



NATIONAL SENIOR CERTIFICATE EXAMINATION  
SUPPLEMENTARY EXAMINATION – MARCH 2019

**MATHEMATICAL LITERACY: PAPER II**

**EXAMINATION NUMBER**

|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|

Time: 3 hours

150 marks

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of:
  - 23 pages
  - 4 questions
  - Appendix with 2 annexures
    - Annexure A – Chevron Cape Town Refinery
    - Annexure B – Kloofzicht Lodge

Please check that your question paper is complete.

2. Answer all the questions.
3. It is strongly suggested that all working details be shown.
4. Approved non-programmable calculators may be used in all questions.
5. It is in your own interest to write legibly and to present your work neatly.
6. Maps and diagrams are not necessarily drawn to scale, unless stated otherwise.

| Question | 1  | 2  | 3  | 4  | Total |
|----------|----|----|----|----|-------|
| Mark     |    |    |    |    |       |
| Total    | 25 | 41 | 54 | 30 | 150   |

**QUESTION 1****Refer to Annexure A.**

Chevron South Africa has a crude-oil refinery (a factory where substances in their natural state, such as oil or sugar, are made pure) in Cape Town that produces gasoline, diesel, jet fuel, liquefied petroleum gas and other products for South Africa, and it exports some of these products to other African countries.

[Source: <[www.chevron.com](http://www.chevron.com)>]

- 1.1 The picture shown in Annexure A is an aerial satellite image of the refinery. The large circles are the silos in which they store the different fuels. Use the aerial satellite image and the bar scale to determine the actual diameter of the silo marked **A**. Round off your answer to the nearest metre.

---

---

---

---

---

---

---

(4)

- 1.2 If the silo has a volume of  $137\,375\text{ m}^3$ , determine the height of the silo.

You may use the following formula:

$$Volume_{cylinder} = Area\ of\ base \times Height \qquad \pi = 3,142$$

---

---

---

---

---

---

(4)

- 1.3 Convert the volume of  $137\,375\text{ m}^3$  to kl if  $1\text{ m}^3 = 1\,000$  litres.

---

---

---

---

(2)

- 1.4 Fuel is sold in barrels. Chevron Refinery has the capacity to store 100 000 barrels. One barrel holds 42 US gallons.

Determine to the nearest litre, the volume of fuel Chevron Refinery can store when at capacity, if 1 litre = 0,264 US gallons.

---

---

---

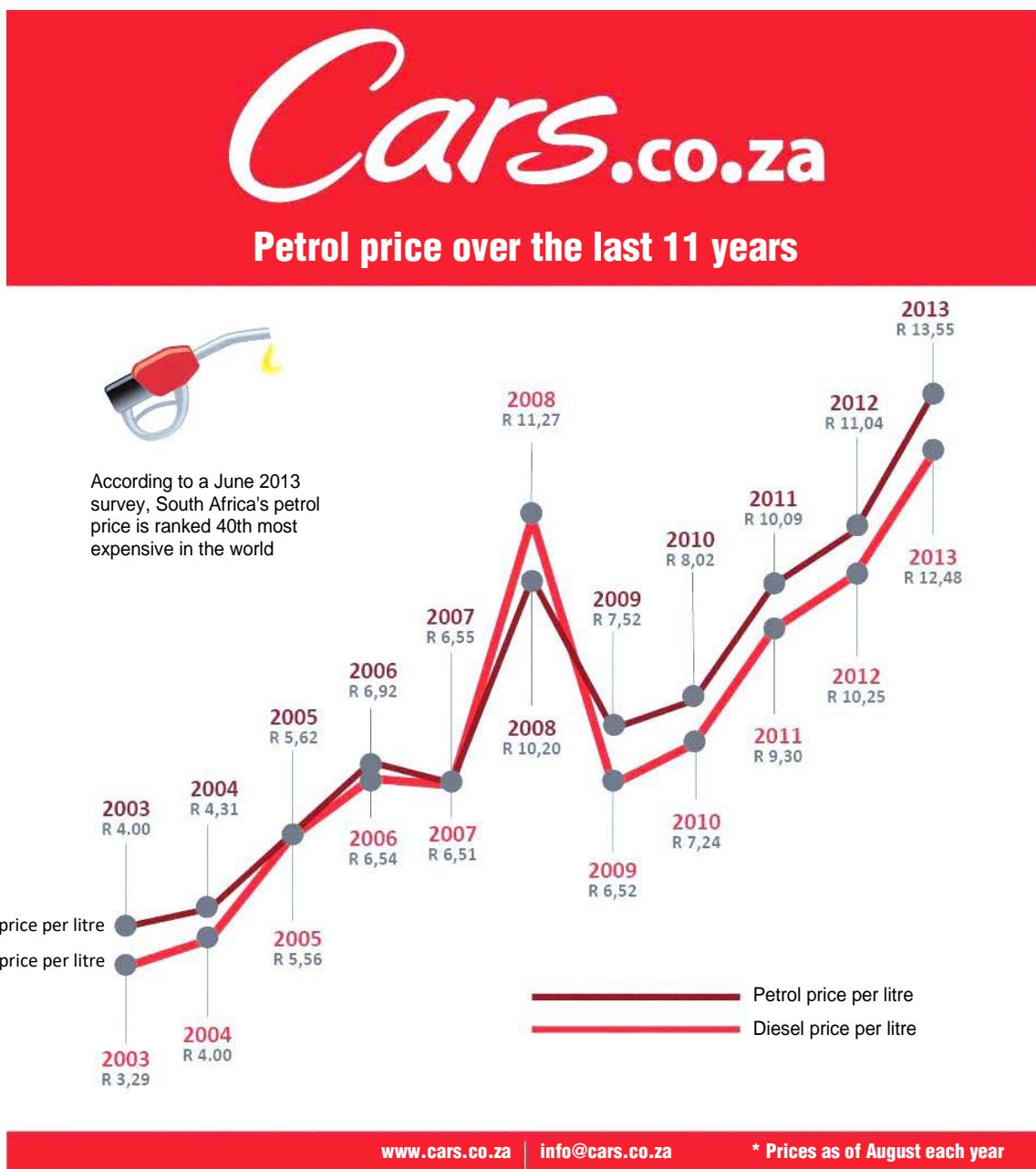
---

---

---

(4)

1.5 Below is a graph of petrol and diesel prices per litre from 2003 to 2013.



1.5.1 Would it be correct to say that petrol always costs more than diesel? Justify your answer by referring to the graph.

---



---



---



---

(2)

1.5.2 Calculate the range for the diesel price over the 11 years.

---

---

---

---

---

(3)

1.5.3 If each given value were rounded off to the nearest rand, determine what the modal cost of diesel per litre would be.

---

---

---

---

(2)

1.5.4 At the bottom of the graph it states "\*Prices as of August each year". Explain why this is an important positive piece of information in the collection of this data.

---

---

---

---

(2)

1.5.5 In 2005 and 2007, it looks like the cost of petrol and diesel are the same, yet the values given tell us that this is not the case. Which part of the graph would you change to make these points clearer? Explain your answer.

---

---

---

---

(2)  
[25]

**QUESTION 2****Refer to Annexure B.**

Leandro wants to take his wife on a hot-air balloon ride.

The hot-air balloon launches from Glenburn Lodge and Spa **A**, moves in a NW direction to point **B** before flying over the Rhino and Lion Nature Reserve to point **C**. It then travels NE to Kloofzicht Lodge **D** before landing about 3,4 km from where it started.

[Source: <[www.air-ventures.co.za](http://www.air-ventures.co.za)>]

- 2.1 The map measurement from point **B** to **C**, as the crow flies, is 10,5 cm. Show by means of calculation that the actual distance covered by the balloon, as the crow flies, is approximately 5 km.

---

---

---

---

---

---

(4)

- 2.2 The balloon can only go up or down and uses the wind currents to change direction. It takes the balloon 18 min to get from point **A** to point **B**, where it is 20 m above the ground. While continuing on its path, the balloon ascends a further 180 m from point **B** to point **C**, which takes 0,7 hours. The last leg of the flight, where the balloon lands at point **D**, takes a quarter of an hour.

Use this information to draw a graph which represents the distance above the ground for the duration of the flight. You may use the lines below to help with calculations.

---

---

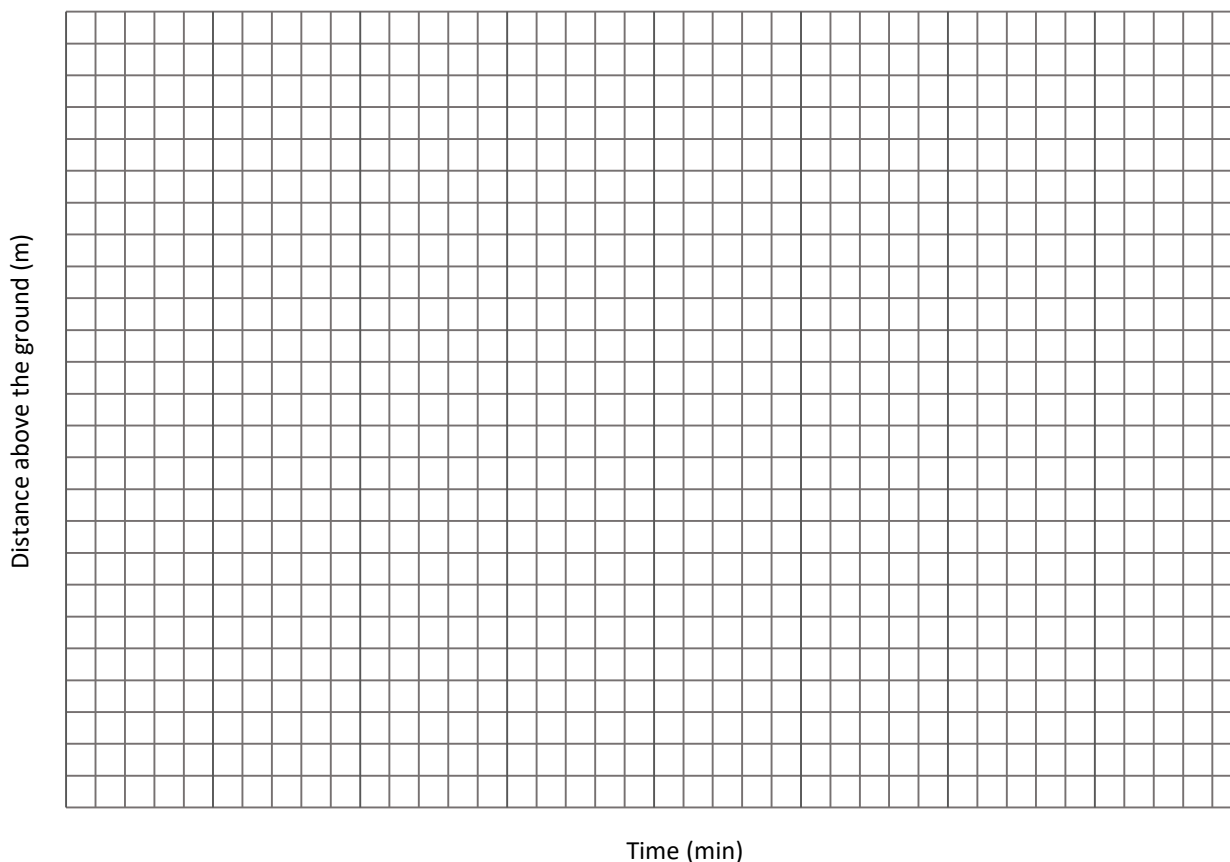
---

---

---

---

Distance above the ground for the duration of the balloon flight



(7)

- 2.3 If the sun rises in the east and the balloon ride took place in the morning. Describe where the sun would be in relation to Leandro (i.e. behind, in front, to the left, to the right of him) if he was always facing in the direction of travel on the following routes:

(a) **A to B**

\_\_\_\_\_ (1)

(b) **B to C**

\_\_\_\_\_ (1)

(c) **C to D**

\_\_\_\_\_ (1)

- 2.4 Google Maps indicates that Kloofzicht Lodge is 3,4 km away from Glenburn Lodge and Spa and that it would take an average person 45 minutes to walk there.

Leandro walks back to fetch the car. Calculate the speed in metres/second, correct to two decimal places, that Leandro would need to walk to make this time.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (4)



2.5



The hot-air balloon pilot uses propane gas to heat up the air which causes the balloon to lift and "fly".

The general rule that a pilot needs to follow is to have a  $\frac{1}{4}$  of a 38 litre tank of propane per passenger. The pilot is also considered a passenger as he must be in the basket too.

- 2.5.1 Determine how many litres of propane gas is needed for Leandro and his wife to go up in the balloon.

---

---

---

---

(3)

- 2.5.2 Determine how many tanks the pilot will need to take along if he has 16 passengers.

---

---

---

---

(3)

- 2.6 2.6.1 The table below gives the combined mass of the hot-air balloon Leandro will be going on.

| Component                       | Kg             | Mass %     |
|---------------------------------|----------------|------------|
| Balloon material                | 113,4          | 3,3        |
| Passenger basket                | 63,5           | 1,9        |
| Burner                          | 22,7           | (b)        |
| 75,7 litre fuel tanks (propane) | 183,7          | 5,4        |
| 5 passengers                    | 340,2          | 10,0       |
| 2 800 m <sup>3</sup> heated air | (a)            | 78,8       |
| <b>TOTAL</b>                    | <b>3 409,7</b> | <b>(c)</b> |

Calculate the missing values (a), (b) and (c) in the table; show all calculations.

---

---

---

---

---

---

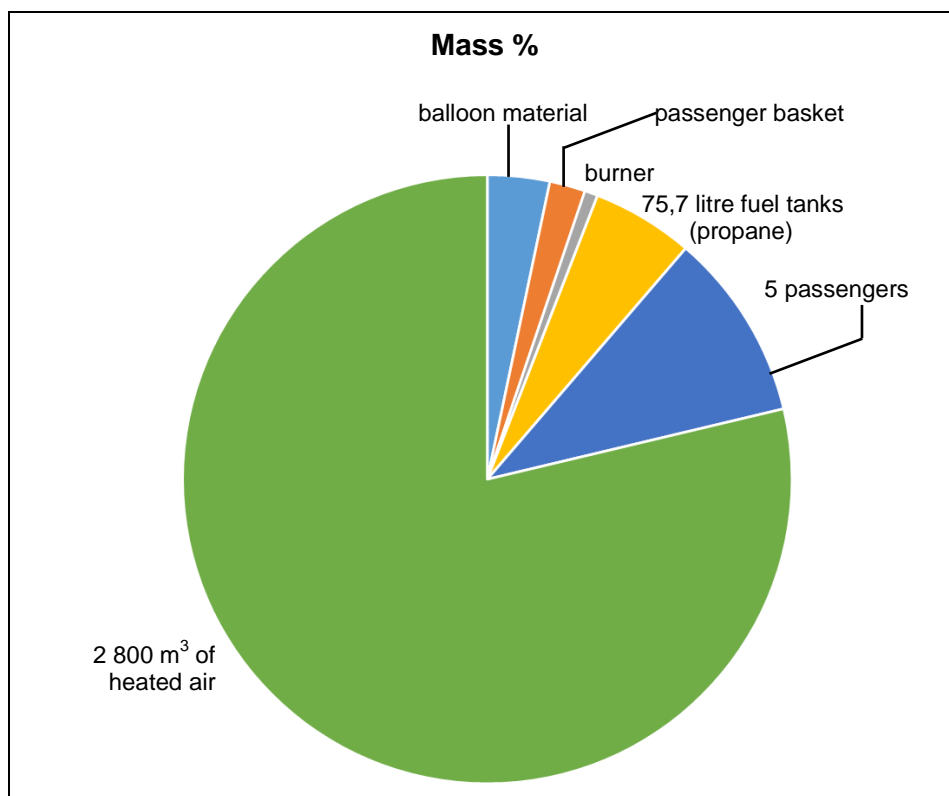
---

---

---

(6)

2.6.2 Below is a pie chart representing the information in the table.



Calculate the angle, in degrees, that represents the weight of the five passengers.

---



---



---



---

(3)

2.7 2.7.1 There are 16 passengers (local and international tourists) scheduled to go up for the next hot-air balloon ride. Five of them are international tourists.

Use this information to determine the values (a) to (d) in the table.

|        | Local Tourist | International Tourist | Total Passengers |
|--------|---------------|-----------------------|------------------|
| Male   | (a)           | (b)                   | (c)              |
| Female | 4             | 3                     | 7                |
| Total  |               |                       | (d)              |

(4)

- 2.7.2 The passenger basket is divided into compartments. Each compartment can fit two passengers.

Determine the probability of a female international tourist and a local male tourist being in the same compartment if the pilot selected people at random when filling the basket.



---

---

---

---

---

---

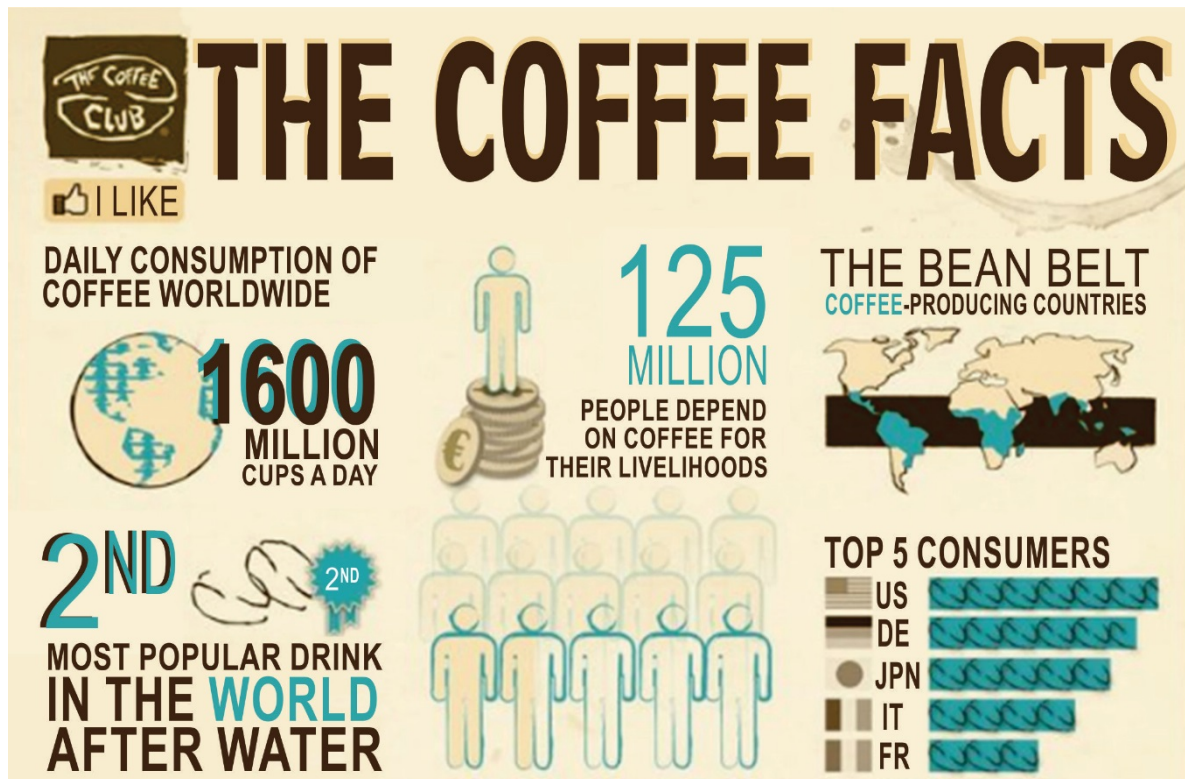
(4)  
[41]

**QUESTION 3**

3.1 Coffee is a very popular drink all over the world.

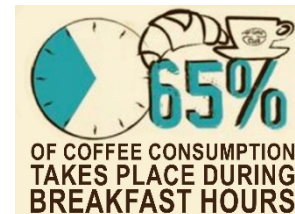


Study the infographic below and answer the questions that follow.



[Source: <www.thecoffeclub.com>]

3.1.1 The infographic states that, worldwide, 1 600 million cups of coffee are consumed daily. 1 cup = 250 ml.



- (a) Amy states that 65% of the coffee consumed daily is drunk at breakfast and this equates to 260 million litres of coffee. With the aid of calculations, state whether her statement is correct.

---



---



---



---

(4)

- (b) Ayanda says that there are 7,6 billion people in the world, and that amounts to 52,63 ml of coffee consumed per person per day. By means of a calculation, show whether he is correct or not.

---



---



---



---

(5)

- 3.1.2 In the infographic they also state that 125 million people depend on coffee for their livelihoods (jobs). Give two examples of jobs that would be directly linked to the manufacturing or production of coffee.

---

---

---

(2)

- 3.2 Thabo decides to start importing and selling premium (superior) coffee beans. To buy the beans will cost him R90 per 500 g. He wants to retail (sell) the coffee beans at R320 per 1 kg.

- 3.2.1 Calculate Thabo's percentage mark-up on the coffee beans.

---

---

---

---

---

(4)

- 3.2.2 Write an equation which represents Thabo's import costs if, over and above the cost of the beans, he has to pay an R800 import fee. Use **C** to represent the total import cost and **n** the number of kilograms imported.

---

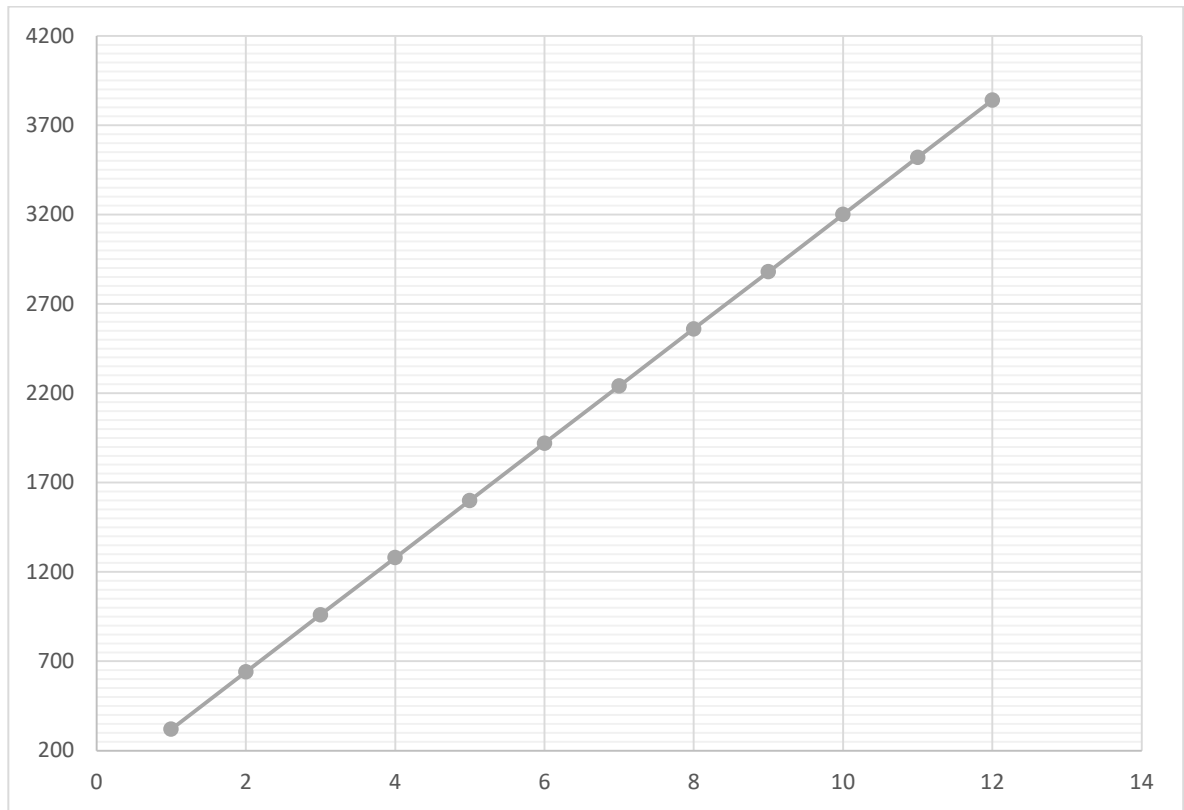
---

---

---

(3)

- 3.2.3 Draw the graph that represents the import costs for Thabo on the axes below. The graph representing the income from selling the beans has already been drawn. Provide suitable labels for the graph.



(8)

- 3.2.4 (a) On your graph, indicate with the letter **A**, the point at which Thabo will break even. (1)
- (b) Using your graph, determine the approximate amount of kilograms of coffee beans Thabo would need to sell in order to break even.

---

---

---

---

(2)

- 3.2.5 Thabo imports the coffee beans from Tanzania in central Africa. Tanzania's currency is the Tanzanian shilling (TZS). The original quote for the coffee beans was 16 300 TZS per 500 g. Thabo is concerned that his conversion to R90 per 500 g is not accurate. Prove, with calculations, that Thabo's conversion is not accurate:

|                           |                                     |
|---------------------------|-------------------------------------|
| 1 TZS                     | = 0,00032 GBP (Great British Pound) |
| 1 ZAR (South Arican Rand) | = 0,05899 GBP                       |

---

---

---

---

---

---

(5)



3.2.6 The following statistics show the top five producers of coffee beans.

| Top 5 producers |           |
|-----------------|-----------|
| COUNTRY         | TONNES    |
| Brazil          | 1 795 337 |
| Vietnam         | 1 076 875 |
| Indonesia       | 433 595   |
| Colombia        | 413 445   |
| Guatemala       | 235 518   |

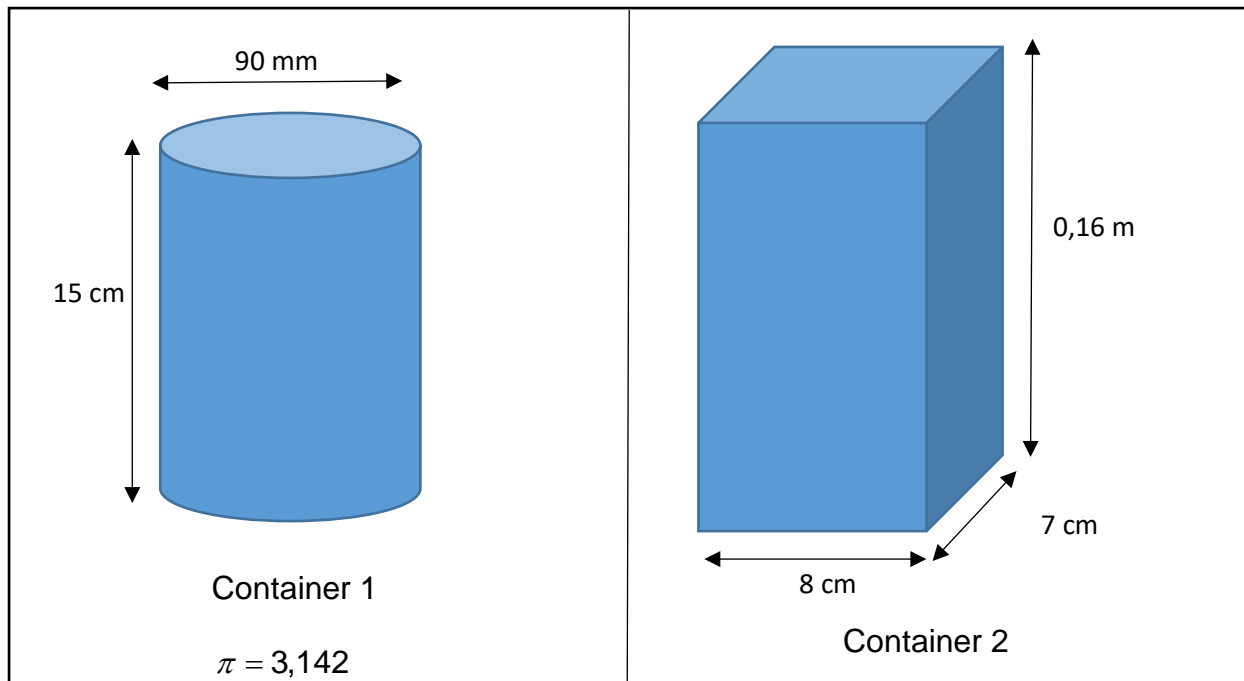
[Source: *Huffington Post Newspaper*]

Represent this information on a bar graph on the axes given below. Round off the values in the table to the nearest hundred thousand before plotting. Label your graph appropriately.



(6)

- 3.3 Thabo will repack the coffee beans he sells into resealable containers. He has a choice of two containers:



- 3.3.1 Thabo has worked out that the volume of the container needs to be as close to  $950 \text{ cm}^3$  as possible. Determine which container would be the most suitable and show all your calculations.

---

---

---

---

---

---

---

---

(7)

- 3.3.2 In order to keep the coffee fresh, Thabo will need to wrap the container in a plastic sleeve. Determine the total surface area of Container 1 that needs to be covered by the plastic sleeve.

---

---

---

---

---

---

---

---

(7)  
[54]

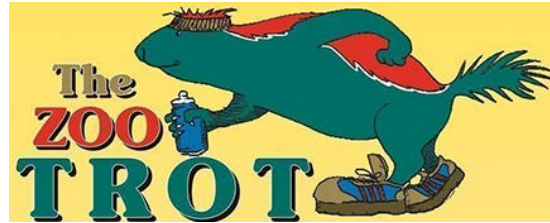
**QUESTION 4**

The Johannesburg Zoo is a non-profit organisation and so the zoo keepers have had to come up with clever ways of generating an income for the zoo.



At the moment, the zoo needs to raise R45 000 so that they can upgrade the tiger enclosure.

- 4.1 One way is to have a zoo walk/run, called "The Zoo Trot". An entrance fee of R45 is charged to compete in the 5 km or 10 km race.



- 4.1.1 Calculate how much the zoo would make if 900 people participated in The Zoo Trot.

---



---

(2)

- 4.1.2 If the zoo invested the amount generated in Question 4.1.1 in an account at an 8,9% interest rate per annum, compounded annually, how much would they have at the end of two years?

---



---



---



---



---

(5)

- 4.1.3 The contractor who will be upgrading the enclosure quotes the zoo R53 000 for the work that needs to be done. He then decides to give the zoo a 22% discount because the zoo is a non-profit organisation.

Determine whether they will have enough money in the account after two years, to pay the contractor. Justify your answer with calculations.

---



---



---



---

(4)

- 4.2 A regular donor to the zoo decides to donate a large sum of money so that the zoo can acquire an exotic pheasant collection. The donor wants six species of pheasant to commemorate his six years of donations, with one male and one female of each type of bird.

The zoo keeper finds a supplier in the USA who breeds exotic pheasants and gets the following price list.

| Picture   | Type of pheasant              | Price per pheasant in USD |
|---|-------------------------------|---------------------------|
|    | Reeves Pheasants              | \$203,00                  |
|    | Elliot's Pheasants            | \$350,00                  |
|   | Temminck's Tragopan Pheasants | \$636,00                  |
|  | Grey Peacock Pheasants        | \$530,00                  |
|  | Impeyan Pheasants             | \$804,00                  |
|  | Blue-eared Pheasants          | \$595,00                  |

[Source: <[www.exoticpheasantfarm.com](http://www.exoticpheasantfarm.com)>]

- 4.2.1 Calculate what it will cost, in rand, to buy the pheasants the donor wants if the following applies:

|                                 |                                     |
|---------------------------------|-------------------------------------|
| 1 USD<br>(United States Dollar) | = 12,29 ZAR<br>(South African Rand) |
|---------------------------------|-------------------------------------|

---

---

---

---

---

(4)

- 4.2.2 Import tax is calculated at 35% of the cost of the pheasants. Determine the import tax fee.

---

---

---

(2)

- 4.2.3 The contractor has been employed to build six  $80 \text{ m}^2$  enclosures for each type of pheasant and charges R240/ $\text{m}^2$ .

- (a) Determine the total area required for the enclosures.

---

---

---

(2)

- (b) Calculate what it will cost the zoo to have the six enclosures built.

---

---

---

(2)

- 4.2.4 The zoo keeper would like to include 120 kg of bird feed in the budget. This is enough bird feed to last for a year. He finds the following prices at different suppliers:

| <b>Feeds and Seeds</b>                    | <b>Birds R Us</b>                         | <b>BBBirds</b>                            |
|---|---|---|
| A 10 kg bag<br>of mixed seed<br>@ R320,00 | A 15 kg bag<br>of mixed seed<br>@ R472,50 | A 20 kg bag<br>of mixed feed<br>@ R654,00 |

Calculate how many bags he will have to purchase and determine which supplier would be the best option to purchase it from.

---

---

---

---

---

---

---

---

(7)

- 4.2.5 Taking the above costs into consideration, determine the minimum amount the donor would need to donate for the exotic pheasant collection.

---

---

---

(2)  
[30]**Total: 150 marks**