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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2021

GEOGRAPHY: PAPER II

EXAMINATION NUMBER

Time: 1½ hours

100 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. Write your examination number in the blocks provided above.
2. This question paper consists of 24 pages, a topographic map extract, orthophoto map extracts 1 and 2 (on one page) and a yellow equipment sheet. Please check that your question paper is complete.
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 2832 AC MTUBATUBA and the orthophoto map extracts 1 and 2. The area covered by orthophoto map extract 1 is marked with a pink block on the topographic map extract.
6. The topographic map extract has grid lines with markings A to F and 1 to 8 that can be used to identify locations according to blocks.
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 extracts 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 (page 22–24) 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.

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Question	1	2	3	4	Total
Marks	33	28	23	16	100
Obtained					

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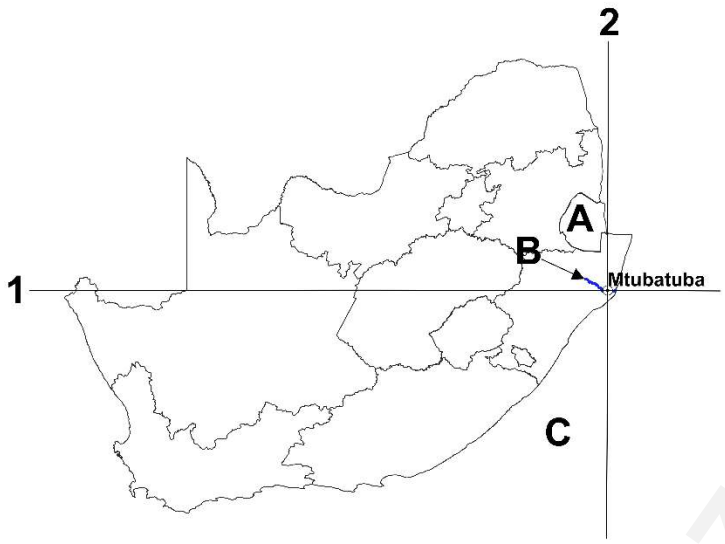
QUESTION 1 THE ECONOMY OF MTUBATUBA, MAP SKILLS, GIS

Figure 1 – Location map



Fact File: Mtubatuba and the Umfolozi Sugar Mill (USM)

- The Umfolozi Sugar Mill (commonly called USM), part of the Illovo Sugar Group, is the industrial flagship of Mtubatuba in Northern KwaZulu-Natal.
- Between 4% and 10% of the cane is delivered by small-scale growers, who farm on numerous plots of approximately 1,5 hectares each along the Mfolozi River.
- The Black and White Mfolozi rivers rise in the Lebombo Mountains and at their confluence, become the Mfolozi River.

[Source: Examiner]

Refer to the location map above, the topographic map extract 2832 AC MTUBATUBA and the orthophoto map extracts to answer the questions that follow.

1.1 Name the country labelled **A** on the location map in Figure 1.

eSwatini	
Namibia	
Botswana	
Zimbabwe	

(1)

1.2 Name the river labelled **B** on the location map in Figure 1.

Berg	
Orange	
Mfolozi	
Breede	

(1)

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1.3 Name the ocean labelled **C** on the location map in Figure 1.

Atlantic	
Indian	
Pacific	
Arctic	

(1)

1.4 1.4.1 The topographic map extract of Mtubatuba was generated using … data.

vector	
raster	

(1)

1.4.2 Using the GIS concepts of point / line / polygon, name each type of feature found in block D5. Complete the table.

Feature	**GIS concept Choose from: point / line / polygon**

(3)

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1.5 1.5.1 Choose the correct true bearing from the centre of USM at Point **X** (C6) to the end of the narrow-gauge railway at Point **Y** (C8).

80°	
170°	
260°	
350°	

(2)

1.5.2 Calculate the magnetic declination for 2021. Complete the table.

Magnetic declination for 2019	24° 13' W
Change per annum	11' W
Difference in years	
Magnetic declination for 2021	
Calculations	

(3)

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1.6 Complete the table below by choosing the option (from those given) that applies to each photo.

	Primary sector	**Most common farming method used**	**Scale of farming**
	farming, mining, forestry, fishing, hunting	mechanised, manual labour	small scale, large scale
Photograph 1 (A7)			
Photograph 2 (C5)			
Photograph 3 (D6)			

[Source: Examiner]

(9)

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1.7 Photograph 4 is taken close to the road at Point **Z** (D6).

Photograph 4 – Small train on narrow-gauge railway transporting an agricultural product

[Source: Examiner]

1.7.1 What is the likely agricultural product being transported here?

Wheat	
Grapes	
Mangoes	
Sugar cane	

(1)

1.7.2 The train is heading towards the sugar mill in C6. In what direction is the train travelling at this point?

East	
South-west	
North-north-east	
West-north-west	

(1)

1.7.3 The sugar mill **imports** / **processes** / **markets** the sugar cane. Circle the correct word. (1)

1.7.4 Value-added products, manufactured from the 128 000 tonnes of sugar produced by USM, are sold in shops countrywide. Define the term *value-added product*.

_____

_____

(2)

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1.8 Study Photographs 5 and 6 below as well as Image 1 on page 8. The locations of Photographs 5 and 6 are shown by the yellow box on the topographic map extract.

Photograph 5

[Source: Examiner]

Photograph 6

[Source: Examiner]

1.8.1 (a) Photograph 5 shows an example of **informal** / **formal** trading. (1)

(b) Photograph 6 shows an example of **informal** / **formal** trading. (1)

1.8.2 Give TWO examples of anchor tenants in Photograph 6.

_____ _____ (2)

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Study Image 1 below.

Image 1 – Google Earth view of Mtubatuba showing the locations of photographs 5 and 6 (as shown by the yellow box on the topographic map extract)

[Source: Google Earth]

1.8.3 A sustainable method of generating power is visible on a roof in Image 1.

(a) Name this method of sustainable power generation.

_____ (1)

(b) Draw the conventional symbol to reflect this on an updated topographic map.

Conventional symbol	

(2)
[33]

Q1 subtotal

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QUESTION 2 SETTLEMENT, MAP SKILLS, GIS

2.1 Photograph 6 (on page 7) was taken in A5. It is an example of a …

zone of decay.	
regional shopping centre.	
central business district.	
heavy industry.	

(1)

2.2 2.2.1 Give evidence from the topographic map extract for TWO site factors favouring sugar cane growth in the mapped area.

_____

_____

(2)

2.2.2 Explain TWO situational factors for the Umfolozi Sugar Mill (USM) and the surrounding cultivated land. Use topographic map extract evidence.

_____

_____

_____

_____

(4)

2.3 Orthophoto map extract 2 shows the Glen Barlyn Farm in C7 (on the topographic map extract). All the questions in 2.3 refer to orthophoto map extract 2.

2.3.1 Which map shows the more recent information?

Topographic map extract	
Orthophoto map extract 2	

(1)

2.3.2 Provide a reason for your answer to Question 2.3.1.

_____

_____

(2)

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2.3.3 (a) Calculate the gradient of the slope from D to E.

Difference in height from D to E	_____m	(1)
Distance between D and E	_____m	(2)
Calculations		
Gradient from D to E		(2)
Calculations		

(b) The slope from D to E is …

convex.	
concave.	

(1)

(c) Contour farming is visible in this extract. Select the most appropriate options below to describe this farming method.

(i) It is used where the land has a sloping profile.

(ii) It favours infiltration of rainwater as runoff is stopped.

(iii) The risk of soil erosion is greater with this method of ploughing.

(iv) The land is ploughed at right angles to the slope.

Select the best combination of answers from the options below:	
(ii), (iii)	
(i), (ii), (iii)	
(i), (ii), (iv)	
All of the above.	

(2)

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(d) The most likely platform (where the camera is attached) used for this orthophoto is a …

satellite.	
weather balloon.	
fixed-wing aircraft.	

(1)

(e) Did an active or a passive sensor capture this image?

Active	
Passive	

(1)

2.4 The areas of River View (C5) and Indlovu (B 4/5) show typical apartheid-style planning characteristics.

2.4.1 Complete the table below. Options are provided for (a) and (b). Choose ONE for each.

	River View (C5)	Indlovu (B 4/5)
(a) Settlement pattern *Choose ONE – planned irregular, planned rectangular*		
(b) Most likely housing evident *Choose ONE – low-income, upper-income*		

(4)

2.4.2 Provide TWO examples of an apartheid-style buffer zone between River View (C5) and Indlovu (B 4/5).

_____ _____ (2)

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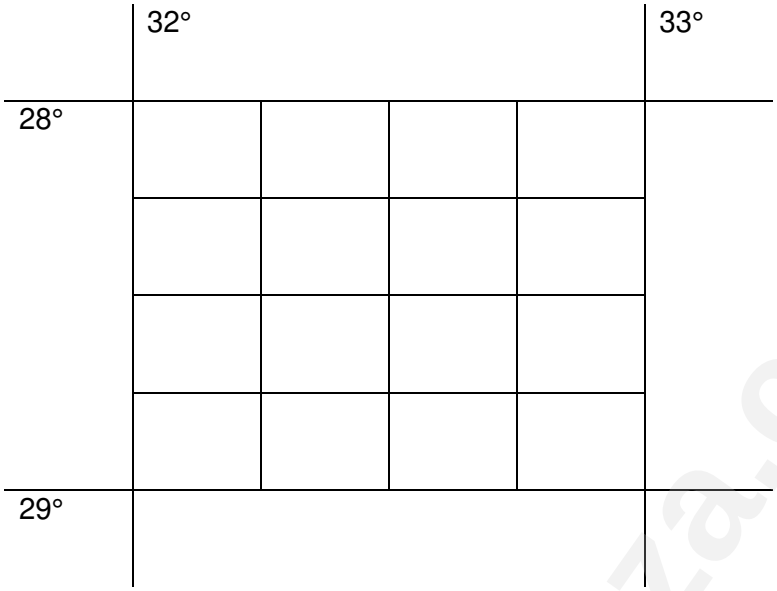
2.5 Mtubatuba's map code is 2832 AC. Using the table below, shade the correct grid reference block for Mtubatuba.



(2)
[28]

Q2 subtotal

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QUESTION 3 CLIMATE, WEATHER, MAP SKILLS

3.1 Study orthophoto map extract 1, the area marked with a pink block in D/E 4 on the topographic map extract.

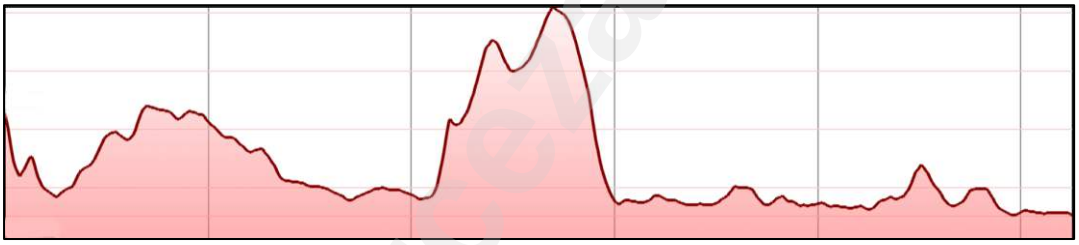
3.1.1 A red line is drawn from **F** to **G** on orthophoto map extract 1.

Three cross-sectional sketches, (A) to (C), are drawn below. Which sketch best represents the profile from **F** to **G** on this extract?

A	
B	
C	

(2)

(A) Cross-sectional sketch 1



(B) Cross-sectional sketch 2

(C) Cross-sectional sketch 3

3.1.2 A feature, indicated by the line from **I** to **J** on orthophoto map extract 1, can be described as a …

ridge.	
saddle.	
waterfall.	
terrace.	

(1)

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3.2 Study the fact file on Lake Eteza (E/F 4), visible on orthophoto map extract 1.

Fact File: Lake Eteza

- Lake Eteza is located 7 km south of Mtubatuba, on level terrain and at an altitude of 10 m above sea level.
- A major part of the site consists of a shallow lake, rarely more than 1,5 m deep, that forms an integral part of the Mfolozi River system.

[Source: Adapted from <https://www.birdlife.org.za/iba-directory/lake-eteza-nature-reserve/>]

Orthophoto map extract 1 shows that Lake Eteza has dried up significantly.

3.2.1 Provide a climatological reason for this.

_____

_____

(2)

3.2.2 Provide an economic reason for this.

_____

_____

(2)

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3.3 Study Photograph 7 below.

Photograph 7 – Umfolozi Sugar Mill's (USM's) pollution plume and the narrow-gauge railway (C6)

[Source: Examiner]

3.3.1 The residents of Hill Haven Estate (E/F 5) often complain of a smell produced by the mill.

Choose the prevailing wind most likely to carry the smell (as visible from the cloud in Photograph 7) from USM (C6) to Hill Haven Estate (E/F 5).

South-westerly	
North-westerly	
North-easterly	
South-easterly	

(1)

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3.3.2 Umfolozi Sugar Mill produces between 1 150 000 and 1 250 000 tonnes of cane in 'normal' climatic conditions in a 36-week milling season.

Based on Mtubatuba's location, complete the sentence to describe 'normal' climatic conditions using words from the box below. Write your answers in the table below.

Mtubatuba has a ___A___ climate where summers are __B___ and __C___.

The ___D___ draws in moisture which results in __E__. This provides the catchment with sufficient water for irrigation purposes.

continental	frontal rain	South Indian HP	dry	maritime
thundershowers	hot	South Atlantic HP	cool	humid

A	
B	
C	
D	
E	

(5)

3.4 Provide map evidence to support the fact that Mtubatuba does not produce an exaggerated heat island.

_____

_____

_____

_____

_____

_____

(4)

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3.5 The Mtubatuba Municipality is using a specialist GIS company to report on pollution levels from USM. Data is collected from remote-sensing satellites and stations on the ground.

3.5.1 What is remote sensing?

_____

_____

(1)

3.5.2 Using the information from the remote-sensing satellites together with information from stations on the ground is an example of …

data security.	
data integration.	
buffering.	
standardisation.	

(2)

3.5.3 A map is produced of areas in Mtubatuba showing the concentration of atmospheric pollution.

Name three layers of information that should be on the map to enable people to understand the impact of the pollution from USM. Tick the correct options below.

Umfolozi Sugar Mill	
Mvanyamwanya Lake	
Riverview, Mtubatuba and Indlovu settlements	
Concentrations of pollution	
Golf course	
Railway line	

(3)
[23]

Q3 subtotal

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QUESTION 4 FLUVIAL GEOMORPHOLOGY, MAP SKILLS

4.1 Refer to Lake Eteza (E/F 4) on the topographic map extract.

Complete the table below.

Please note: 1 hectare = 10 000 m^2

Approximate length of Lake Eteza	2 500 m
Approximate breadth of Lake Eteza	1 000 m
Rectangular area of Lake Eteza (length × breadth)	_____ ha
Calculations:	

(2)

4.2 Study the fact file below as well as Photograph 8 on page 19.

Fact File: Umfolozi Sugar Mill (USM)

- Two years after the inception of the mill in 1916, a devastating flood caused extensive damage to the factory and infrastructure.
- Following another flood in 1925, it was decided to re-site the mill on higher ground where it is presently situated. In the early 1930s it was decided to drain the lower Umfolozi flats thus making more silt-rich land available.

[Source: adapted from <https://umfolozisugarmill.co.za/>]

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Photograph 8 – The remains of the 1916 Umfolozi Sugar Mill (at point G in D5)

[Source: Examiner]

4.2.1 Refer to the fact file and use TWO pieces of topographic map extract evidence to justify the decision to move the Umfolozi Sugar Mill (USM) to higher land in 1925.

(4)

4.2.2 Geographic Information Systems (GIS) did not exist in 1925.

Explain the geoprocessing concept of *buffering* and how it could have helped to make better decisions about the location of the mill in 1925.

(2)

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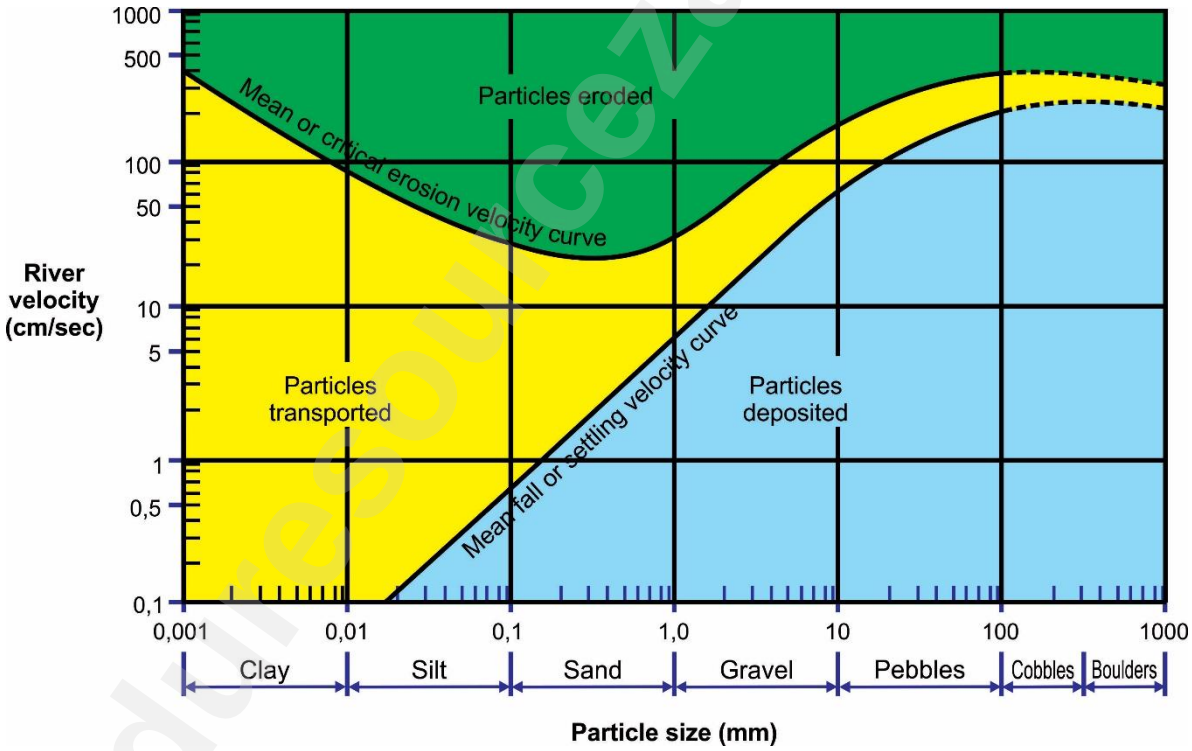
4.3 Study Photograph 9 and Figure 2 below.

Photograph 9 – View from bridge over the Mfolozi River (D5)

[Source: Examiner]

Figure 2 – Hjulström curve



[Source: <www.thegeoroom.co.zw>]

4.3.1 At what velocity will a particle of 0,04 mm be deposited?

_____ cm / sec (1)

4.3.2 Give THREE pieces of evidence to prove that this river is in its lower course.

(a) Map evidence (Topographic map)

_____ _____ (2)

(b) Photographic evidence from Photograph 9

_____ (1)

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4.4 The attribute table below contains data about the Mfolozi River at Point H (D3). Complete the attribute table below.

Mfolozi River at H (attribute table)			
Elevation (m)	Watershed	Riparian vegetation* type 1	Riparian vegetation* type 2

*riparian vegetation refers to the plant communities growing in the riparian zone.

(4)
[16]

Q4 subtotal

Total: 100 marks

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

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