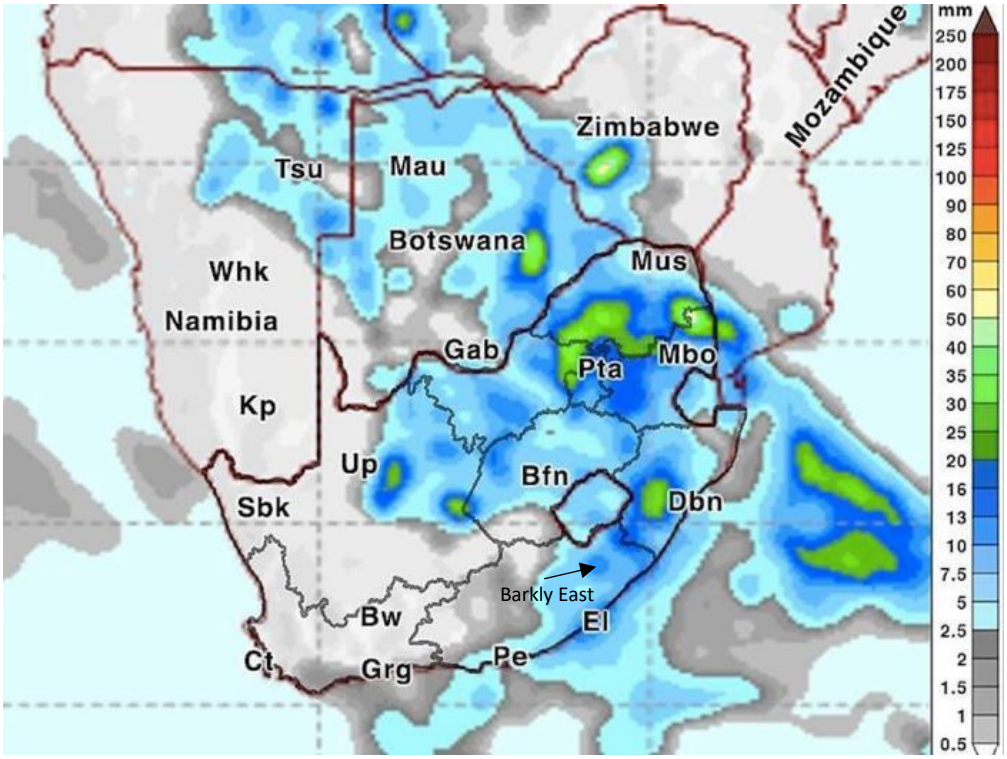
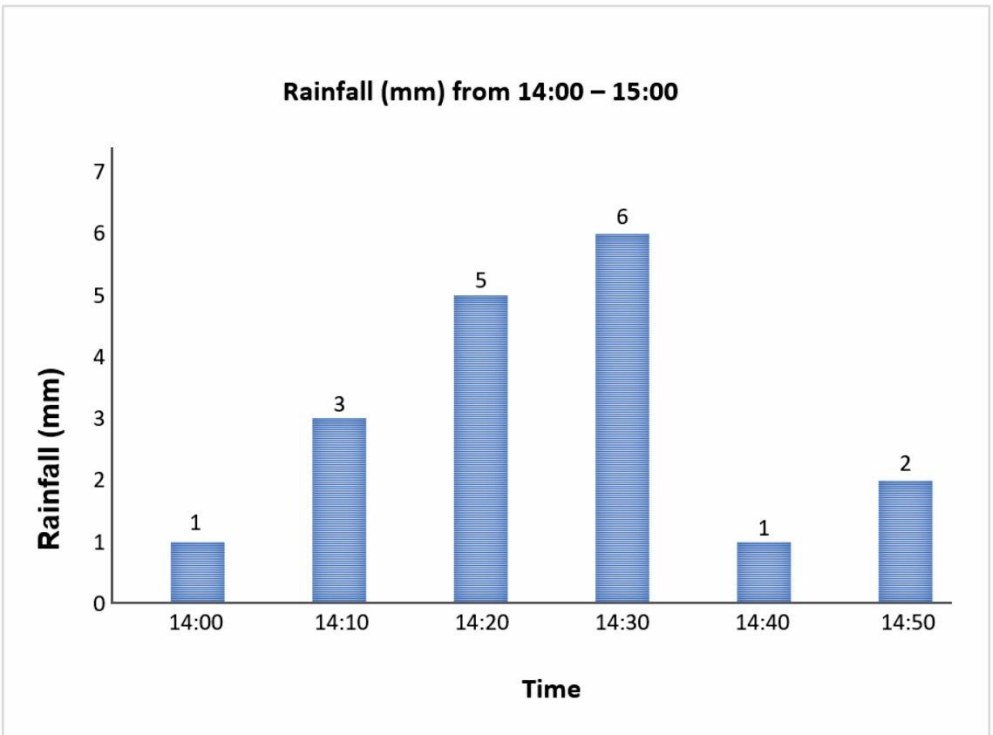


Figure 5 – Thunderstorm rainfall graph



4.1.1 Calculate the total amount of rain that fell during this storm.

_____ mm

(1)

4.1.2 How long did the storm last? Circle the correct answer.

40 minutes / 60 minutes / 70 minutes

(1)

4.1.3 Provide the names of TWO neighbouring countries where heavy rain (over 20 mm) is expected.

_____ _____

(2)

4.1.4 A lot of the rain falls over the Indian Ocean on this day. Provide ONE reason for this.

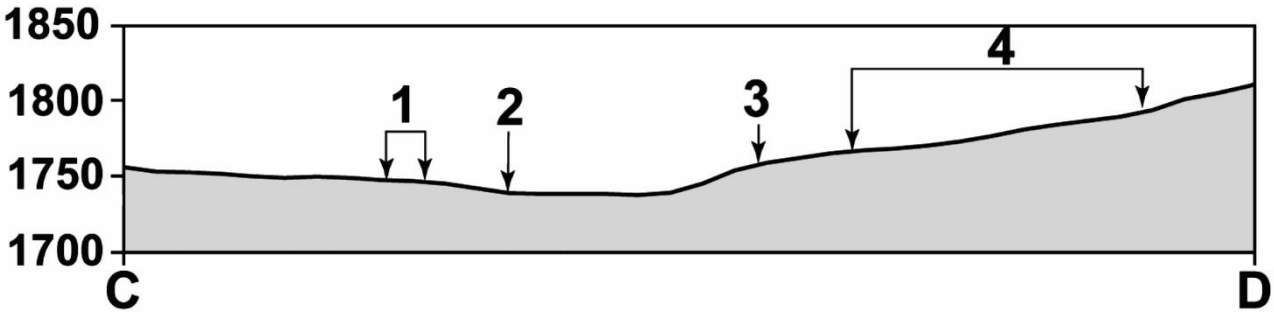
_____

_____

(1)

4.2 The orthophoto map extract shows an area in E7/8. In a field study conducted at 6 a.m. in winter, temperatures (–2 °C and 0 °C) were recorded between C and D.

Figure 6 – Cross section from C to D



4.2.1 Study Figure 6 and the orthophoto map extract.

Provide the land uses/features evident for 1–4 on cross section C–D.

1. _____

2. _____

3. _____

4. _____

(4)

4.2.2 Complete the table below.

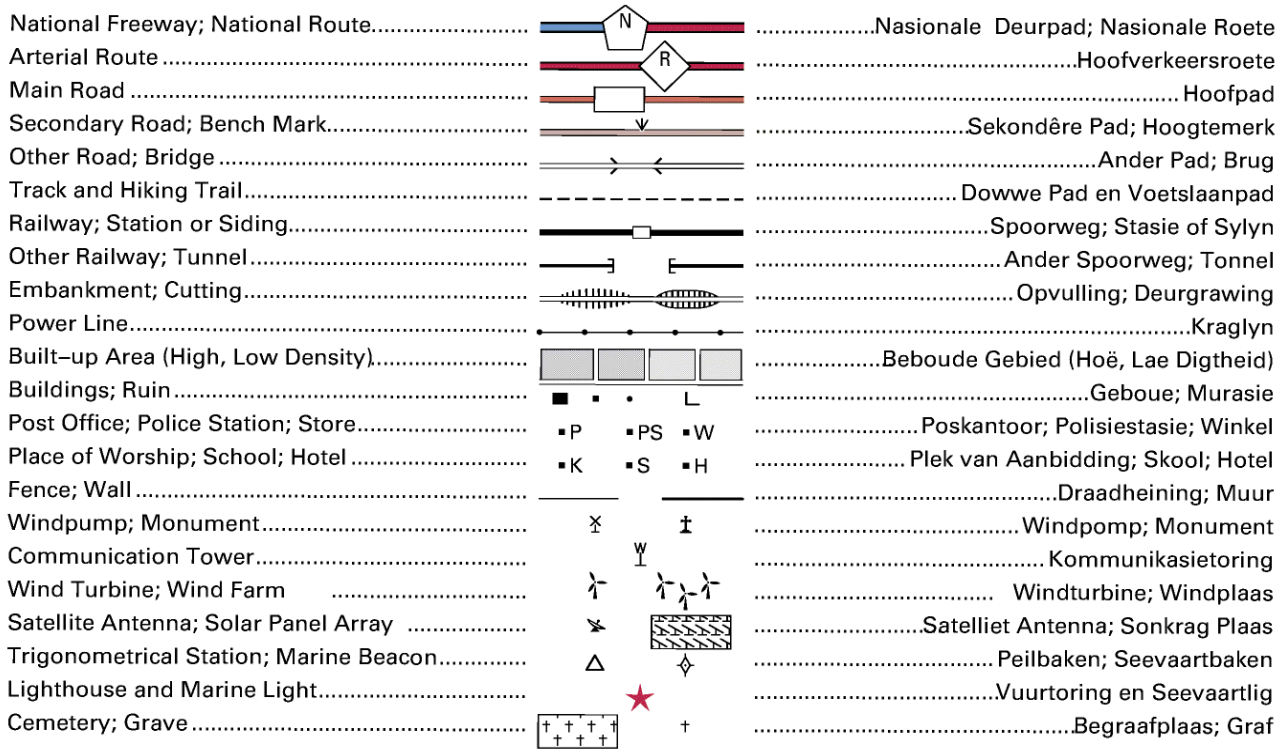
Recorded temperature	–2 °C	0 °C	
Position at which temperature was recorded.	2 or 3	2 or 3	(2)
Reason for position chosen (use map extract evidence).			(4)

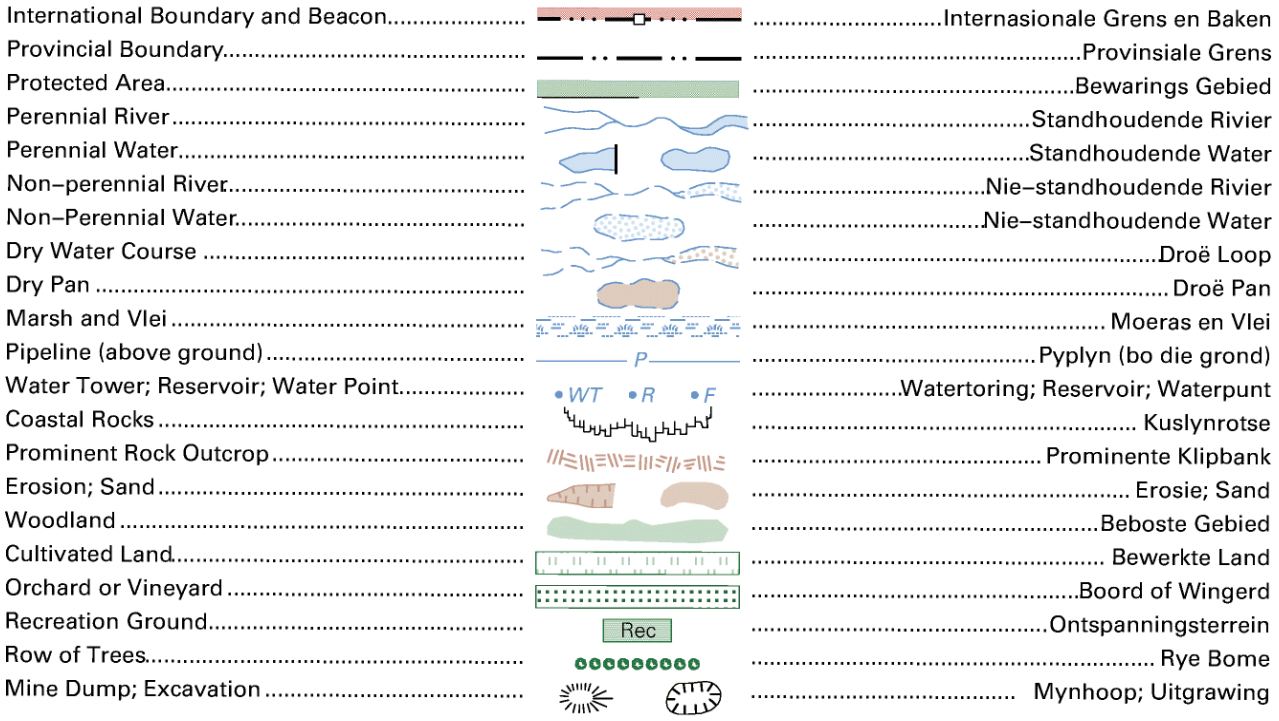
[15]

Q4 subtotal

Total: 100 marks

Conventional symbols





ADDITIONAL SPACE (ALL QUESTIONS)

REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.

