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NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2017

MATHEMATICAL LITERACY: PAPER I

Time: 3 hours | 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 12 pages
   - 5 questions
   - an **Answer Sheet** of 1 page (i)
   - an Appendix with 2 annexures
     - Appendix A – Floor plan
     - Appendix B – Map of South Africa
2. Ensure that your question paper is complete.
3. Answer ALL the questions.
4. Start each question on a new page.
5. Number the answers exactly as the questions are numbered.
6. A non-graphical, non-programmable calculator may be used.
7. ALL necessary calculations must be clearly shown.
8. Units of measurement must be included where applicable.
9. Round off all final answers to TWO decimal places, unless otherwise stated OR where the real-life context requires rounding UP or DOWN.
10. It is in your own interest to write legibly and to present your work neatly.
11. Maps and diagrams are not necessarily drawn to scale unless stated otherwise.

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QUESTION 1

Lebogang is a 37 year old sales representative in a pharmaceutical company earning a gross monthly salary of R13 200.

1.1 Determine Lebogang's annual gross salary. (2)

1.2 UIF (Unemployment Insurance Fund) constitutes 2% of the gross salary. 1% is paid by the employer and 1% by the employee. Determine Lebogang's monthly contribution to UIF. (2)

1.3 Lebogang's employer pays $\frac{1}{3}$ of his monthly medical aid contribution. Determine the total monthly payment towards medical aid if Lebogang's portion is R 1 273,00. (4)

1.4 Lebogang's annual taxable income is R153 180.

Use the SARS tax table below to answer the questions that follow:

RATES OF TAX FOR INDIVIDUALS

2017 tax year (1 March 2016–28 February 2017)

Tax bracket	Taxable income (R)	Rates of tax (R)
1	0–188 000	18% of taxable income
2	188 001–293 600	33 840 + 26% of taxable income above 188 000
3	293 601–406 400	61 296 + 31% of taxable income above 293 600
4	406 401–550 100	96 264 + 36% of taxable income above 406 400
5	550 101–701 300	147 996 + 39% of taxable income above 550 100
6	701 301 and above	206 964 + 41% of taxable income above 701 300

Tax Rebates

Tax Rebate	
Primary	R13 500
Secondary (65 and older)	R7 407
Tertiary (75 and older)	R2 466

1.4.1 State which tax bracket Lebogang falls into. (2)

1.4.2 Determine the rebate amount Lebogang is eligible for. (2)

1.4.3 Using the table above, calculate Lebogang's annual tax payable. (3)

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1.5 Use the calculations in Question 1 to complete the missing values of Lebogang's monthly payslip provided on the Answer Sheet. (7)

1.6 Lebogang's boss, Mr Moodley, gets a monthly travel allowance. He drives a car valued at R456 000 and on average covers a distance of 1 200 km per month. Use the SARS table below and then answer the questions that follow:

RATES PER KILOMETRE

Please note: The value of the vehicle includes Value-Added Tax (VAT).
2017 (1 March 2016–28 February 2017)

Value of the vehicle (R)	Fixed cost (R p.a)	Fuel cost (c/km)	Maintenance cost (c/km)
0–80 000	26 675	82.4	30.8
80 001–160 000	47 644	92.0	38,6
160 001–240 000	68 684	100.0	42.5
240 001–320 000	87 223	107.5	46.4
320 001–400 000	105 822	115.0	54.5
400 001–480 000	125 303	132.0	(a)
480 001–560 000	144 784	136.5	79.5
more than 560 000	144 784	136.5	79.5

1.6.1 Determine Mr Moodley's monthly fixed travelling costs. (3)

1.6.2 Determine Mr Moodley's monthly fuel costs in Rands. (3)

1.6.3 Determine the missing (a) (in c/km) if Mr Moodley's monthly maintenance cost is R768. (3)

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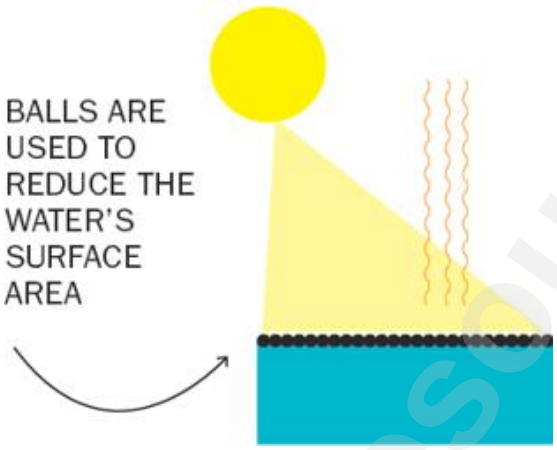
QUESTION 2

The state of California in the United States of America has been using a special method to control the evaporation of water. The method involves floating plastic balls on the surface of the water to minimise the surface area of the water exposed to the sun which thus reduces evaporation.

The pictures below show how the balls were placed in a dam in California:



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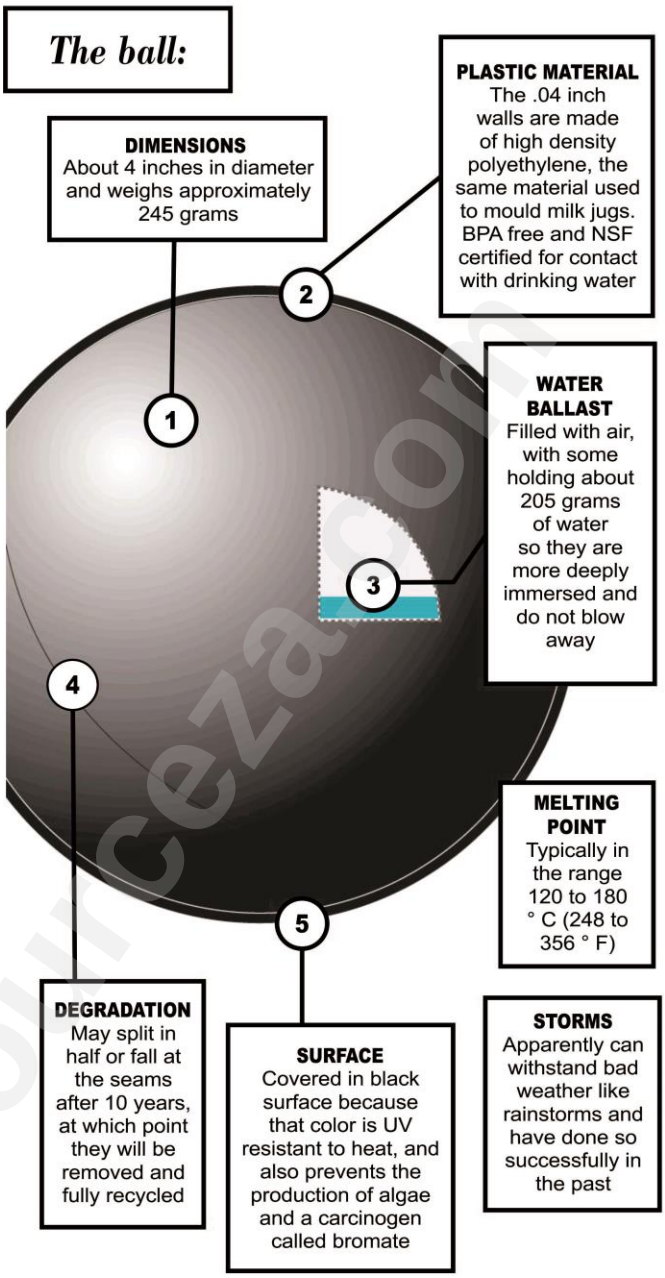
2.1 Using the the infographics alongside, answer the questions that follow:



[Sources: DADWP; Orange Products, XavierC; *The L.A. Times*]

2.1.1 Determine the radius of the ball (in cm) if 1 inch = 2,54 cm. (3)

2.1.2 Each ball has a total weight of 245 g of which 205 g is water found in the inside of the ball. Write, in simplest form, the ratio of the total weight of the ball to the water found inside the ball. (3)

2.1.3 The ball has a total volume of 550 cm^3. Determine, in cm^3, the volume of water found inside the ball. You may use the following conversions:

100 g (water) = 100 ml and 1 litre = 1 000 cm^3 (3)

2.1.4 Calculate, to the nearest percent, the volume of water found inside the ball as a percentage of the total volume of the ball. (3)

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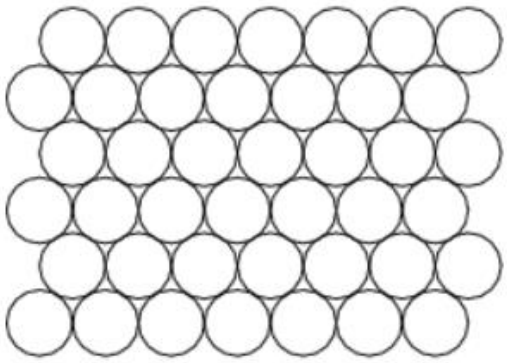
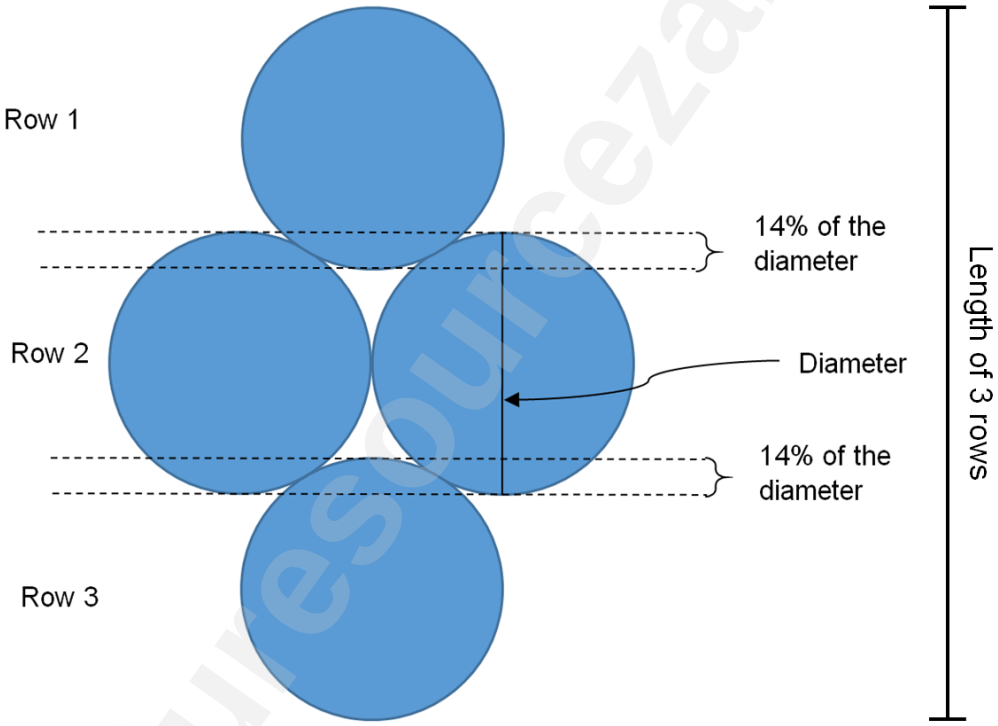
2.2 The sketch below shows an aerial view of the balls as seen on the surface of the dam.



If we were to enlarge a portion of this diagram we could see that there is an overlap of the balls. This overlap is 14% of the 4 inch diameter of the balls:



2.2.1 Determine (in inches) the length of the 14% of the diameter that overlaps. (2)

2.2.2 Determine the length of three rows of balls. (4)

2.3 2.3.1 The production company of the plastic balls report that for every 525 balls manufactured, 1 is defective. Determine the probability that a ball chosen at random is defective. (2)

2.3.2 If 3 150 balls where produced in a week determine the number of balls that were not defective. (3)

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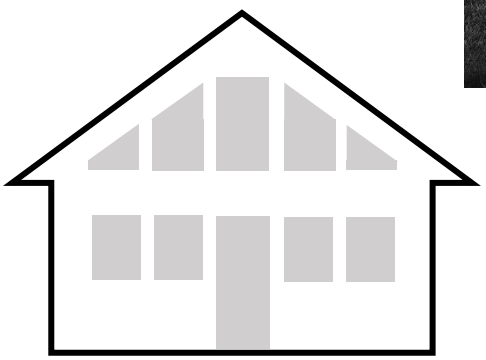
QUESTION 3

3.1 A family decides to go on holiday and books a chalet in the game park. The chalet looks like the picture alongside.

If a sketch of the north elevation of the chalet looks like the sketch below, sketch the west elevation.



(3)

3.2 Appendix A shows the floor plan of the chalet above, use it to answer the questions that follow.

3.2.1 The total width of the chalet shown on the diagram is 8 m and the total length is 12 metres. Determine the total floor area. (3)

3.2.2 Measure and write down (in cm) the length of the chalet excluding the "sundeck" (A to B on the floor plan). (2)

3.2.3 The scale of the floor plan is 1 : 64. Determine (in metres) the actual length of bedroom 2 if it measures 59 mm on the floor plan. (3)

3.2.4 Determine in which compass direction bedroom 2 is from the living room. (2)

3.2.5 The width of the sundeck on one side of the chalet is 94,4 cm, which is a third of the width of the front of the sundeck. Calculate the width (in cm) of the front of the sundeck. (2)

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QUESTION 4

Plastic Surgery is a growing industry. A survey was conducted in South America in 2014 and the following information was reported in an article on statista.com:

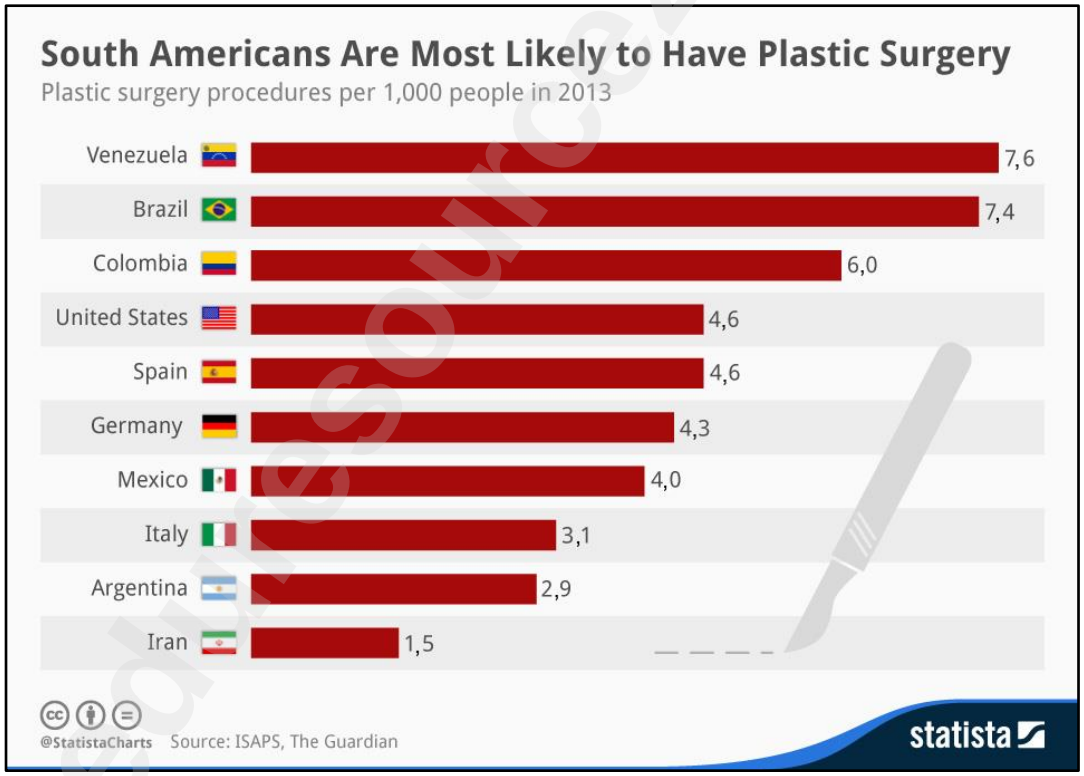
> Eight out of every 1 000 Venezuelans had experienced some form of plastic surgery operation by 2013, propelling them to the top of the plastic surgery popularity league.

4.1 4.1.1 Complete the following statement …

One in every ... people have plastic surgery procedures in Venezuela. (2)

4.1.2 If the number of Venezuelans having plastic surgery increased by 38% in 2014, determine the number of Venezuelans per 1 000 who experienced plastic surgery in 2014. (2)

4.2 The graph below shows the plastic surgery procedures per 1 000 people in 2013.



4.2.1 (a) State the number of plastic surgery procedures per 1 000 people conducted in Iran. (2)

(b) How many more per 1 000 people had plastic surgery in Italy as compared to Argentina? (2)

4.2.2 (a) Give the maximum number of plastic surgeries per 1 000 people that were conducted. (2)

(b) If there were 2 500 people surveyed in Mexico, how many of

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4.2.3 Determine from the graph the mean average plastic surgery procedures conducted per 1 000 people. (4)

4.2.4 (a) State the type of graph depicted on the previous page. (2)

(b) Explain the difference between continuous and discrete data. (2)

(c) State whether the data shown in the graph is discrete or continuous. (2)

4.3 The probability of men having plastic surgery is $\frac{1}{9}$ and the probability of the procedure done (skin and hair procedure) is $\frac{14}{25}$. Determine the probability that a person randomly chosen from a list of people, is a male that had a skin procedure done. (3)

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QUESTION 5

5.1 An advertisement on a website showing second-hand farming equipment lists the following details of a tractor for sale:

1999 John Deere 7810

44 000 € excluding VAT
53 680 € including VAT
(624 360 ZAR excluding VAT)
Total number of Hours worked: 4 500
(January 2014)

[Source: <http://www.machinefinder.com/ww/en-ZA/machines/3153390>]

5.1.1 Write down the date when this advertisement was posted. (2)

5.1.2 If the tractor was bought in January 1999, determine how many years it was in service till the date of this advertisement. (2)

5.1.3 The advertisement states that the tractor worked 4 500 hours. Determine the average number of hours the tractor worked per year. (2)

5.1.4 If the tractor continued to work at the average number of hours per year, what would its total number of hours be by January 2017? (3)

5.1.5 The advertisement shows the price in Euros (€) and in South African Rands (ZAR). Determine the exchange rate of 1 Euro to Rands. (3)

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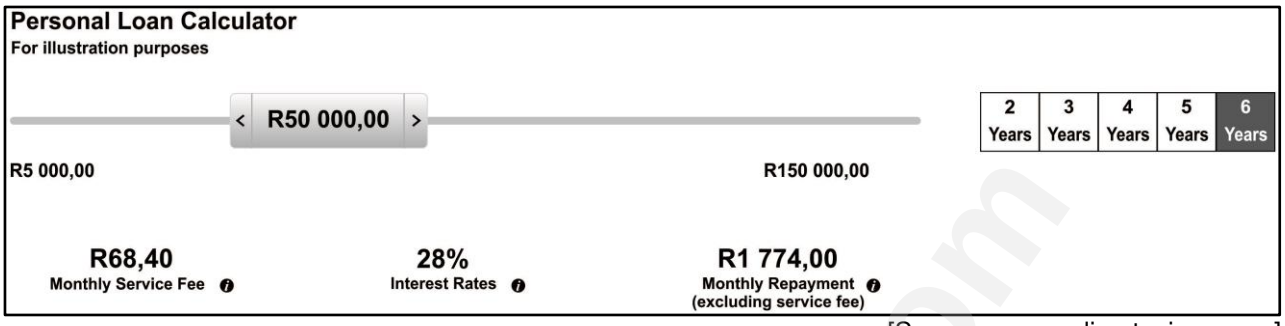
5.2 A farmer decides to buy the tractor. He decides to take a loan of R50 000 as a down payment. Direct Axis, a loan company, advertises a loan of R50 000 as shown below:



[Source: <www.directaxis.co.za>]

5.2.1 State the period of the advertised loan. (2)

5.2.2 The monthly repayment indicated in the advertisement is not the full monthly amount that needs to be repaid every month. Determine the actual monthly amount to be repaid. (3)

5.2.3 Determine the **total** repayment amount of the loan over the full period of the loan. (3)

5.3 The website provides the following information as an illustrative example:

> An illustrative example of a loan at an interest rate of 28% per annum would be: Loan amount R50 000.00 plus a once-off initiation fee of R1 197.00 and a monthly admin fee of R68.40, over 72 months.

5.3.1 Determine the total value of the loan including the once-off initiation fee. (2)

5.3.2 A client applied for a loan at 15:38. If the client got a response at 10:55 the next day, calculate how long it took for the client to get a response from the time he applied. (3)

5.4 The majority of farmers in West Africa (according to "We Farm Africa") earn an average income of $3 a day.

Determine the annual income if the farmers work 5 days a week and 4 weeks a month every month. (4)

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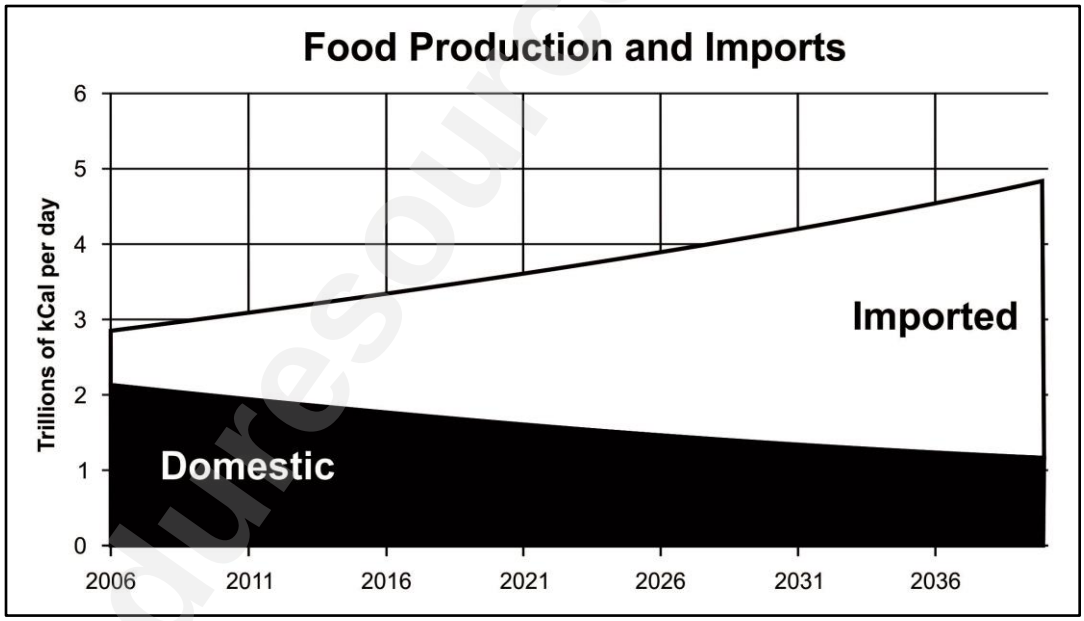
5.5 The following information relating to the Democratic Republic of Congo was accessed from the website <www.borgenproject.org>:

> The Democratic Republic of the Congo (DRC) is the poorest country in Africa and the second poorest country in the world, with almost 88% of the population living on less than $1.25 a day. With a population of 65.7 million people, 88% is an unnerving statistic. Children are severely malnourished (rates have reached 30% in certain areas) and many die due to these adverse conditions. In fact, children account for almost 50% of deaths in the country.

5.5.1 Determine the number of people in the DRC that are living on less than $1,25 per day. Write this number out in full without the word million. (3)

5.5.2 If 2,75 million people died in the DRC determine the number of children who died. (2)

5.6 The following graph is taken from a paper called "Africa 2040" where scientists consider all factors and predicts future occurrences. The graph shows how the amount of food production and food importing per day for Africa will change:



5.6.1 The graph shows that in 2006 there was just above 2 trillion kCal (kilo calories) of domestic food produced per day for Africa. (A trillion is a million million.)

If there are 1 000 calories (Cal) in 1 kilo calorie (kCal), write the number 2 trillion kCal in Cal without using the word trillion. (3)

5.6.2 If an adult requires approximately 2 000 calories per day to maintain a healthy weight, calculate how many adults are being fed per day by the 2 trillion kCal. (2)

5.6.3 Use the graph to estimate, to the nearest trillion, the domestic food

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5.7 Appendix B shows a map of South Africa indicating types of farming done. Use it to answer the questions that follow.

5.7.1 Name one city that one would pass if one travelled from Beaufort West to Pietersburg in a North-easterly direction. (2)

5.7.2 State which city on the map is closest to where most of the vineyards are grown. (2)

5.7.3 Identify Swaziland's primary farming crop. (2)

5.7.4 Identify 4 agricultural crops on the map fit for human consumption. (4)

5.8 A farmer needs to calculate how many seeds he needs to plant in a small field.

The seeds need to be planted in rows 15 cm apart and the rows need to be 30 cm from each other.

If the field is 5 m long and the first seed is planted against the edge of the 5 m, determine how many seeds will fit in a row. (5)

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Total: 150 marks

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