

EXAMINATION	NATIONAL SENIOR CERTIFICATE
GRADE	12
DATE	JUNE 2024
SUBJECT	GEOGRAPHY
PAPER	1
MARK TOTAL	150
DURATION (HOURS)	3
NUMBER OF PAGES	17



SOUTH AFRICAN COMPREHENSIVE ASSESSMENT INSTITUTE
SUID-AFRIKAANSE KOMPREENSIEWE ASSESSERINGSINSTITUUT

INSTRUCTIONS AND INFORMATION

1. This question paper consists of **THREE** questions.

SECTION A

QUESTION 1: CLIMATE AND WEATHER (60 MARKS)

QUESTION 2: GEOMORPHOLOGY (60 MARKS)

SECTION B

QUESTION 3: MAP SKILLS AND CALCULATIONS (30 MARKS)

2. Answer **ALL THREE** questions.
3. Leave a line between subsections of questions answered.
4. Start **EACH** question at the top of a **NEW** page.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Answer questions in **FULL SENTENCES**, except where you have to state, name, identify or list. Write in full sentences when answering paragraph questions.
7. Units of measurement **MUST** be indicated in your final answer.
8. Draw fully labelled diagrams when instructed to do so.
9. You may use a non-programmable calculator and a magnifying glass.
10. Write neatly and legibly.

SECTION B: ADDITIONAL INSTRUCTIONS AND INFORMATION

11. Extracts of a 1:50 000 topographical map 2530CA BELFAST and a 1:10 000 orthophoto map 2530 CA 16 BELFAST, of a part of the mapped area, are provided.
12. Marks are allocated for the calculations/steps and **NOT** full marks for the correct answer only. The correct substitution should be indicated for the stated formula.
13. Return the topographical map and orthophoto map to the invigilator at the end of the examination session.

SECTION A

QUESTION 1: CLIMATE AND WEATHER

1.1 Four options are provided as possible answers to the following statements/ definitions. Choose the correct answer and write only the number and the correct letter (A – D) in your answer book. e.g. 1.1.9 A.

1.1.1 Tropical cyclones form...

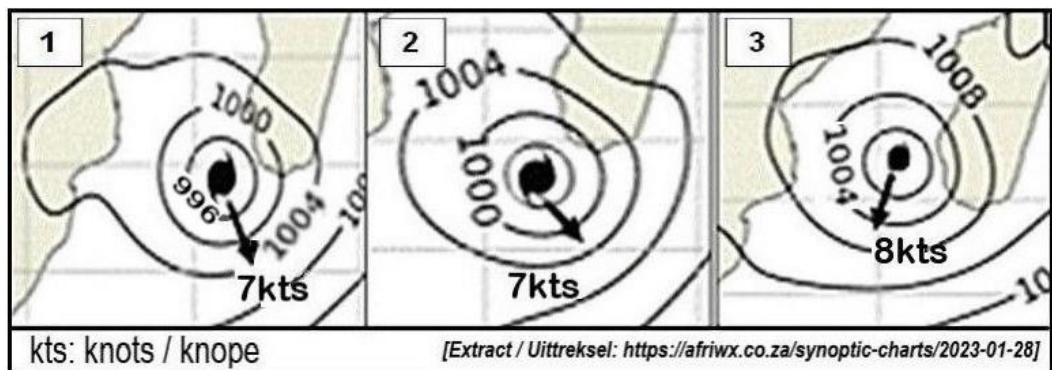
- A. on the western side of continents in warm oceans.
- B. between 5° North and 5° South of the equator.
- C. where tropical easterly winds and westerly winds meet.
- D. in the tropical easterly wind belt.

1.1.2 Conditions necessary for the formation of tropical cyclones are ...

- i. coriolis force
- ii. the release of latent heat
- iii. very strong winds
- iv. a maximum sea surface temperature of 24°C

- A. ii and iv
- B. i and iii
- C. iii and iv
- D. i and ii

The extracts below are from three consecutive synoptic weather maps for 28 January 2023, showing tropical cyclone Cheneso.



1.1.3 The air pressure at the centre of Cheneso in extract 2 is ...

- A. 1004 hPa (mb)
- B. 7 knots
- C. 996 hPa (mb)
- D. 1000 hPa (mb)



- 1.1.4 The order of increasing maturity of the stages of development of Cheneso in extracts 1, 2 and 3 is ...
- A. 2 – 3 – 1.
 - B. 1 – 2 3.
 - C. 3 – 2 – 1.
 - D. 3 – 1 – 2.
- 1.1.5 The worst weather conditions are experienced in the ... in a tropical cyclone in the Southern Hemisphere.
- A. eye
 - B. eye wall
 - C. forward right-hand quadrant
 - D. forward left-hand quadrant
- 1.1.6 Winds with a velocity of more or less 150km/h are described as ... winds.
- A. gale force
 - B. torrential
 - C. hurricane strength
 - D. storm
- 1.1.7 The bulge of sea water reaching the coast, caused by strong winds blowing during a tropical cyclone is called a ...
- A. storm bulge.
 - B. sea bulge.
 - C. tsunami.
 - D. storm surge.
- 1.1.8 A long-term environmental effect of tropical cyclones is ...
- A. a loss of life.
 - B. electricity supply can be cut off.
 - C. crops are destroyed.
 - D. floods remove top soil.

(8x1) = [8]



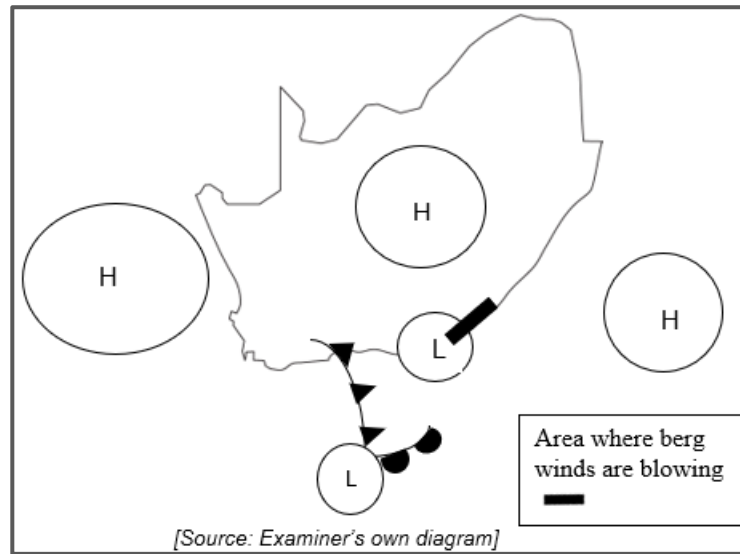
- 1.2 The following statements refer to one of the three anticyclones that influence the climate of South Africa. Choose the correct anticyclone that fits the description from the list below. Write only the correct letter (A-C) on your answer sheet. e.g. 1.2.8 – A.

<p>A – Kalahari High pressure/anticyclone B – South Atlantic High pressure/anticyclone C – South Indian High pressure/anticyclone</p>
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- 1.2.1 Warm air flows from this high pressure over the eastern parts of the country towards the interior in summer.
- 1.2.2 Involved in the formation of berg wind conditions.
- 1.2.3 Ridges in the south of the country causing strong south-easterly winds along the Southern Cape coastal region.
- 1.2.4 Contributes to seasonal droughts in the interior.
- 1.2.5 Can cause a cut-off low pressure to form during winter.
- 1.2.6 Cold air flows from this high pressure towards the interior in summer.
- 1.2.7 Lessens in intensity and rises up during summer, allowing warm moist air to flow into the interior of the country.

(7x1) = [7]

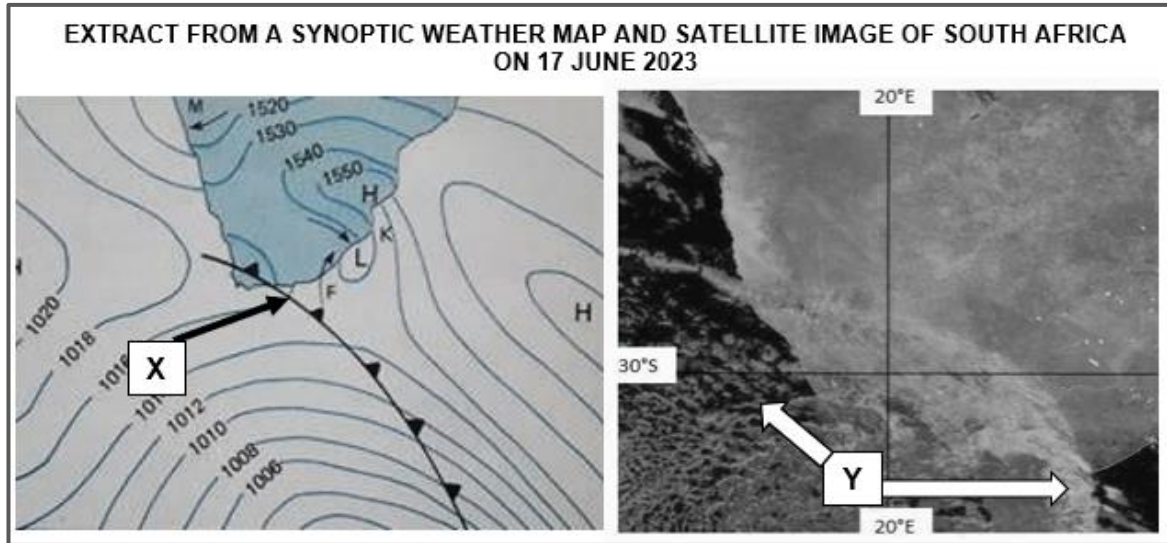
1.3 Refer to the simplified synoptic weather map below, which shows berg wind conditions in South Africa during winter.



- 1.3.1 Name the TWO specific pressure cells, visible on the simplified synoptic weather map, that need to be present for berg winds to form. (2x1) (2)
- 1.3.2 Where will the impact of berg winds be felt most strongly in South Africa? (1x1) (1)
- 1.3.3 Explain how berg winds cease or stop blowing. (1x2) (2)
- 1.3.4 Explain why berg winds are warm and dry. (2x2) (4)
- 1.3.5 Give TWO risks that people living in the affected areas will be exposed to during berg wind conditions. (2x1) (2)
- 1.3.6 Discuss TWO precautions that can be taken to reduce the risks mentioned in QUESTION 1.3.5. (2x2) (4)

[15]

1.4 Refer to the synoptic chart and satellite image below.

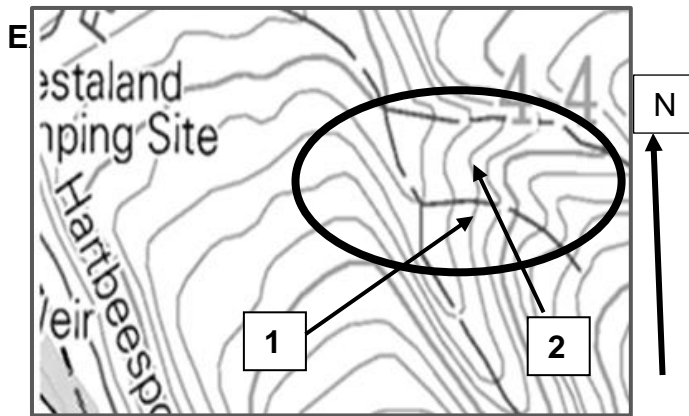


<https://resources.eumetrain.org/satmanu/CM4SH/SACF/index.htm.co.za>

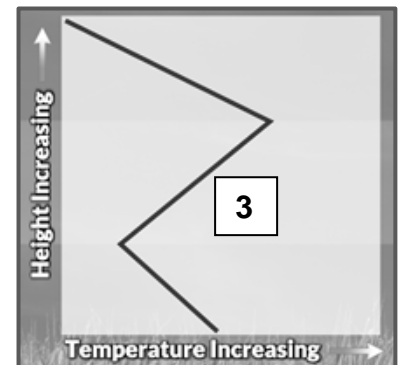
- 1.4.1 Identify the front labelled **X** on the synoptic weather map extract, that forms part of a mid-latitude cyclone. (1x1) (1)
- 1.4.2 (a) Identify the season represented by the synoptic weather map extract. (1x1) (1)
- (b) Give a reason for your answer to QUESTION 1.4.2 (a) (1x1) (1)
- 1.4.3 (a) Name TWO types of clouds, associated with the front in QUESTION 1.4.1, visible at the areas marked **Y**, on the satellite image. (2x1) (2)
- (b) Explain how clouds are formed along the front **X**. (1x2) (2)
- (c) Describe the type of precipitation expected along the front **X**. (1x2) (2)
- 1.4.4 Discuss the negative impact of the front marked by **X**, on farming in the areas it passes over. (3x2) (6)

[15]

1.5 The extracts below provide information related to valley climate in the Southern hemisphere.



Temperature graph in a valley at night



[Extracted from 2527 DB Brits]

[https://www.nwahomepage.com/]

Radiation fog in the early morning (just after sunrise)



[Photographer: Afikile Hermanus 2023]

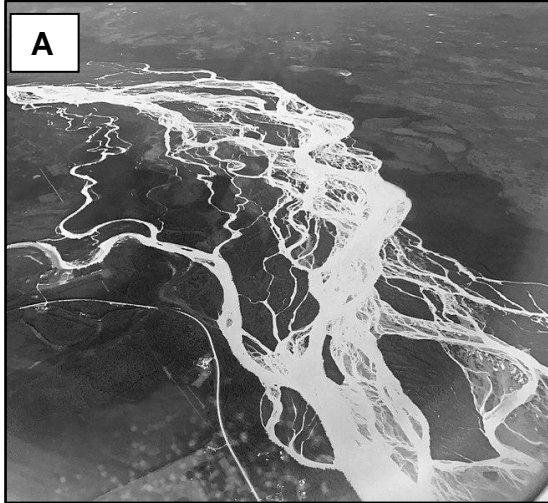
- 1.5.1 Define the concept *slope aspect*. (1x2) (2)
- 1.5.2 Refer to the valley circled on the topographical map extract.
 - (a) Which slope, 1 or 2, will be warmer? (1x1) (1)
 - (b) Provide evidence from the topographical map extract to support your answer in QUESTION 1.5.2 (a). (1x2) (2)
- 1.5.3 Refer to the temperature graph.
 - (a) Name the winds that blow during the night that cause the temperature on the valley floor to be low. (1x1) (1)
 - (b) What is the term used for the area at 3 where the temperature increases with height in a valley? (1x1) (1)
- 1.5.4 **In a paragraph of 8 -10 lines**, explain how radiation fog develops and why it appears as if the fog “is lifting” later in the morning. (4x2) (8)

[15]
TOTAL QUESTION 1 [60]

QUESTION 2: GEOMORPHOLOGY

2.1 Photographs **A** and **B** illustrate fluvial landforms in two rivers. Match the statements with one of the pictures. Only write the question number with the correct alphabetical letter next to it in your answer book. Eg. 2.1.8 B.

Tanana River in Alaska



<https://thegeoroom.co.zw/hydrology>

Jinsha River in China

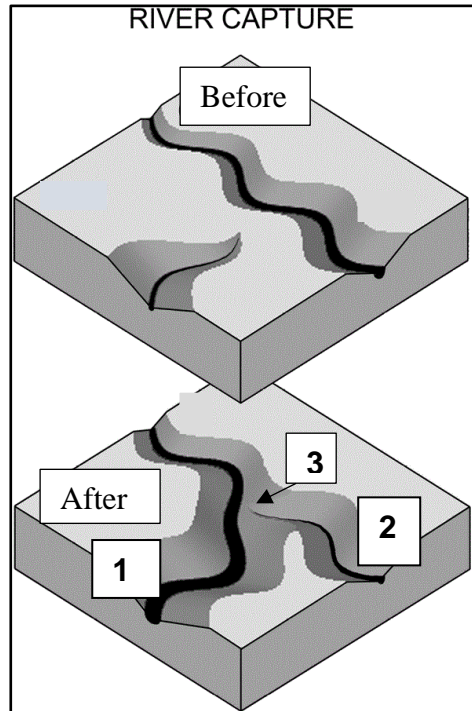


<https://www.audleytravel.com/blog>

- 2.1.1 An example of the lower course of a river
- 2.1.2 Load of alluvium in the water in this river is high
- 2.1.3 Shape of the cross-profile of this river will be wide and shallow
- 2.1.4 Section of the river flowing through a gorge
- 2.1.5 A braided stream
- 2.1.6 Rejuvenation has played a role in the development of this river
- 2.1.7 Section of the river near the river mouth

(7x1) **[7]**

2.2 Refer to the diagrams which illustrate River Capture.

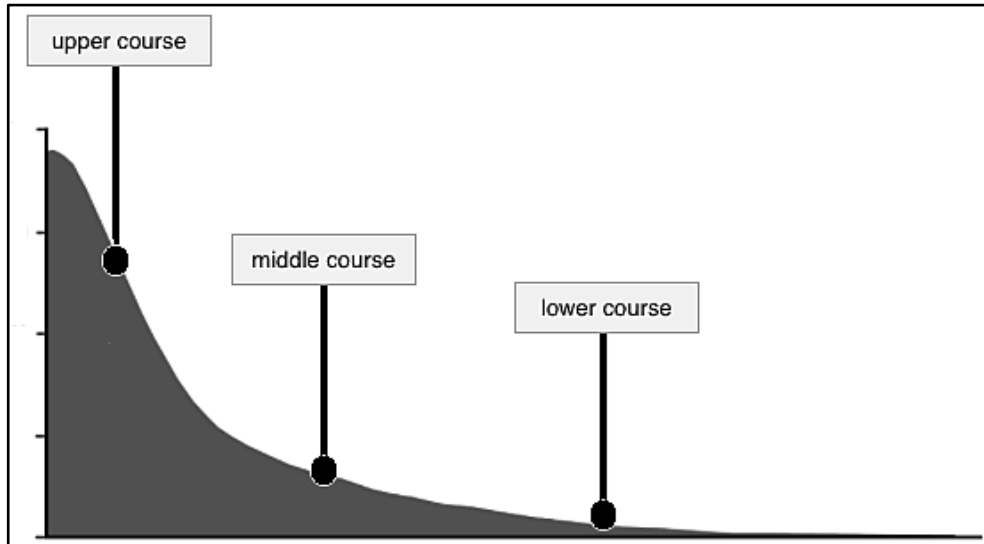


[<https://www.quora.com/What-does-a-river-capture-mean>]

- 2.2.1 Name the river at **1** and river at **2**, that are associated with river capture. (2x1) (2)
- 2.2.2 Would the gradient of river **1** be steep or gentle? (1x1) (1)
- 2.2.3 Which of the rivers, **1** or **2**, has more erosive energy? (1x1) (1)
- 2.2.4 State ONE characteristic of the underlying rock structure at river **1**. (1x1) (1)
- 2.2.5 State the erosive process in river **1** which resulted in river capture taking place. (1x1) (1)
- 2.2.6 What is the dry area called, that forms at **3** in the river bed of river **2** as a result of river capture? (1x1) (1)
- 2.2.7 Predict what would happen to the flow of river **2** if it receives no base flow. (1x1) (1)

[8]

2.3 Refer to the diagram which illustrates the longitudinal profile of a river.



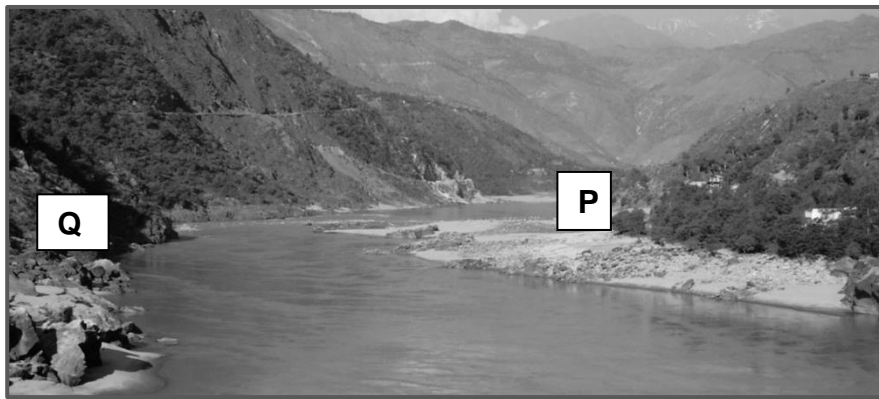
Adapted from <http://www.geography.learnontheinternet.co.uk/>

- 2.3.1 Define the term *longitudinal profile of a river*. (1x2) (2)
- 2.3.2 This longitudinal profile is graded. Describe the shape of a graded profile. (1x1) (1)
- 2.3.3 Why is it possible for a river to keep flowing in the upper course, despite it having a small volume and a lot of friction? (1x2) (2)
- 2.3.4 Draw a simple annotated cross profile of a river in the middle course. Indicate the shape of the river bed and the fluvial processes involved in shaping it. (4x1) (4)
- 2.3.5 Explain how building a dam in a river will affect the flow of the river downstream of the dam. (3x2) (6)

[15]

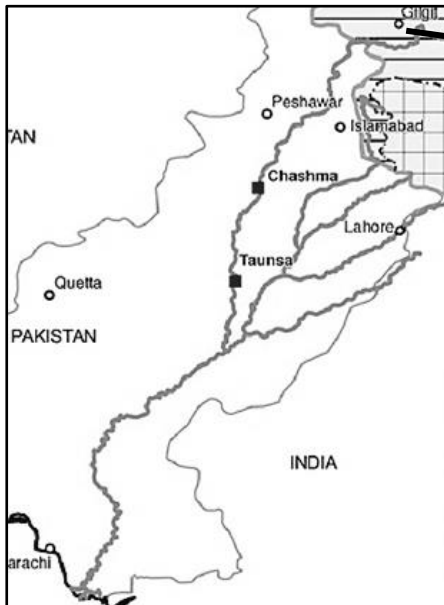
2.4 Refer to the photo and maps about the Indus River.

INDUS RIVER VALLEY



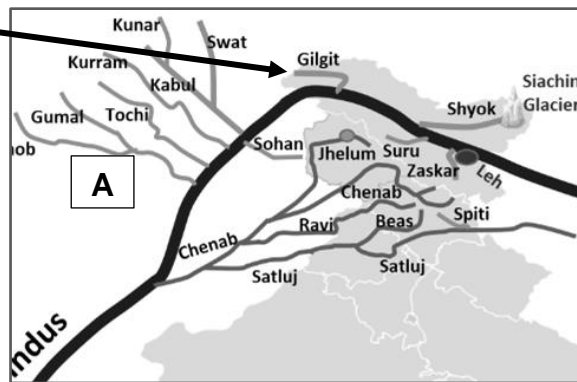
[<https://worldview.stratfor.com/article/familiar-dispute-indus-river-valley>]

MAP OF THE INDUS RIVER COURSE



[<https://www.researchgate.net/figure/Location-map>]

SECTION OF THE UPPER REGION OF THE INDUS RIVER



[Civildpedia.com/Indus-river-system]

- 2.4.1 Identify the fluvial landform in the photograph. (1x1) (1)
- 2.4.2 (a) Name the river bank at **P**. (1x1) (1)
- (b) Name the river bank at **Q**. (1x1) (1)
- 2.4.3 Account for the difference in the steepness of the river banks at **P** and **Q**. (2x2) (4)
- 2.4.4 How would rejuvenation change the landform in the photograph? (2x2) (4)
- 2.4.5 (a) Identify the drainage pattern of the Indus River at **A**. (1x1) (1)

- (b) Give ONE piece of evidence from the map to substantiate your answer to QUESTION 2.4.5 (a). (1x1) (1)
- (c) Explain the reason for the drainage pattern in this area. (1x2) (2)

[15]

- 2.5 The extract is from an article in the Mail and Guardian about the Thukela River catchment area.

It pays to save the Thukela River catchment

By Sheree Bega

The benefits of restoring a major river catchment in KwaZulu-Natal would outweigh the costs.

Research focused on the Thukela River Basin, where farming, overgrazing, the spread of invasive alien plants, bush encroachment, human settlements and mining have damaged fragile savannah and grasslands.

“It was estimated that almost 555 000 ha or 26% of the remaining natural area of the Thukela catchment was degraded by 2015.

The research, commissioned by the United Nations Environment Programme, used satellite imagery and ecosystem accounting to map where ecosystem services are provided and where restoration would be most worthwhile.

“It’s about understanding that intact ecosystems are ultimately worth more to humanity than when they are destroyed.”

[Adapted from <https://mg.co.za/environment/2021-07-17>]

- 2.5.1 Give the percentage of the remaining natural area of the Thukela catchment that has been degraded by 2015. (1x1) (1)
- 2.5.2 Quote from the extract to prove that remote sensing was used during the research process. (1x1) (1)
- 2.5.3 Give ONE human activity, mentioned in the extract, that has degraded (damaged) the Thukela River Basin. (1x1) (1)
- 2.5.4 Explain how deforestation in a catchment area impacts a river. (2x2) (4)
- 2.5.5 In a **paragraph of 8 to 10 lines**, discuss the benefits of a healthy river system for the people living in the Thukela River Basin. (4x2) (8)

[15]

TOTAL QUESTION 2: [60]

TOTAL SECTION A: [120]

SECTION B

QUESTION 3: GEOGRAPHICAL SKILLS AND TECHNIQUES

Refer to the Addendum

3.1 MAP SKILLS AND CALCULATIONS

3.1.1 The gradient from the Forest Station in block **B1** on the topographical map to the reservoir in block **C1** is ...

- A. steep.
- B. gentle.
- C. terraced.
- D. convex.

(1x1) (1)

3.1.2 The reference number of the orthophoto map directly east of 2530CA 16 is ...

- A. 2530CB 16.
- B. 2530CA 15.
- C. 2530CA 17.
- D. 2530CB 15.

(1x1) (1)

3.1.3 Choose the correct words in brackets.

The (north-west/south-east OR west-south-west/east-north-east) runway is longer.

(1x1) (1)

3.1.4 Calculate the area of the cemetery marked **1** on the orthophoto map in square meters. The measurement for the length of the cemetery on the orthophoto map is 2.2 cm.

SHOW ALL CALCULATIONS

(4x1) (4)

Formula: Area = Length x Breadth

3.1.5 The magnetic declination given for the topographical map is for 2019. Calculate the magnetic declination for the topographical map for 2024.

SHOW ALL CALCULATIONS

(3x1) (3)

[10]

3.2 MAP INTERPRETATION

- 3.2.1 The road labelled **2** on the orthophoto map is a ...
- A. national road.
 - B. secondary road.
 - C. other road.
 - D. arterial route. (1x1) (1)
- 3.2.2 The presence of ... is evidence that the water table in the topographical map area is nearly level or even higher than the surface in some places.
- A. marsh and vlei areas
 - B. dams
 - C. large woodland areas
 - D. many rivers (1x1) (1)
- 3.2.3 Refer to river system at **A** in blocks **D4**, **D5**, **E4** and **E5** on the topographical map as well as the river system at **B** in block **C3**.
- (a) Define the term *drainage density*. (1x2) (2)
 - (b) The river system at **A** has a higher drainage density than the one at **B**. Give ONE reason, visible on the topographical map, for the higher drainage density at **A**. (1x2) (2)
 - (c) Give the general direction of flow of the main stream at **B** where it flows through block **C3** on the topographical map. (1x1) (1)
- 3.2.4 Refer to the topographical map.
- (a) Aeroplanes always land and take off against the wind. Which of the runways will be used by an aeroplane taking off, if the wind blows from a north-westerly direction?
 - A. north-west to south-east
 - B. west-south-west to east-north-east
 - C. east-north-east to west-south-west
 - D. south-east to north-west (1x2) (2)
 - (b) You are travelling by car on the 540 road from block **D3**, on the topographical map. Explain why higher temperatures will be found at **C** compared to those in block **D3**. (1x2) (2)
 - (c) Describe the influence of the dam in block **E1** on the topographical map, on the temperature of the immediate surroundings. (1x1) (1)

[12]

3.3 GEOGRAPHIC INFORMATION SYSTEMS

- 3.3.1 The river in block **A1** on the topographical map forms part of the ... data layer.
- A. land use
 - B. topography
 - C. drainage
 - D. infrastructure
- (1x1) (1)
- 3.3.2 What type of spatial object is the monument in block **D4** on the topographical map? (1x1) (1)
- 3.3.3 (a) Would the orthophoto map be considered primary or secondary data? (1x1) (1)
- (b) Give a reason for your answer to QUESTION 3.3.3 (a) (1x1) (1)
- 3.3.4 (a) Define the term *spatial resolution*. (1x2) (2)
- (b) Compare the spatial resolution of the extract from the orthophoto map below with that of the same area at **3** on the orthophoto map.



(1x2) (2)

[8]

TOTAL SECTION B: [30]

GRAND TOTAL: [150]

ROUGHWORK:

Do NOT remove this page from the question paper. Any work done on this page will not be marked.

