basic education

Department:
Basic Education
**REPUBLIC OF SOUTH AFRICA**

# SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

## MATHEMATICAL LITERACY P2

**2023**

Stanmorephysics

**MARKS: 150**

**TIME: 3 hours**

**This question paper consists of 13 pages and an addendum with 3 annexures.**

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## INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. Use the ANNEXURES in the ADDENDUM to answer the following questions:

   ANNEXURE A for QUESTION 1.2
   ANNEXURE B for QUESTION 2.1
   ANNEXURE C for QUESTION 5
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations clearly.
7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

## QUESTION 1

1.1 In TABLE 1 below is a list of explanations and definitions of concepts used in Mathematical Literacy.

**TABLE 1: EXPLANATIONS AND DEFINITIONS OF CONCEPTS**

| | |
|---|---|
| **A** | The distance from the centre of a circle to the outer part of the circle |
| **B** | The use of cardinal directions (i.e. north, south, east and west) to describe the location of one point to the other |
| **C** | The path or boundary that surrounds a circular-shaped object or surface |
| **D** | A position which is not exact, but roughly shows the location of an object |
| **E** | A measure of body fat based on the height and weight of an adult person |
| **F** | The total area of all the faces of a 3D-shaped object |
| **G** | A special type of diagram used to determine the outcomes of an event in probability examples |
| **H** | The arrangement of something laid out, such as the structural features of a mall |
| **I** | The ratio of the distance in real life compared to the same distance on a map |
| **J** | The rate of covering a certain distance over time |

Use the information above to write down the letter of the explanation or definition (A to J) of EACH of the following concepts:

1.1.1 BMI (body mass index) (2)

1.1.2 Circumference (2)

1.1.3 Map scale (2)

1.1.4 Compass direction (2)

1.1.5 Tree diagram (2)

1.2 ANNEXURE A shows the layout of a vegetable garden with different plant beds, as well as TABLE 2 which shows plants with their partner plants.

Use ANNEXURE A to answer the questions that follow.

1.2.1 Identify THREE plants that have cabbage as a partner. (3)

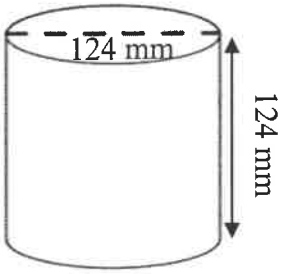
1.2.2 Determine the number of partners of the plant found in bed 4 of the vegetable garden. (2)

1.2.3 Name the partner plant which appears four times in the partner column. (2)

1.2.4 Give the compass direction of sage from the onions in the vegetable garden. (2)

1.2.5 Some of the plant beds in the vegetable garden contain more than one type of plant. Write down the plant bed numbers of these plant beds. (3)

1.3 The sketches below show a pedestal and a diagram of the pedestal with its dimensions. The pedestal can be used as a table, plant stand or as extra seating.

| PICTURE OF PEDESTAL | DIAGRAM OF PEDESTAL WITH DIMENSIONS |
|---|---|
|  |   |

[Source: ladiff.com/project/unaconcrete-pedestals]

Use the information above to answer the questions that follow.

1.3.1 Choose a formula (**A**, **B** or **C**) below which can be used to calculate the total volume of the pedestal.

**NOTE:** In EACH formula, **r** = **radius** and **h** = **height**.

**A** Volume = $(2 \times \pi \times r \times h) + (2 \times \pi \times r^2)$

**B** Volume = $(2 \times \pi \times r^2) \times h$

**C** Volume = $\pi \times r^2 \times h$ (2)

1.3.2 Write down the unit of measurement for the volume of the pedestal using the given unit in the diagram. (2)

1.3.3 Convert the height of the pedestal to metres. (2)
**[28]**

## QUESTION 2

2.1 Ring lights are the best lighting option for close-up photography and videography. Ring lights are used for projects like make-up sessions.

ANNEXURE B shows the item list and assembly instructions for a ring light. Some of the instructions have been omitted.

Use ANNEXURE B to answer the questions that follow.

2.1.1 Determine the total number of items needed to assemble the ring light. (2)

2.1.2 Identify, in the list, the item that will be used as the ring light stand. (2)

2.1.3 Is the direction of the arrow in diagram B clockwise or anticlockwise? (2)

2.1.4 Match the following instructions with the correct picture (**F**, **G** or **H**):

(a) Clamp the cellphone to the cellphone holder. (2)

(b) Install the tripod on the pan-tilt and rotate until tightened. (2)

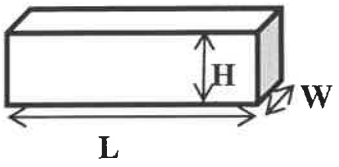
2.2 The scale used on a wall map in a classroom is 1 : 250 000.

2.2.1 Use the given scale to determine the distance on the wall map if the real distance is 65 kilometres. (3)

2.2.2 Name ONE other type of scale used on maps. (2)

2.3 A Mathematical Literacy teacher collected 36 reams of paper from her learners.

Shown below is a picture and a diagram, with the dimensions, of a ream of paper.

| PICTURE OF A REAM OF PAPER | DIAGRAM OF A REAM OF PAPER WITH DIMENSIONS |
|---|---|
|   |   <br>Length (**L**) = 27,94 cm Width (**W**) = 21,59 cm<br>Height (**H**) = 6,35 cm |

The teacher intends packing the reams of paper in a secure cabinet, as shown in the picture alongside.

The dimensions of the maximum space on one shelf are 102 cm long, 44 cm wide and 39 cm high.

**PICTURE OF A CABINET**



Use the information above to answer the questions that follow.

2.3.1 Show, with calculations, that all the reams of paper collected can fit on ONE shelf of the cabinet. (7)

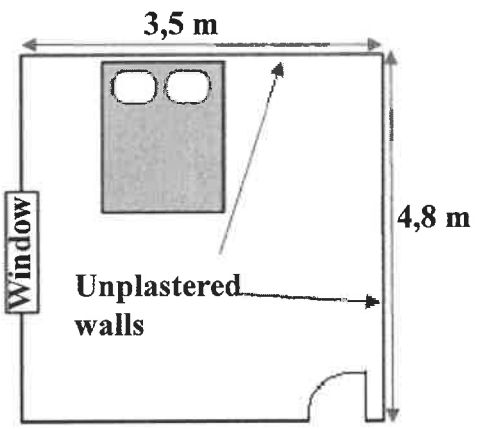
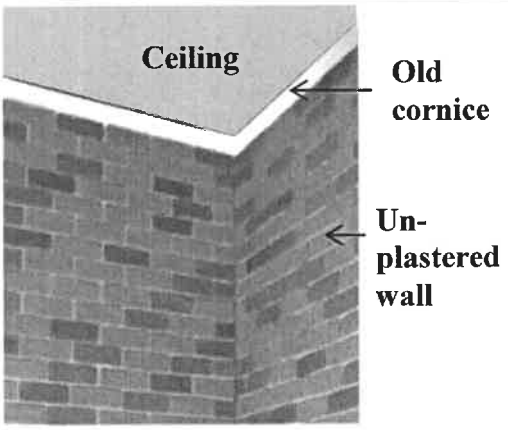
2.3.2 Give ONE reason why the teacher would like to pack the reams of paper in the cabinet. (2)

**[24]**

## QUESTION 3

3.1 Unathi bought a house. Two of the walls in one of the bedrooms were not plastered. The dimensions of the floor of this bedroom are 4,8 m × 3,5 m, as shown in the diagram below, with a wall height of 2,75 m. Unathi intends having the walls plastered.

**NOTE:** 'Plastered' means the walls are coated with a sand and cement mixture to create a smooth wall surface.

| DIAGRAM SHOWING BEDROOM WITH DIMENSIONS | PICTURE OF TWO UNPLASTERED WALLS, THE CEILING AND OLD CORNICES |
|---|---|
|  |  |





Use the information above to answer the questions that follow.

3.1.1 Calculate, in $m^2$, the total surface area of the two walls that need to be plastered.

You may use the following formula:

**Area of a rectangle = length × width** (4)

3.1.2 The plaster on the walls has a uniform thickness of 12 mm.

Determine, in $cm^3$, the volume of plaster required to plaster these two walls.

You may use the following formula:

**Volume of plaster = area of walls × thickness of plaster** (5)

3.1.3 The ready-mix plaster is available in bags. One bag is needed for every 15 000 $cm^3$.

Determine the minimum number of bags needed to plaster the two walls. (3)

3.1.4 Unathi would also like to have all the old cornices in the bedroom, where the four walls meet the ceiling, replaced.

Calculate, in metres, the total length of the new cornices.

You may use the following formula: **Perimeter = 2 × (length + width)** (3)

3.2 Unathi is advised to choose a specific brand of ready-mix plaster to prevent dampness in the walls.

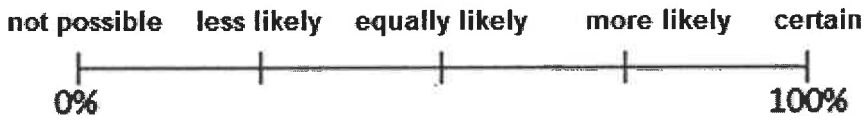
3.2.1 At the store, there are five available brands. Unfortunately, Unathi forgets the name of the specific brand.

If she randomly selects one of the available brands, determine the probability that she will select the specific brand. (2)

3.2.2 There is a 0,75 probability that the dampness will appear if the incorrect brand of ready-mix plaster is used.

Determine the probability that the dampness will NOT appear if the incorrect ready-mix plaster is used. (2)

3.2.3 The probability scale below shows the likelihoods for various probabilities.




Write down the likelihood that best describes your answer given to QUESTION 3.2.2. (2)

3.3 The instructions on the ready-mix plaster bag are as follows:

- Use 7 litres of water for a 40 kg bag of ready-mix plaster.
- Mix the water and plaster for 4 minutes to achieve a good consistency.
- Do not overmix.
- Allow the mixture to stand for 3 minutes for additives to dissolve.
- Mix again for about 2 minutes.
- Plaster is ready for use.




Use the above information to answer the questions that follow.

3.3.1 Determine the time that Unathi must start mixing the first bag of ready-mix plaster if she wants this bag to be ready for use at 08:05. (3)

3.3.2 Calculate (rounded to TWO decimal places) how many gallons of water she will use to mix five bags of plaster, if one gallon = 3,78541 ℓ. (3)

3.3.3 The plaster reaches its full strength 21 days after it has been applied, at an average room temperature of 73,4 °F.

Convert this temperature to °C.

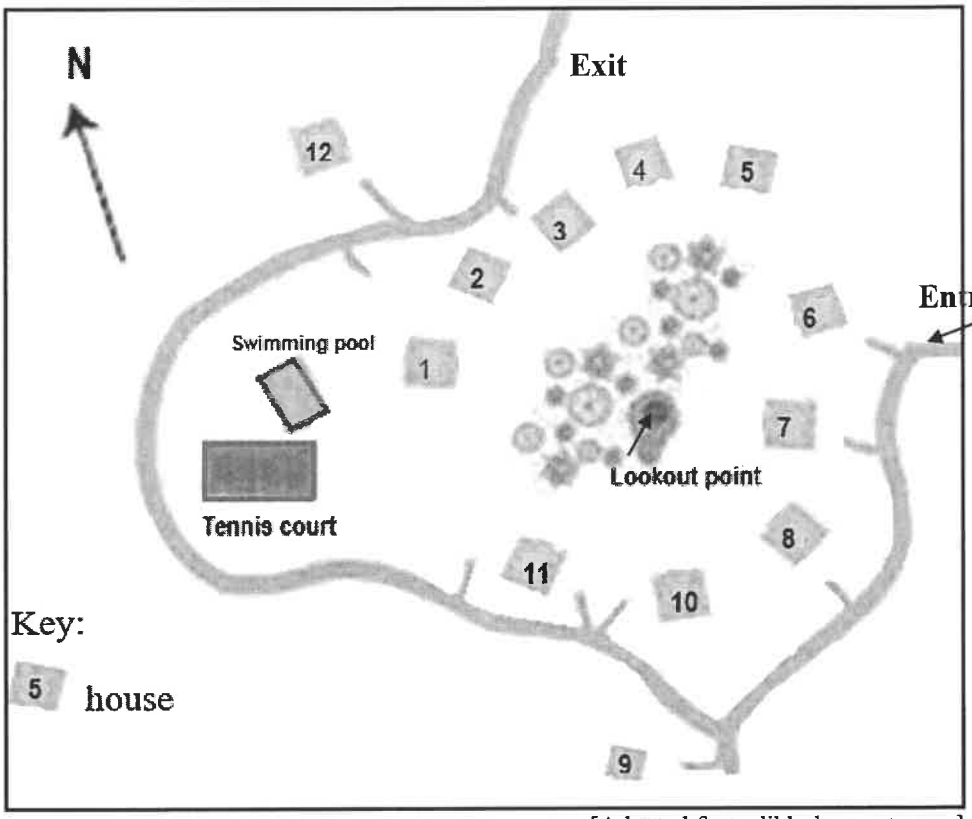
You may use the following formula: **°F – 32° = (1,8 × °C)** (4)
**[31]**

## QUESTION 4

4.1 The layout plan of a holiday resort is given below.

The resort has a rectangular swimming pool and a tennis court. There is an overgrown area in the middle of the resort where local wildlife can be viewed from a lookout point. This area is surrounded by houses.

**LAYOUT PLAN OF A HOLIDAY RESORT**




[Adapted from dikholoresort.co.za]

Use the information above to answer the questions that follow.

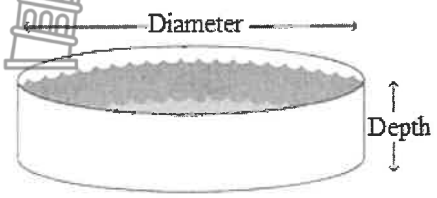
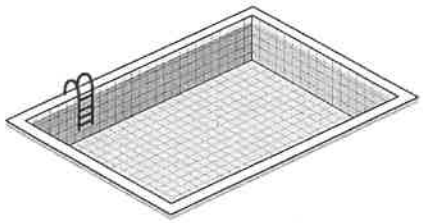
4.1.1 Determine the total number of houses in this holiday resort. (2)

4.1.2 A person standing at the lookout point, facing north, views houses that are in a north-westerly direction.

Give the numbers of TWO of the houses he viewed. (3)

4.2 The owners of the holiday resort plan to build a cylindrical pool.

The pictures below show the existing rectangular swimming pool and a cylindrical swimming pool which the owners plan to build at the holiday resort.

| CYLINDRICAL SWIMMING POOL | RECTANGULAR SWIMMING POOL |
|---|---|
|  |  |
| [Source: swimuniversity.com] | [Source: vexels.com] |
| **Inner dimensions of the pool:**<br><br>Diameter = 7 m<br>Depth = 1 m<br><br>**Tiles** = 20 cm × 20 cm (16 in a box) | **Inner dimensions of the pool:**<br><br>Length = 6,2 m<br>Width = 3,25 m<br>Depth = 1,65 m |
| **NOTE:** 1 $m^3$ = 1 000 litres | |

Use the information above to answer the questions that follow.

4.2.1 Give ONE reason why you think the cylindrical pool is designed for small children. (2)

4.2.2 Explain the meaning of *capacity of a swimming pool*. (2)

4.2.3 Calculate, rounded to the nearest litre, the difference in volume of the two swimming pools.

You may use the following formulae:

**Volume of a cylinder = 3,142 × (radius)$^2$ × depth**

**Volume of a rectangular prism = length × width × depth** (8)

4.2.4 The total inner surface of the cylindrical pool will be tiled. An additional 10% tiles were purchased.

You may use the following formula:

**Surface area of an open cylinder**
**= 3,142 × radius × (radius + 2 × depth)**

(a) Give ONE reason why additional tiles were purchased. (2)

(b) The tiler states that he requires more than 100 boxes of tiles to complete the tiling.

Verify, showing ALL calculations, whether his statement is valid. (11)
**[30]**

## QUESTION 5

5.1 Lanri, Neo and three friends plan to drive to the Sani Pass in KwaZulu-Natal. They will travel from Johannesburg and stay at Mkomazana.

ANNEXURE C shows the route map to Mkomazana.

Use the information above and ANNEXURE C to answer the questions that follow.

5.1.1 Write down the road number on which they will travel from exit 99 to Bulwer. (2)

5.1.2 Give the distance from Underberg to Himeville. (2)

5.1.3 After driving 2 km from Himeville, the road splits to the left and the right.

State in which direction (left or right) they must drive. (2)

5.1.4 It is 16 km from Himeville to Mkomazana. The distance between Mkomazana and the hotel is 4,4 km.

Calculate how many kilometres after the split in the road the hotel (indicated with *H on the map) is located. (3)

5.2 Mkomazana offers 2-sleeper and 6-sleeper accommodation options.

The rates given in TABLE 3 are per cottage per night.

**TABLE 3: RATES PER COTTAGE PER NIGHT**

| ACCOMMODATION | | RATES | |
|---|---|---|---|
| **Options** | **Names** | **Midweek** | **Weekend** (Friday and Saturday nights) |
| 2-sleeper | Stone Cottage<br>Rose Cottage | R1 150 | R1 250 |
| 6-sleeper | Valley Cottage<br>Coot Cottage | R2 640 | R2 730 |

* The single-night surcharge is R200 for a 2-sleeper and R300 for a 6-sleeper.

**NOTE:** Surcharge is an extra amount that is payable.

Use the information above to answer the questions that follow.

5.2.1 Give a possible reason why there is a surcharge on a single-night stay. (2)

5.2.2 Name, with a reason, the cottage you would recommend for the group to book. (3)

5.2.3 Neo states that the total cost for the accommodation will be R8 100 if they stay in the cottage from Thursday to Saturday night.

Verify, showing ALL calculations, whether his statement is VALID. (5)

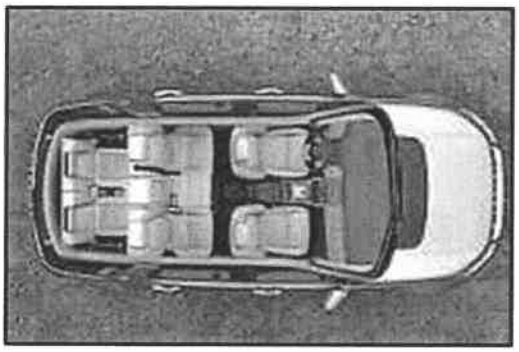
5.3 ANNEXURE C shows the route from Johannesburg to Durban.

The tollgate fees for the Johannesburg to Durban route are as follows:

- $T_1$ (De Hoek) – **R56,00**
- $T_2$ (Wilge) – **R77,00**
- $T_3$ (Tugela) – **R82,00**
- $T_4$ (Mooi) – **R58,00**
- $T_5$ (Marianhill) – **R13,50**

Lanri, Neo and friends will travel in a Land Rover. The vehicle has a fuel consumption of 6,42 ℓ/100 km and a seating layout as shown below.

**THE SEATING LAYOUT OF A LAND ROVER**



Use ANNEXURE C and the information above to answer the questions that follow.

5.3.1 Indicate whether the following statements are TRUE or FALSE. If FALSE, give a reason.

(a) The N3 is the only road on this map with tollgates. (2)

(b) Howick is on the eastern side of Lesotho. (2)

5.3.2 State the view represented in the layout picture. (2)

5.3.3 The distance from Johannesburg to Mkomazana is 588 km. The Land Rover covers this distance in 7 hours.

Calculate the average speed of this vehicle.

You may use the following formula: **Distance = speed × time** (3)

5.3.4 The accommodation, petrol and tollgate fees for the round trip to Mkomazana will be shared equally amongst all group members.

Calculate the total cost per person.

You may use R21,40 as the fuel price per litre. (9)

**[37]**

**TOTAL: 150**

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# SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

## MATHEMATICAL LITERACY P2

## ADDENDUM

## 2023

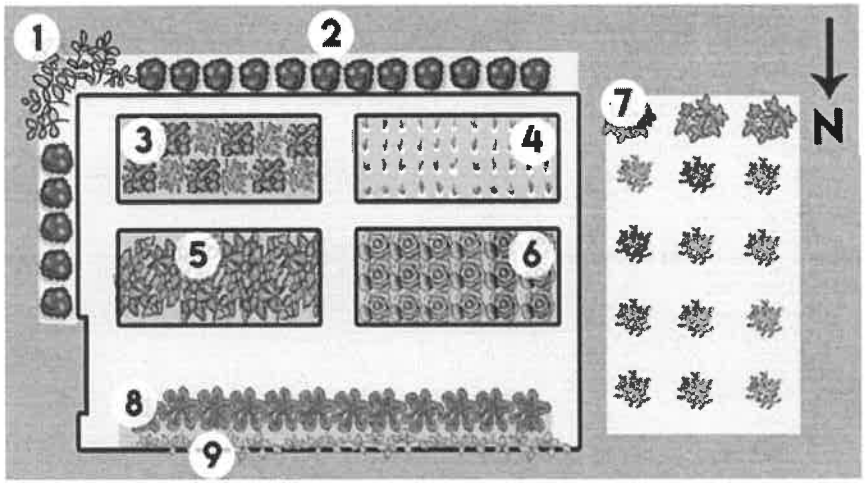
**This addendum consists of 4 pages with 3 annexures.**

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**ANNEXURE A**

**QUESTION 1.2**

## LAYOUT OF A VEGETABLE GARDEN WITH DIFFERENT PLANT BEDS




| Plant bed number | Plant type |
|---|---|
| 1 | Sage |
| 2 | Marigold |
| 3 | Tomatoes/Rocket and other greens |
| 4 | Onions |
| 5 | Potatoes |
| 6 | Cabbages |
| 7 | Okra/Tomatoes |
| 8 | Kale |
| 9 | Peas |

## TABLE 2: PLANTS WITH THEIR PARTNER PLANTS[1]

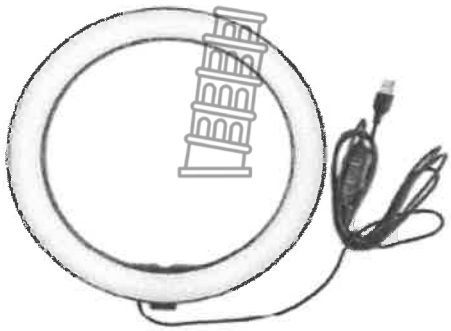
| PLANT | PARTNER PLANTS | | | | | |
|---|---|---|---|---|---|---|
| Lettuce | Mint | Chives | Dill | Beans | Beetroot | Onions |
| Potatoes | Corn | Cabbage | Peas | Squash | Beans | |
| Onions | Carrots | Parsnip | Lettuce | Cabbage | Beetroot | Tomatoes |
| Squash | Corn | Peas | Radish | Dill | Beans | |
| Cucumber | Corn | Cabbage | Beans | Radish | Celery | Lettuce |

**[1]Partner plants are plants that grow well when planted next to each other.**

**ANNEXURE B**

**QUESTION 2.1**

## ITEM LIST



**Ring light**



**Tripod**



**Pan-tilt**



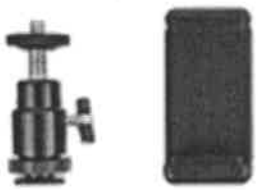
**Pan-tilt**



**Cellphone holder**

## ASSEMBLY INSTRUCTIONS

**A**



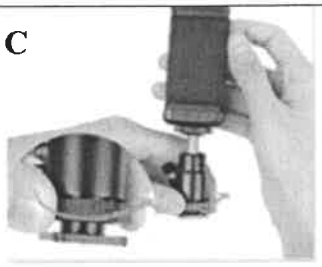
Prepare the pan-tilt and the cellphone holder.

**B**



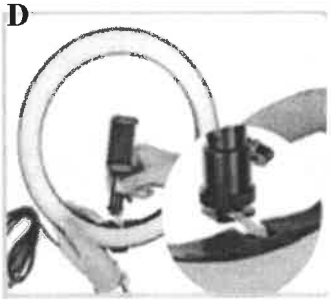
Install the cellphone holder on the pan-tilt. Tighten it, as shown, in the direction of the arrow.

**C**



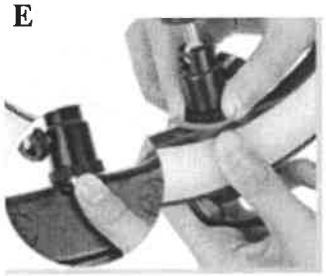
Loosen the bottom screw and leave a gap for easy installation on the ring light.

**D**



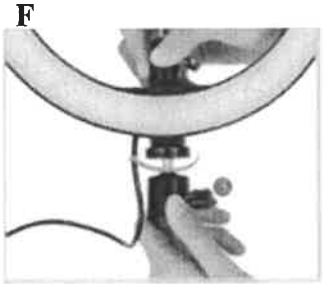
Mount the assembled cellphone holder on the ring of the ring light.

**E**



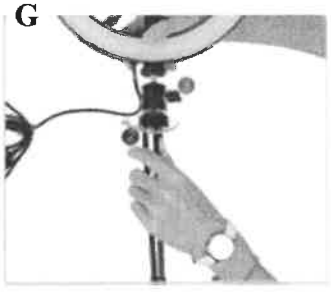
Press the clamp with your finger and rotate until tightened, as shown above.

**F**



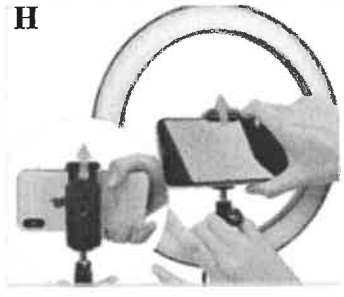
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**G**



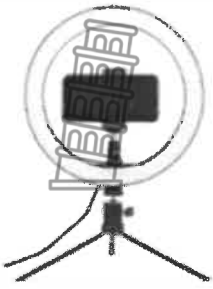
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**H**



?

**I**

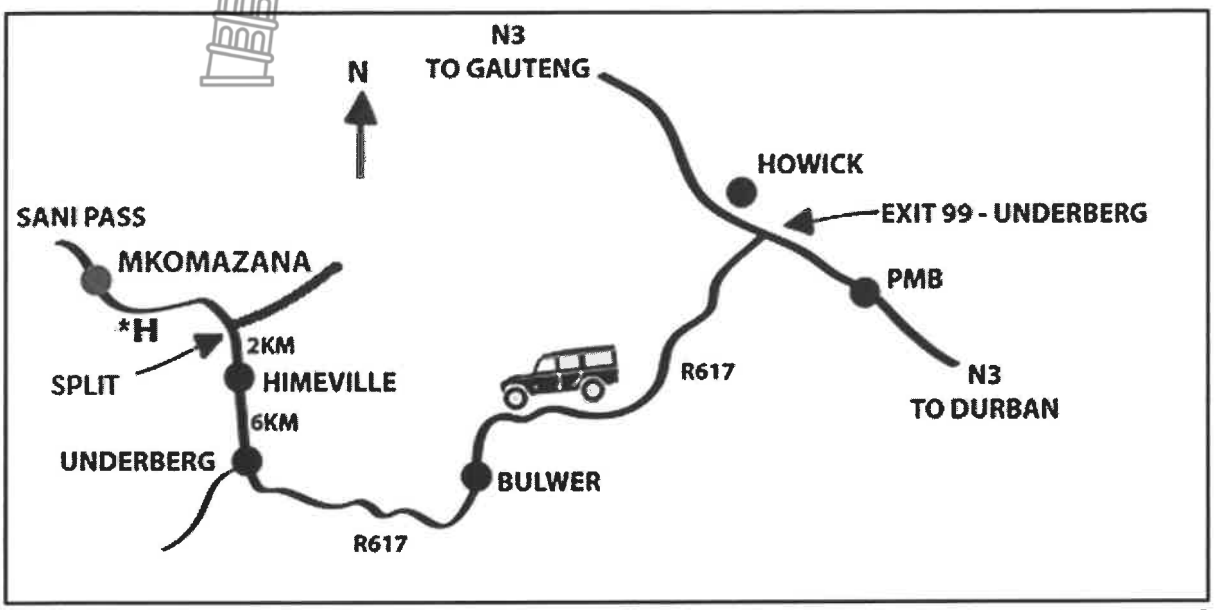


Completed assembly

**ANNEXURE C**

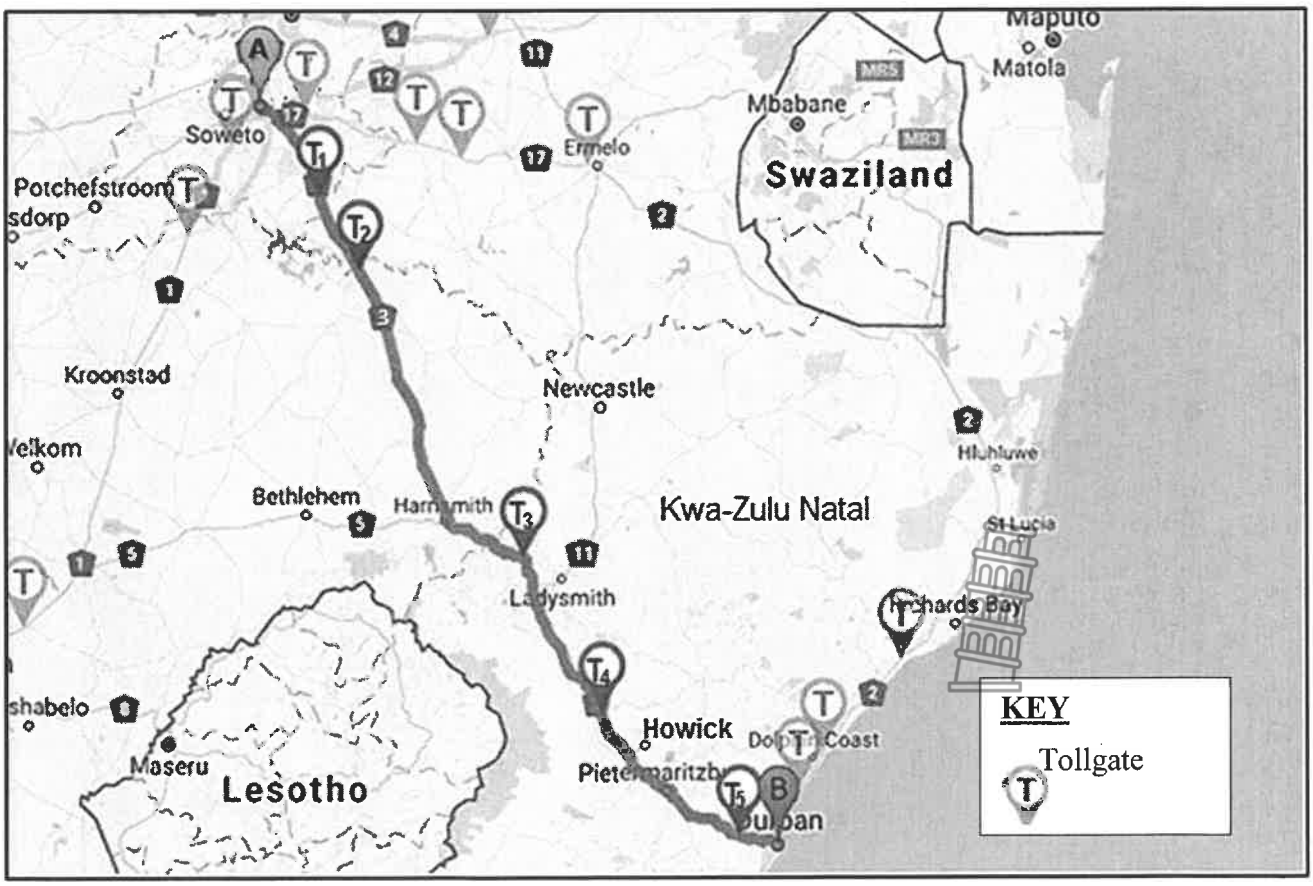
**QUESTION 5**

**ROUTE MAP TO MKOMAZANA**




[Source: mkomazana.co.za]

**ROUTE MAP FROM JOHANNESBURG (A) TO DURBAN (B)**




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