75

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL
SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P2

COMMON TEST

JUNE 2019

MARKS: 75

TIME: 1.5 Hours

This question paper consists of 14 pages and 1 page for rough work.

NAME: _____

DIVISION: _____

Please Turn Over

RESOURCE MATERIAL

1.   An extract from topographical map 2930 CB PIETERMARITZBURG (EXTRACT).

2.   Orthophoto map 2930 CB 8 PIETERMARITZBURG.

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 (2930 CB PIETERMARITZBURG) and an orthophoto map (2930 CB 8 PIETERMARITZBURG) 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 test 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, e.g. 10km; 2.1cm.

8.   You may use a non-programmable calculator.

9.   You may use a magnifying glass.

10.   The area demarcated in RED on the topographic 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
Diggings	Uitgrawings
Canal	Kanaal
Firebreak	Brandgordel
Hiking Trail	Staproete
Golf Course	Gholfbaan
Hospital	Hospitaal
River	Rivier
Sewage Works	Rioolwerke
Waterworks	Waterwerke
Store/Shopping centre/Mall	Winkel(W)

GENERAL INFORMATION ON PIETERMARITZBURG
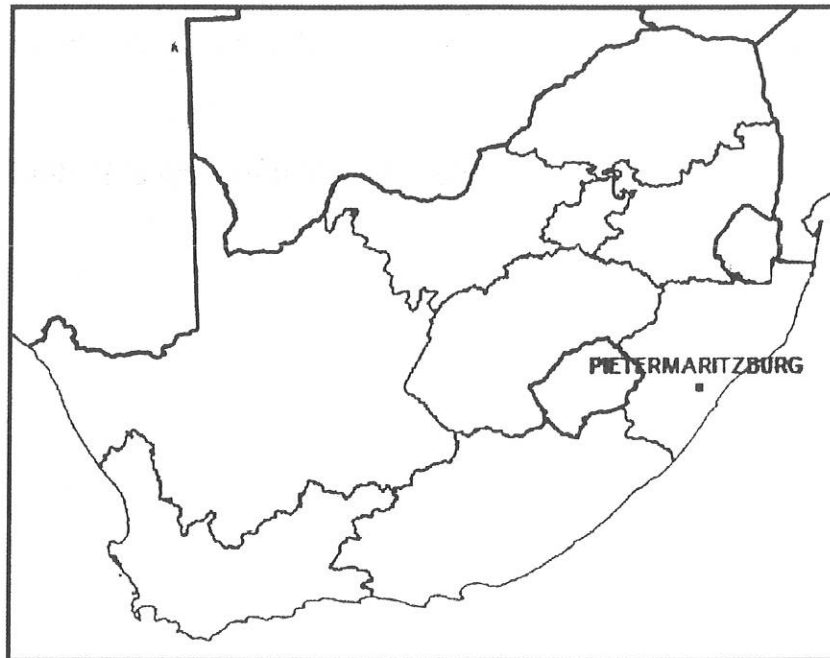
Pietermaritzburg (umGungundlovu) is the capital city of KwaZulu-Natal. This second-largest city in the province was founded in 1838. It is a regionally important industrial hub, well-known for processing aluminium, timber and dairy products. It has an estimated population of around 500 000 (including neighbouring townships). Pietermaritzburg is situated along the N3 national road, the main route between the Pretoria-Witwatersrand-Vereeniging conurbation and the harbour city of Durban, some 90 kilometres from Pietermaritzburg. The Oribi airport is situated just outside Pietermaritzburg and has a regular scheduled service to the OR Tambo International Airport in Johannesburg.

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

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1:50 000 topographical map (2930CB PIETERMARITZBURG) as well as the orthophoto map as 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 map index/reference of the orthophoto map to the south of Pietermaritzburg is …

A 2930CD.
B 2930CB13.
C 2930CB3.
D 2930DA.

1.2 The direction of the residential area Raisethorpe in block **D 10/11** from Northdale in block **D 9** is ...

A east north east.
B east.
C west south west.
D west.

1.3 The terrain (landscape) of the CBD of Pietermaritzburg in the south east of the orthophoto map can be best described as …

A steep
B terraced
C gentle
D mountainous

1.4 The human made feature **7** on the orthophoto map is a …

A museum.
B shopping centre.
C observatory.
D police station.

1.5   The height of the reservoir on Town Hill in block **F7** is … metres.

A   836.3
B   251
C   800
D   816.9

1.6   The contour interval on the orthophoto map is … metres.

A   5
B   10
C   15
D   20

1.7   The Mabane river that flows down a steep gradient from the Gordon Falls
       is dominated by … flow.

A   turbulent
B   laminar
C   straight
D   meandering

1.8   The type of infrastructure found at **Q** on the topographical map is a …

A   railway.
B   main road.
C   national freeway.
D   pipe line.

1.9   The land-use zone in block **F/G 11/12** on the topographic map in which
       the purification plant is located is known as the …

A   industrial zone.
B   zone of decay.
C   rural-urban fringe.
D   commercial zone.

1.10   The predominant (major) street pattern at Copesville in blocks **D11/12**
       on the topographic map is …

A   radial.
B   planned irregular.
C   grid iron.
D   cobweb.

Please Turn Over

1.11   The type of farming activity being practised at New England in block **H12**
       is ... farming.

       A   crop
       B   fruit
       C   stock
       D   poultry

1.12   The economic activity at **S** in block **D4** on the topographic map is
       a ... activity.

       A   primary
       B   secondary
       C   tertiary
       D   quatenary

1.13   The straight-line distance from trigonometrical station **263 (J)** in block **D7**
       to spot height **1031(K)** in block **B6** on the topographic map is ... km.

       A   6.75
       B   3.35
       C   4.45
       D   2.60

1.14   A tourist travelling on the **N2** in a north westerly direction from
       Pietermaritzburg will reach ... which is 200km away.

       A   Durban
       B   Howick
       C   Harrismith
       D   Ladysmith.

1.15   The orthophoto map was last edited in ...

       A   2003
       B   2004
       C   2013
       D   2016

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

'NSC   st

QUESTION 2: MAPWORK TECHNIQUES AND CALCULATIONS

2.1   Refer to both the topographic map and the orthophoto map when answering
        the questions below.

        2.1.1   Which map, the topographic map or the orthophoto map, has a
                larger scale?

        _____ (1 x 1) (1)

        2.1.2   Give ONE reason to support your answer to QUESTION 2.1.1.

                _____

                _____

        _____ (1 x 1) (1)

        2.1.3   Give the grid reference of the isolated farmstead at Surrey Farm
                in block **E11**.

                _____

        _____ (2 x 1) (2)

2.2   Refer to trigonometrical station 103 at Signal Hill in block **H6** and spot
        height 789 in block **G5**.

        2.2.1   Give the true bearing of trigonometrical station 103 from spot
                height 789.

        _____ (1 x 1) (1)

        2.2.2   Is there intervisibility between trigonometrical station 103 and
                spot height 789?

        _____ (1 x 1) (1)

        2.2.3   Give a reason for your answer to QUESTION 2.2.2.

                _____

        _____ (1 x 1) (1)

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2.2.4 Calculate the average gradient between trigonometrical station 103 and spot height 789. Show ALL calculations. Marks will be awarded for calculations.

Formula: Gradient = <u>Vertical interval</u>
 Horizontal equivalent

_____

_____

_____

_____

_____

_____

_____ (5 x 1) (5)

2.2.5 Explain your answer to QUESTION 2.2.4.

_____

_____

_____

_____ (1 x 2) (2)

NSC

2.3 A cross section is drawn along the Voortrekker Wagon Trail between points **O** and **P** on the topographical map.
Assume that the vertical scale is 1cm represents 20m.

2.3.1 Calculate the vertical exaggeration of the cross section.
Show all your calculations.

VE = *VS÷HS*

_____

_____

_____

_____

_____

_____

_____

_____ (5 x 1) (5)

2.3.2 Provide ONE reason why the vertical scale in a cross section is exaggerated (made bigger).

_____

_____

_____ (1 x 1) (1)

[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1   Study the table below showing temperatures for the area **4** and **8** on the
       orthophoto map and answer the questions.

Area	4	8
Average summer temperatures	19°	28°

3.1.1   Calculate the difference in temperature between **4** and **8**.

_____ (1 x 1) (1)

3.1.2   Give TWO possible reasons for the difference in temperature
        mentioned in your answer to QUESTION 3.1.1.

_____

_____

_____

_____ (2 x 2) (4)

3.2   With reference to rainfall.

3.2.1   Does Pietermaritzburg receive seasonal or perennial rainfall?

_____

_____ (1 x 1) (1)

3.2.2   Give ONE point of evidence from the topographic map to support
        your answer to QUESTION 3.2.1.

_____

_____ (1 x 1) (1)

NSC

3.3   Refer to block **A 2/3**

3.3.1   State the general flow direction of the Gwen's Spruit (river) in block **A 2/3**.

_____

_____ (1 x 1) (1)

3.3.2   Using map evidence give ONE reason from the topographic map for your answer to QUESTION 3.3.1.

_____ (1 x 2) (2)

3.4   Refer to the drainage pattern in block **I 12**.

3.4.1   Identify the drainage pattern in block **I 12**.

_____ (1 x 1) (1)

3.4.2   State the underlying rock structure associated with this drainage pattern, answer to QUESTION 3.4.1.

_____ (1 x 1) (1)

3.5   If Pietmaritzburg had to experience extremely high rainfall over a short period of time, explain how the amount of vegetation would influence the chances of flooding in the north western section of the city.

_____

_____

_____ (1 x 2) (2)

3.6   The residential area **6** on the orthophoto map is a high-income residential area. Give ONE piece of evidence from the orthophoto map to support this statement.

_____

_____

_____ (1 x 2) (2)

3.7   Refer to the land use zone **8** on the orthophoto map.

   3.7.1   Identify the land-use zone.

   _____ (1 x 1) (1)

   3.7.2   Describe TWO factors that may have influenced the location of
           the land-use zone.

   _____

   _____

   _____ (2 x 1) (2)

   3.7.3   Suggest TWO problems the residents of the settlement next to
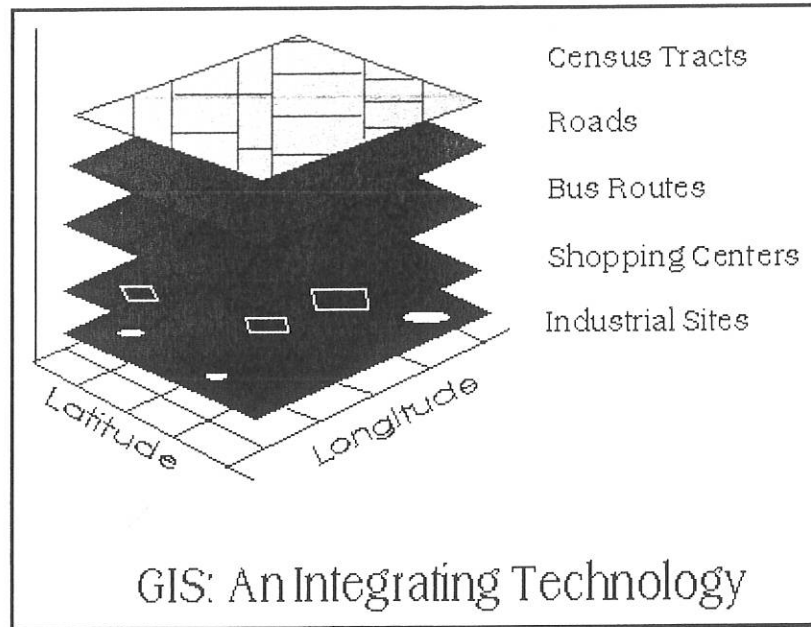   the land-use would experience.

   _____ (2 x 1) (2)

3.8   Evaluate possible environmental injustices that could have been caused
       by the excavation occurring at **S** in block **D4**.

   _____

   _____

   _____

   _____

   _____ (2 x 2) (4)

                                                            [25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

The diagram below illustrates the concept of data layering. Study the diagram carefully and answer the questions that follow.

Census Tracts

Roads

Bus Routes

Shopping Centers

Industrial Sites

Latitude Longitude

GIS: An Integrating Technology

4.1   Define the term *data layering*.

_____

_____

_____ (1 x 1) (1)

4.2   Refer to the shopping centre labelled **2** on the orthophoto map.

4.2.1   List TWO types of data related to accessibility of the shopping
            centre from the above diagram.

_____

_____ (2 x 1) (2)

4.2.2   With reference to the data types identified in QUESTION 4.2.1
            explain how the business partners of Pietermaritzburg used these
            data layering information to decide on this site for the construction
            of the shopping centre.

_____

_____ (2 x 2) (4)

4.3   An urban and regional planner is concerned about the impact that urban
        sprawl may have in the eastern section of Pietermaritzburg.

        4.3.1   Give the term used in GIS where questions are asked about a relevant
                geographical issue.

                _____

                _____ (1 x 1) (1)

        4.3.2   State and explain the GIS process that an urban and regional
                planner would use to limit the impact of urban sprawl in this area.

                _____

                _____

                _____

                _____ (1 + 2)(3)

        4.3.3   Suggest how the GIS process identified in QUESTION 4.3.2 will
                impact positively on the primary activities in Pietermaritzburg.

                _____

                _____

                _____

                _____

                _____ (2 x 2) (4)

                                                                        [15]

                                              TOTAL MARKS: 75

GEOG P2 + LIFE SCIENCES GR 12

QUESTION 1: MULTIPLE-CHOICE QUESTIONS

The questions below are based on the 1:50 000 topographical map (2930CB PIETERMARITZBURG) as well as the orthophoto map as 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 map index/reference of the orthophoto map to the south of Pietermaritzburg is …

   A   2930CD.
   B   2930CB13.
   C   2930CB3.
   D   2930DA.

1.2 The direction of the residential area Raisethorpe in block D 10/11 from Northdale in block D 9 is...

   A   east north east.
   B   east.
   C   west south west.
   D   west.

1.3 The terrain (landscape) of the CBD of Pietermaritzburg in the south east of the orthophoto map can be best described as...

   A   steep
   B   terraced
   C   gentle
   D   mountainous

1.4 The human made feature 7 on the orthophoto map is a …

   A   museum.
   B   shopping centre.
   C   observatory.
   D   police station.

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education

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PROVINCE OF KWAZULU-NATAL

NATIONAL
SENIOR CERTIFICATE

GRADE 12

GEOGRAPHY P2

COMMON TEST

MARKING GUIDELINE

JUNE 2019

MARKS: 75

This marking guideline consists of 12 pages.

1.5 The height of the reservoir on Town Hill in block **F7** is … metres.

A   836.3
B   251
C   800
D   816.9

[A ✓]

1.6 The contour interval on the orthophoto map is … metres.

A   5
B   10
C   15
D   20

[A ✓]

1.7 The Mabane river that flows down a steep gradient from the Gordon Falls is dominated by … flow.

A   turbulent
B   laminar
C   straight
D   meandering

[A ✓]

1.8 The type of infrastructure found at **Q** on the topographical map is a …

A   railway.
B   main road.
C   national freeway.
D   pipe line.

[C ✓]

1.9 The land-use zone in block **F/G 11/12** on the topographic map in which the purification plant is located is known as the …

A   industrial zone.
B   zone of decay.
C   rural-urban fringe.
D   commercial zone.

[C ✓]

1.10 The predominant (major) street pattern at Copesville in blocks **D11/12** on the topographic map is …

A   radial.
B   planned irregular.
C   grid iron.
D   cobweb.

[B ✓]

1.11 The type of farming activity being practised at New England in block **H12** is … farming.

A   crop
B   fruit
C   stock
D   poultry

[A ✓]

1.12 The economic activity at **S** in block **D4** on the topographic map is a … activity.

A   primary
B   secondary
C   tertiary
D   quatenary

[A ✓]

1.13 The straight-line distance from trigonometrical station **263 (J)** in block **D7** to spot height **1031(K)** in block **B6** on the topographic map is …km.

A   6.75
B   3.35
C   4.45
D   2.46

[B ✓]

1.14 A tourist travelling on the **N2** in a north westerly direction from Pietermaritzburg will reach ….which is 200km away.

A   Durban
B   Howick
C   Harrismith
D   Ladysmith.

TECHNICAL ERROR

[C]

1.15 The orthophoto map was last edited in …

A   2003
B   2004
C   2013
D   2016

[A ✓]

(1 x 14) **[14]**

QUESTION 2: MAPWORK TECHNIQUES AND CALCULATIONS

2.1 Refer to both the topographic map and the orthophoto map when answering the questions below.

2.1.1 Which map, the topographic map or the orthophoto map, has a larger scale?   (1 x 1) (1)

   orthophoto map ✓

2.1.2 Give ONE reason to support your answer to QUESTION 2.1.1.

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

2.1.3 Give the grid reference of the isolated farmstead at Surrey Farm in block **E11**.

   29°34'10" S [8" to 12"] ✓ 30° 25'51"E [49" to 53"] ✓   (2 x 1) (2)

2.2 Refer to trigonometrical station 103 at Signal Hill in block **H6** and spot height 789 in block **G5**.

2.2.1 Give the true bearing of trigonometrical station 103 from spot height 789.

   147° ✓ [Range 146° to 148°]   (1 x 1) (1)

2.2.2 Is there intervisibility between trigonometrical station 103 and spot height 789?

   Yes ✓   (1 x 1) (1)

2.2.3 Give a reason for your answer to QUESTION 2.2.2.

   There are no obstructions /obstacles between trigonometrical station 103 and spot height 789 ✓   (1 x 1) (1)

2.2.4 Calculate the average gradient between trigonometrical station 103 and spot height 789. Show ALL calculations. Marks will be awarded for calculations.

   Formula: $Gradient = \dfrac{vertical\ interval\ (VI)}{horizontal\ equivalent\ (HE)}$

   $VI = 895.4\ m - 789\ m$ $VI = 895.4\ m - 789\ m$
   $= 106.4\ m$ ✓ $= 106.4\ m$ ✓

   $HE = 3.4\ cm \times 500$ ✓   OR $HE = \dfrac{3.4\ cm \times 50\ 000}{100}$ ✓
   [Range 3.3cm – 3.5cm $= 1700\ m$ ✓
   $= 1700\ m$ ✓
   [Range 330m – 350m]

   $G = \dfrac{106.4}{1700}$ ✓ $G = \dfrac{106.4}{1700}$ ✓

   [Mark allocated for substitution]

   $= \dfrac{1}{15.97}$ $= \dfrac{1}{15.97}$
   $= 1 : 15.97$ ✓ $= 1 : 15.97$ ✓

   Range [1 : 15.5 to 16.45]   (5 x 1) (5)

2.2.5 Explain your answer to QUESTION 2.2.4.

   For every 1 unit vertically we move 15.97 units horizontally ✓✓
   Small ratio between height and distance ✓✓
   [Any ONE]   (1 x 2) (2)

2.3 A cross section is drawn along the Voortrekker Wagon Trail between points **O** and **P** on the topographical map.
Assume that the vertical scale is 1cm represents 20m.

2.3.1 Calculate the vertical exaggeration of the cross section. Show all your calculations.

Formula: **VE = VS÷HS**

1cm = 20 m ✓ (therefore 20m= 20 x 100 = 2000✓)

$$VE = \frac{1}{2000} \div \frac{1}{50000} \checkmark$$

$$= \frac{1}{2000} \times \frac{50000}{1} \checkmark$$

$$= \frac{50}{2}$$

= 25 times✓

(5 x 1) (5)

2.3.2 Provide ONE reason why the vertical scale in a cross section is exaggerated (made bigger)

It allows for the relief features to be seen more clearly✓
If the vertical scale is not exaggerated, the relief feature will be flat✓ (1 x 1) (1)
[Any ONE]

[20]

QUESTION 3: APPLICATION AND INTERPRETATION

3.1 Study the table below showing temperatures for the area **4** and **8** on the orthophoto map and answer the questions.

Area	4	8
Average summer temperatures	19°	28°

3.1.1 Calculate the difference in temperature between **4** and **8**.

9° C/ 9°✓ (1 x 1) (1)

3.1.2 Give TWO possible reasons for the difference in temperature mentioned in your answer to QUESTION 3.1.1.

Area 8 is the Industrial Zone ✓✓
Area 8 is made up of artificial surfaces that absorb and radiate heat (concrete, steel, tar) ✓✓
Area 8 lacks vegetation to absorb the heat ✓✓
Large space occupied by building traps heat ✓✓
More heavy vehicles produces more heat✓✓

Area 4 is away from the Industrial Zone✓✓
Fewer roads. ✓✓
Greater amount of vegetation. More evapotranspiration ✓✓
Close to the river. Cooling effect✓✓
Fewer cars, less heat produced✓✓ (2 x 2) (4)
(ANY TWO)

3.2 With reference to rainfall.

3.2.1 Does Pietermaritzburg receive seasonal or perennial rainfall?

Seasonal ✓ (1 x 1) (1)

3.2.2 Give ONE point of evidence from the topographic map to support your answer to QUESTION 3.2.1

Number of non-perennial rivers ✓
Numerous dams ✓
Presence of reservoirs ✓ (1 x 1) (1)

3.3   Refer to block **A 2/3**

3.3.1   State the general flow direction of the Gwen's Spruit (river) in block
         A 2/3.

         North/Northerly✓   (1 x 1) (1)

3.3.2   Using map evidence give ONE reason from the topographic map
         for your answer to QUESTION 3.3.1.

         *Dam wall facing northerly direction/dam wall is north of
         the dam* ✓ ✓
         *Contour line crossing the river, forms "v" pointing south
         therefore the river flows north* ✓ ✓
         Higher-lying ground in the south ✓ ✓
         Spot height readings decrease towards north ✓ ✓
         [Any ONE]   (1 x 2) (2)

3.4   Refer to the drainage pattern in block **I 12.**

3.4.1   Identify the drainage pattern in block **I 12.**

         Trellis/Dendritic✓   (1 x 1) (1)

3.4.2   State the underlying rock structure associated with this drainage
         pattern, answer to QUESTION 3.4.1.

         Trellis

         Folded sedimentary✓
         Tributaries erode a valley at right angles✓
         Alternate hard and soft rock✓
         [Any ONE]
                          OR

         Dendritic

         Uniform rocks/equal resistance to erosion ✓   (1 x 1) (1)

3.5   If Pietmaritzburg had to experience extremely high rainfall over a short
       period of time, explain how the amount of vegetation would influence the
       chances of flooding in the north western section of the city.

       Reduce the chances of flooding✓✓   (1 x 2) (2)

3.6   The residential area **6** on the orthophoto map is a high-income
       residential area. Give ONE piece of evidence from the orthophoto map
       to support this statement.

       Away from the industries and CBD✓✓
       Near the recreational facilities✓✓
       Larger houses✓✓
       Larger plots / low density✓✓
       Larger stands✓✓
       More trees ✓✓
       Good views ✓✓
       [Any ONE]   (1 x 2) (2)

3.7   Refer to the land use zone **8** on the orthophoto map.

3.7.1   Identify the land-use zone.

         Industrial zone✓   (1 x 1) (1)

3.7.2   Describe **TWO** factors that may have influenced the location of
         the land-use zone

         The land is flat✓
         Land is cheap✓
         Close to transport ✓*routes- road and rail* ✓
         Open space for further expansion ✓
         [Any TWO]   (2 x 1) (2)

3.7.3   Suggest TWO problems the residents of the settlement next to the
         land-use would experience.

         Air pollution/noise pollution/water pollution ✓
         Acid rain ✓
         Respiratory problems ✓
         Traffic congestion ✓
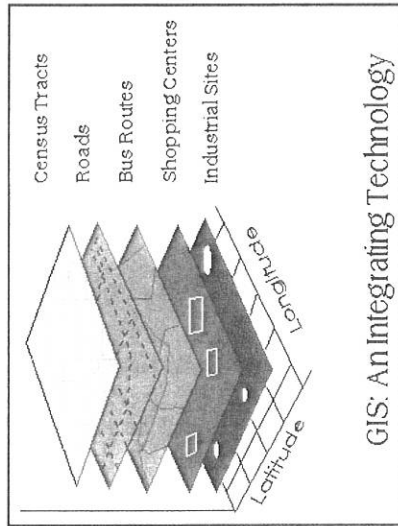   [Any TWO]   (2 x 1) (2)

3.8 Evaluate possible environmental injustices that could have been caused by the excavation occurring at **S** in block **D4**

Unhealthy environment can lead to spread of diseases ✓✓
Destruction of natural vegetation could cause the extinction of flora and fauna ✓✓
Destroys ecosystem/biodiversity/habitat ✓✓
Soil erosion could result in siltation of dams and the choking of rivers ✓✓
Destroys aesthetic appeal of the environment ✓✓
Scars the land causing environmental despoliation ✓✓
Mass movement in the form of landslides may occur ✓✓
[Any TWO]

(2 x 2) (4)
[25]

QUESTION 4: GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

The diagram below illustrates the concept of data layering. Study the diagram carefully and answer the questions that follow.

Census Tracts
Roads
Bus Routes
Shopping Centers
Industrial Sites

Longitude
Latitude

GIS: An Integrating Technology

4.1 Define the term *data layering*.

The placing of different layers of data on top of one another ✓
Different types of information that are projected onto one another ✓
[Concept]

(1 x 1) (1)

4.2 Refer to the shopping centre labelled **2** on the orthophoto map.

4.2.1 List TWO types of data related to accessibility of the shopping centre from the above diagram.

Roads ✓
Bus routes ✓

(2 x 1) (2)

4.2.2 With reference to the data types identified in QUESTION 4.2.1 explain how the business partners of Pietermaritzburg used these data layering information to decide on this site for the construction of the shopping centre.

The roads will make the shopping centre very accessible ✓✓
The bus route will assist in transporting more customers to the shopping centre ✓✓

(2 x 2) (4)

4.3 An urban and regional planner is concerned about the impact that urban sprawl may have in the eastern section of Pietermaritzburg.

4.3.1 Give the term used in GIS where questions are asked about a relevant geographical issue.

Data Querying/ Querying ✓

(1 x 1)(1)

4.3.2 State and explain the GIS process that an urban and regional planner would use to limit the impact of urban sprawl in this area.

Buffering ✓: *Demarcating an area around a feature*

(Concept) ✓

(1 + 2)(3)

4.3.3 Suggest how the GIS process identified in QUESTION 4.3.2 will impact positively on the primary activities in Pietermaritzburg.

Prevent invasion of the farmland ✓✓
Reduce the impact of food insecurity ✓✓

(2 x 2)(4)
[15]

TOTAL MARKS: 74

PLEASE NOTE:
DUE TO THE TECHNICAL ERROR IN QUESTION 1.14 THE TOTAL FOR THE
PAPER HAS BEEN ADJUSTED TO 74.
EDUCATORS NEED TO CONVERT THE MARK TO 75
FORMULA: LEARNER MARK DIVIDED BY 74 X 75