education

Department:
Education
PROVINCE OF KWAZULU-NATAL

75

NATIONAL SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P2

PREPARATORY EXAMINATION

SEPTEMBER 2020

MARKS: 75

TIME: 1½ hours

This question paper consists of 12 pages and 1 page for rough work.

NAME: _____

DIVISION: _____

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RESOURCE MATERIAL

1. An extract from topographical map 2731BC PONGOLA.
2. Orthophoto map 2731 BC 13 PONGOLA.
3. **NOTE:** The resource material must be collected by schools for their own use.

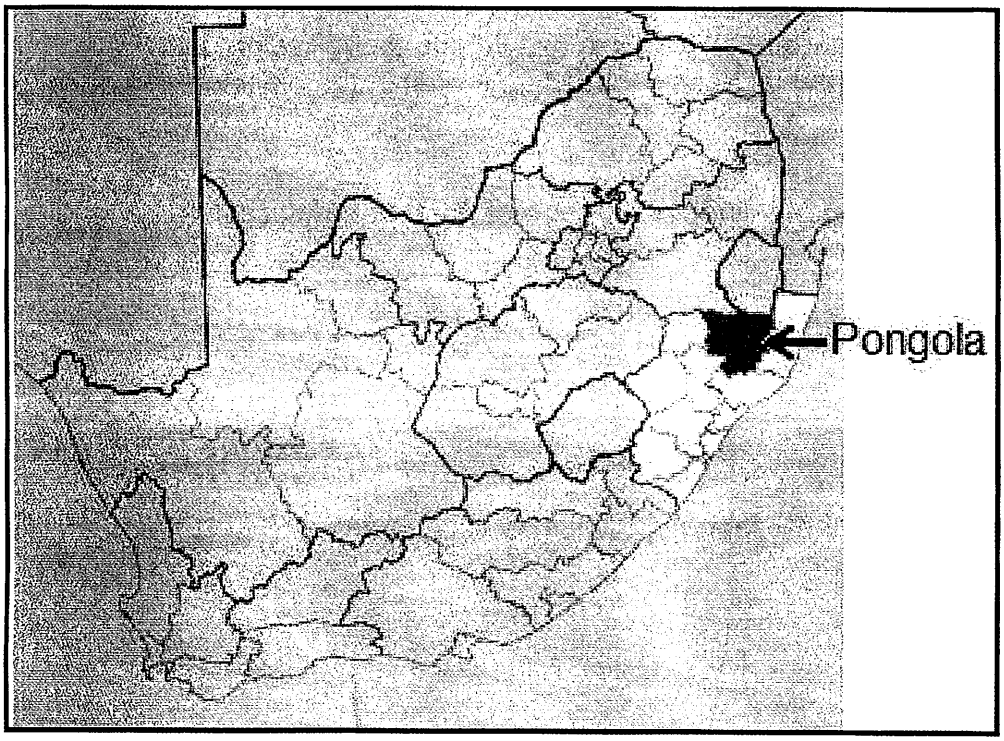
INSTRUCTIONS AND INFORMATION

1. Write your NAME and DIVISION in the spaces on the cover page.
2. Answer ALL the questions in the spaces provided in this question paper.
3. You are provided with a 1: 50 000 topographical map (2731BC PONGOLA) and an orthophoto map (2731 BC 13 PONGOLA) of a part of the mapped area.
4. You must hand the topographical map and the orthophoto map to the invigilator at the end of this examination session.
5. You may use the blank page at the back of this question paper for all rough work and calculations. Do NOT detach this page from the question paper.
6. Show ALL calculations and formulae, where applicable. Marks will be allocated for these.
7. Indicate the unit of measurement in the final answer of calculations, eg.10 km, 21 cm.
8. You may use a non-programmable calculator.
9. You may use a magnifying glass.
10. The area demarcated in BLACK AND RED on the topographical map represents the area covered by the orthophoto map.
11. The following English terms and their Afrikaans translations are shown on the topographical map:

ENGLISH	AFRIKAANS
Aerodome	Vliegveld
Caravan Park	Karavaanpark
Canal	Kanaal
Diggings	Uitgrawings
Golf Course	Gholfbaan
Hospital	Hospitaal
River	Rivier
Sewage Works	Rioolwerke
Sugar Mill	Suikermeule
Waterfall	Waterval

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GENERAL INFORMATION ON PONGOLA



Pongola (also known in IsiZulu as uPhongolo) is a small town located in northern KwaZulu-Natal, only 10 km from the Swaziland border. Pongola is surrounded by 50 km^2 of sugar cane subtropical fruit plantations. The town thrived as a result of the irrigation (canal) system and a sugar mill. Pongola is situated in a tranquil subtropical environment and normally received about 519 mm of rain per year, with most rainfall in summer.

[Source: http://en.wikipedia.org/wiki/pongola]

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1:50 000 topographical map (2731BC PONGOLA), as well as the orthophoto map 2731 BC 13 of a part of the mapped area. Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A – D) in the block next to each question.

1.1 The international boundary line, to the north of the topographical map, separates Pongola from …

A Swaziland.
B Mpumalanga.
C Free State.
D Lesotho.

1.2 The contour interval of the topographical map is … metres.

A 5
B 10
C 20
D 50

1.3 The length of the run-way in block **D7** on the topographical map is … metres.

A 1.1
B 0.22
C 220
D 1100

1.4 The grid reference of the waterfalls in block **B4** is …

A 27^0 19'30"E and 31^0 33'43"S/20^0 19,5'E 31^0 33,7'S.
B 27^0 19'30"S and 31^0 33'43"E/27^0 19.5'S 31^0 33,7'E
C 31^0 33'43"S and 27^0 19'30"E/31^0 33,7'S 27^0 19,5'E
D 31^0 33'43"E and 27^0 19'30"S/31^0 33,7'E 27^0 19,5'S

1.5 The general direction of flow of the Mgugwane river in block **B2** is …

A south easterly
B north westerly
C south westerly
D north easterly

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1.6 The local wind that will blow into the valley between **N** in block **D1** to **M** in block **E3** during the night is the … winds.

A berg
B anabatic
C katabatic
D föhn

1.7 The Pongola River shows characteristics typical of a/an … river.

A seasonal
B exotic
C perennial
D episodic

1.8 The fluvial feature marked **L** in block **B4** on the topographical map form in areas of …

A alternate hard and soft rock.
B uniform resistance to erosion.
C fairly gentle gradient.
D wide and shallow valleys.

1.9 The landform feature limiting the expansion of Pongola to the south west on the orthophoto map is a …

A plateau.
B conical hill.
C mesa.
D mountain.

1.10 The type of road that passes through Pongola to Piet Retief is a/an ...

A secondary road.
B main road.
C national route.
D arterial route.

1.11 The land-use zone encircled as **O** on the topographical map is a/an …

A residential zone.
B zone of decay.
C industrial zone.
D commercial zone.

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1.12 Pongola can be classified as a ....

A metropolitan.
B conurbation.
C village.
D town.

1.13 The settlement pattern at **10** on the orthophoto map is ...

A nucleated.
B linear nucleated
C dispersed.
D linear dispersed.

1.14 The economic activity in the loop of the meander in block **H10** is a ... activity.

A primary
B secondary
C tertiary
D quaternary

1.15 The area in which the aerodrome in block **D7** is situated is the ...

A CBD.
B industrial zone.
C rural-urban fringe.
D residential zone.

(15 x 1) **[15]**

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QUESTION 2: MAPWORK CALCULATIONS AND TECHNIQUES

2.1 Refer to the demarcated area in RED on the topographical map which represents the orthophoto map. Use the demarcated area to calculate the area of the orthophoto map in km². Show ALL calculations. Marks will be awarded for calculations.

Formula: Area = length x breadth

(4 x 1) (4)

2.2 Why does the settlements labelled **10** on the orthophoto map appear different in size to the same settlement on the topographic map?

(1 x 1) (1)

2.3

2.3.1 Calculate the average gradient between the bench mark **315.9** in block **E7** and the trigonometrical station **75** in block **F7** on the topographical map.
Show ALL calculations. Marks will be awarded for calculations.

Formula: Average gradient = $\frac{\text{Vertical Interval}}{\text{Horizontal Equivalent}}$

(5 x 1) (5)

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2.3.2 Explain your answer to QUESTION 2.3.1.

_____

_____ (1 x 2) (2)

2.4 Update the magnetic declination for the current year.
Marks will be awarded for calculations.

Difference in years = _____

Mean Annual change = _____

Total annual chance = _____

Magnetic declination: 2020 = _____

_____

_____

_____ (5 x 1) (5)

2.5 Determine the magnetic bearing for 2020 of spot height **364** in block **J10** from the trigonometrical station **76** in block **J10** on the topographical map.

Formula: **Magnetic bearing = True bearing + Magnetic declination**

_____

_____

_____ (3 x 1) (3)

[20]

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QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Refer to the demarcated area **P** on the topographical map which shows a dendritic drainage pattern.

3.1.1 Give ONE characteristic, visible on the topographic map, which indicates that a dendritic drainage pattern is shown.

_____

_____ (1 x 1) (1)

3.1.2 Describe the underlying rock structure associated with a dendritic drainage pattern.

_____

_____

_____ (1 x 1) (1)

3.1.3 With reference to the dendritic drainage pattern found at **P,** suggest how this pattern has favoured the cultivation of crops in the area.

_____

_____

_____ (1 x 2) (2)

3.2 Refer to the settlement from **N** in block **D1** to **M** in block **E3** .

3.2.1 Name the human-made feature that influenced the shape of the settlement.

_____ (1 x 1) (1)

3.2.2 Assess the negative impact the human-made feature mentioned in QUESTION 3.2.1 will have on the people in that area.

_____

_____

_____

_____

_____ (2 x 2) (4)

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3.3 Refer to blocks **D1** and **D2** on the topographical map.

3.3.1 Describe the general topography (slope) of the area and support your answer with evidence from the topographical map.

Answer: _____

Evidence: _____

_____ (1 + 2) (3)

3.3.2 Suggest how the general topography (slope) described in QUESTION 3.3.1 influenced the settlement pattern of the area.

_____

_____

_____

_____

_____ (2 x 2) (4)

3.4 Refer to block **F10** on the topographical map.

3.4.1 Name the secondary economic activity found in the area.

_____ (1 x 1) (1)

3.4.2 Explain TWO factors that favoured the location of the economic activity named in QUESTION 3.4.1.

_____

_____

_____

_____ (2 x 2) (4)

3.4.3 Assess TWO negative impacts that the economic activity mentioned in QUESTION 3.4.1 would have on the environment of the area.

_____

_____

_____

_____ (2 x 2) (4)

[25]

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QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

4.1 Explain the meaning of the term spatial data.

_____

_____

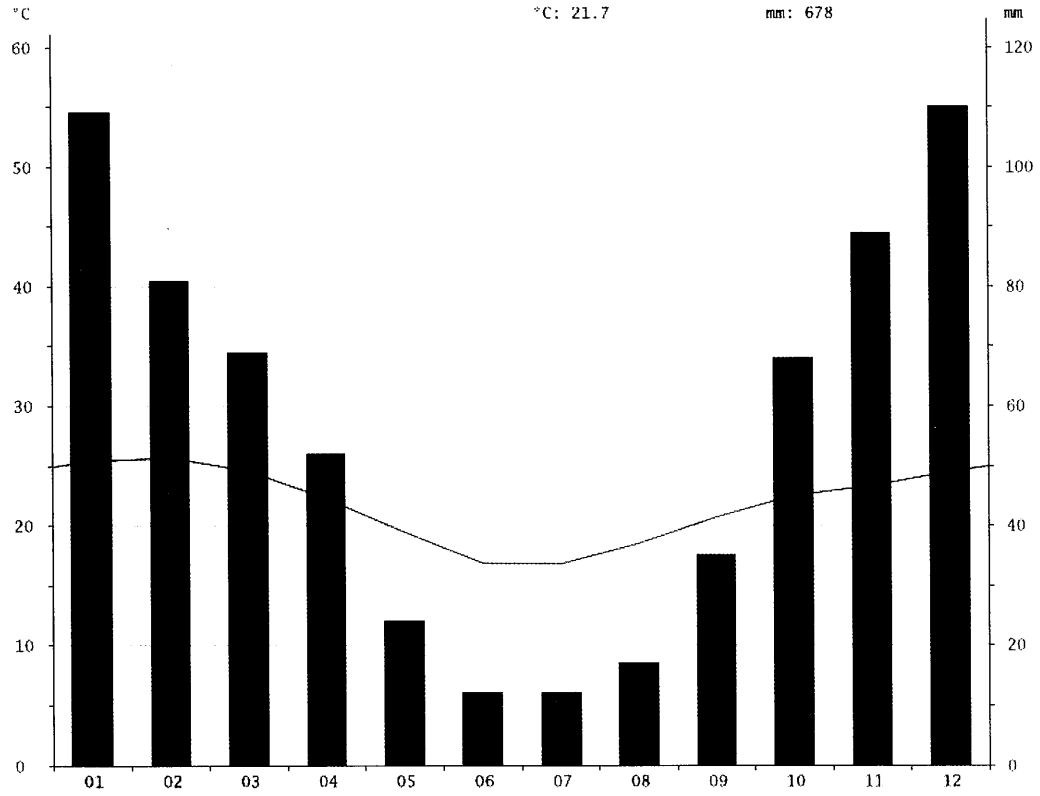
_____ (1 x 1) (1)

4.2 Identify the spatial data (co-ordinates) allocated for Pongla.

_____

_____ (2 x 1) (2)

4.3 Study the graph (FIGURE 4.3) below which depicts temperature and rainfall data for Pongola. A statistical analysis of the data on the graph will be useful for farmers. The bar graph is an example of attribute data.



4.3.1 What is attribute data?

_____

_____

_____ (1 x 1) (1)

4.3.2 Identify TWO attribute data indicated on the graph.

_____ (2 x 1) (2)

4.3.3 Explain how the attribute data indicated on the graph can assist a sugar-cane farmer in planning farming activities in Pongola.

_____

_____

_____ (1 x 2) (2)

4.4 Refer to the orthophoto map which shows a high spatial resolution.

4.4.1 Explain the term spatial resolution.

_____

_____ (1 x 1) (1)

4.4.2 Why can one say that the orthophoto map has a high spatial resolution?

_____

_____ (1 x 2) (2)

4.5 How can GIS assist city planners in determining where a new shopping centre can be built in Pongola?

_____

_____

_____

_____ (2 x 2) (4)

[15]

TOTAL MARKS: 75

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[redacted]

MARKS: 75

This marking guideline consists of 10 pages.

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QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1:50 000 topographical map (2731BC PONGOLA), as well as the orthophoto map 2731 BC 13 of a part of the mapped area. Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A D) in the block next to each question.

1.1 The international boundary line, to the north of the topographical map, separates Pongola from

A Swaziland.
B Mphumalanga.
C Free State.
D Lesotho.

A✓

1.2 The contour interval of the topographical map is metres.

A 5
B 10
C 20
D 50

C✓

1.3 The length of the run-way in block **D7** on the topographical map is metres.

A 1.1
B 0.22
C 220
D 1100

D✓

1.4 The grid reference of the waterfalls in block **B4** is

A 27□19'30"E and 31□33'43"S/20□19,5'E 31□33,7'S.
B 27□19'30"S and 31□33'43"E/27□19.5'S 31□33,7'E
C 31□33'43"S and 27□19'30"E/31□33,7'S 27□19,5'E
D 31□33'43"E and 27□19'30"S/31□33,7'E 27□19,5'S

B✓

1.5 The general direction of flow of the Mgugwane river in block **B2** is

A south easterly.
B north westerly.
C south westerly.
D north easterly.

D✓

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1.6 The local wind that will blow into the valley between **N** in block **D1** to **M** in block **E3** during the night is the winds.

A berg
B anabatic
C katabatic
D föhn

C✓

1.7 The Pongola River shows characteristics typical of a/an ... river.

A seasonal
B exotic
C perennial
D episodic

C✓

1.8 The fluvial feature marked **L** in block **B4** on the topographical map forms in areas of ...

A alternate hard and soft rock.
B uniform resistance to erosion.
C fairly gentle gradient.
D wide and shallow valleys.

A✓

1.9 The landform feature limiting the expansion of Pongola to the south west on the orthophoto map is a

A plateau.
B conical hill.
C mesa.
D mountain.

B✓

1.10 The type of road that passes through Pongola to Piet Retief is a/an ...

A secondary road.
B main road.
C national route.
D arterial route.

C✓

1.11 The land-use zone encircled as **O** on the topographical map is a/an

A residential zone.
B zone of decay.
C industrial zone.
D commercial zone.

A✓

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1.12 Pongola can be classified as a .

A metropolitan.
B conurbation.
C village.
D town.

D✓

1.13 The settlement pattern at **10** on the orthophoto map is

A nucleated.
B linear nucleated
C dispersed.
D linear dispersed.

C✓

1.14 The economic activity in the loop of the meander in block **H10** is a activity.

A primary
B secondary
C tertiary
D quaternary

A✓

1.15 The area in which the aerodrome in block **D7** is situated is the

A CBD.
B industrial zone.
C rural-urban fringe.
D residential zone.

C✓

(15 x 1) **[15]**

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QUESTION 2: MAPWORK CALCULATIONS AND TECHNIQUES

2.1 Refer to the demarcated area in RED on the topographical map which represents the orthophoto map. Use the demarcated area to calculate the area of the orthophoto map in km². Show ALL calculations. Marks will be awarded for calculations.

Formula: Area = length x breadth

Length = 9.9 ✓cm x 0.5 = 4.95 km (range: 4.9 5)

Breadth = 7.3 ✓cm x 0.5 = 3.65 km (range: 3.6 3.7)

Area = 4.95 x 3.65 km ✓

= 18.07 km² ✓ (range: 17.64 18.5) (4 x 1) (4)

2.2 Why does the size of the settlements labelled **10** on the orthophoto map appear different in comparison to the topographic map?

Orthophoto maps scale is 5 times larger than the scale of the topographic map ✓
Features are larger on the orthophoto map as compared to the topographic map ✓
1:10 000 is a larger scale than 1:50 000✓
[Any ONE] (1 x 1) (1)

2.3

2.3.1 Calculate the average gradient between the bench mark **315.9** in block **E7** and the trigonometrical station **75** in block **F7** on the topographical map. Show ALL calculations. Marks will be awarded for calculations.

Formula: Average gradient = $\frac{\text{Vertical interval}}{\text{Horizontal equivalent}}$

VI = 473.3 – 315.9 = 157.4m ✓

HE = 1.8cm x 500 = 900m ✓ (Range: 1.7 – 1.9 cm x 500 = 850 - 950m)

$\frac{VI}{HE} = \frac{157.4}{900}$ ✓

$= \frac{1}{5.71}$ ✓

= 1: 5.71✓ (Range: 1: 5.40 – 1: 6.03) (5 x 1) (5)

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2.3.2 Explain your answer to QUESTION 2.3.1.

For every 5.71m horizontal distance covered the land rises by 1m ✓✓ (1 x 2) (2)

2.4 Update the magnetic declination for the current year.
Marks will be awarded for calculations.

Difference in years = **2020 2002 = 18 years✓**

Annual change = **12 west**

Total annual chance = **18 x 12 = 216 ✓**

Magnetic declination: 2020 = **20□06' +✓ 216'**

20□222'✓ (3□42')

23□42' west of true north✓ (5 x 1) (5)

2.5 Determine the magnetic bearing for 2020 of spot height **364** in block **J10** from the trigonometrical station **76** in block **J10** on the topographical map.

Formula: **Magnetic bearing = True bearing + Magnetic declination**

= **155□✓✓ + 23□42'**

= **178□ 42'✓West of true north** (3 x 1) (3)

Range for True bearing: (154-156)

[20]

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QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Refer to the demarcated area **P** on the topographical map which shows a dendritic drainage pattern.

3.1.1 Give ONE characteristic, visible on the topographic map, which indicates that a dendritic drainage pattern is shown.

Resembles a branch of a tree✓
Tributaries join the main stream at acute angles✓ (1 x 1) (1)
(ANY ONE)

3.1.2 Describe the underlying rock structure associated with a dendritic drainage pattern.

Occurs on rocks that have a uniform/equal resistance to erosion ✓
Associated with horizontal sedimentary and massive igneous rocks ✓
(ANY ONE) (1 x 1) (1)

3.1.3 With reference to the dendritic drainage pattern found at **P** suggest how this pattern has favoured the cultivation of crops in the area.

River channels are spread out evenly resulting in all parts of the cultivated area receiving water✓✓
Water from the tributaries and the river are equally available✓✓ (1 x 2) (2)
(ANY ONE)

3.2 Refer to the settlement from **N** in block **D1** to **M** in block **E3**.

3.2.1 Name the human-made feature that influenced the shape of the settlement.

Road/N2/National route ✓ (1 x 1) (1)

3.2.2 Assess the negative impact the human-made feature mentioned in QUESTION 3.2.1 will have on the people in that area.

Smoke from motor vehicles will result in air pollution resulting in respiratory problems/wheezing/asthma ✓✓
Noise from vehicles will disturb the peace and harmony in the area✓✓
Fast flowing traffic may pose a danger to the pedestrians.✓ ✓
Crime rate may increase/hijacking/theft✓✓
(ANY TWO) (2 x 2) (4)

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3.3 Refer to blocks **D1** and **D2** on the topographical map.

3.3.1 Describe the general topography (slope) of the area and support your answer with evidence from the topographical map.

Answer: **steep/hilly✓✓**

Evidence: **Rugged appearance✓** ✓
Undulating✓✓
Contour lines close together✓✓
(ANY ONE) (1 + 2) (3)

3.3.2 Suggest how the general topography (slope) described in QUESTION 3.3.1 influenced the settlement pattern of the area.

The steep slopes limit space for building resulting in nucleation in available spaces. ✓✓
It is difficult to build on steep slopes. ✓✓
There are few/little flat areas to build on. ✓✓ (2 x 2) (4)
(ANY TWO)

3.4 Refer to block **F10** on the topographical map.

3.4.1 Name the secondary economic activity found in the area.

Sugar milling✓ (1 x 1) (1)

3.4.2 Explain TWO factors that favoured the location of the economic activity named in QUESTION 3.4.1.

Large areas of flat land promoted the construction of the sugar mill✓✓
It is near water supply/river/reservoir✓✓
Close to raw materials since the mill is located on the sugar plantation✓✓
Good network of roads to transport products✓✓
Availability of labour force from areas surrounding the sugar mill✓✓
(ANY TWO) (2 x 2) (4)

3.4.3 Assess TWO negative impacts that the economic activity mentioned in QUESTION 3.4.1 would have on the environment of the area.

Air pollution created by smoke emitted from the chimneys. ✓✓
Noise pollution created by the machinery. ✓✓
Water pollution created by the effluents from the industry. ✓✓
(ANY TWO) (2 x 2) (4)

[25]

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QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

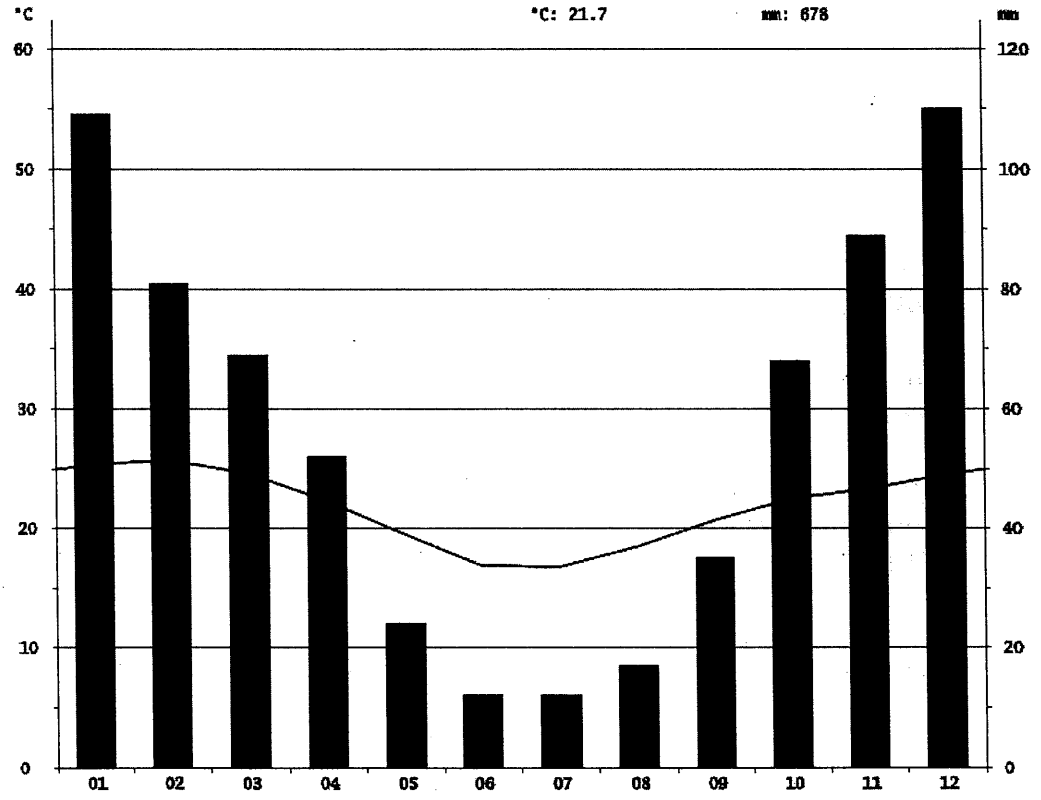
4.1 Explain the meaning of the term spatial data.

Spatial data refers to the shape and location of geographic features using coordinates✓
[Concept] (1 x 1) (1)

4.2 Identify the spatial data (co-ordinates) allocated for Pongola.

27°18' S✓ 31°30' E✓ (2 x 1) (2)

4.3 Study the graph (FIGURE 4.3) which depicts temperature and rainfall data for Pongola. A statistical analysis of the data on the graph will be useful for farmers. The bar graph is an example of attribute data.



4.3.1 What is attribute data?

Attribute data refers to the descriptive properties of objects, events or features✓
[Concept] (1 x 1) (1)

4.3.2 Identify TWO attribute data indicated on the graph.

Temperature ✓
Rainfall ✓
Months ✓
[Any TWO] (2 x 1) (2)

4.3.3 Explain how the attribute data indicated on the graph can assist a sugar-cane farmer in planning farming activities in Pongola.

To determine the average temperature/rainfall for the year✓✓
To determine the maximum temperature/rainfall✓✓
To determine the minimum temperature/rainfall✓✓
To determine months with high temperature/rainfall✓✓
To determine months with low temperature/rainfall ✓✓ (1 x 2) (2)
[Any ONE]

4.4 Refer to the orthophoto map which shows a high spatial resolution.

4.4.1 Explain the term spatial resolution.

Spatial resolution refers to the degree of detail and clarity of an image✓
[Concept] (1 x 1) (1)

4.4.2 Why can one say that the orthophoto map has a high spatial resolution?

An orthophoto map has a large scale ✓✓
It shows more detail✓✓ (1 x 2) (2)
[Any ONE]

4.5 How can GIS assist city planners in determining where a new shopping centre can be built in Pongola?

It can be used to locate the suitable area in which the shopping centre has to be built✓✓
It can be used to determine profitability by looking at the income bracket of the people that live in the surrounding area✓✓
It can be used to determine transport routes to the new shopping centre✓✓
To identify crime hot spots in the area.✓✓ (2 x 2) (4)
[Any TWO]

TOTAL MARKS: 75

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