NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2015

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
   - **Answer Booklet** of 4 pages
   - Appendix with 2 Annexures
     - Annexure A – Map of Birchwood
     - Annexure B – Graph of the Rainfall at Hazelmere Dam

   Detach the Answer Booklet from the centre of the question paper. Hand it in with your Answer Book.

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 appropriately according to the context unless otherwise stated.

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.

QUESTION 1

Thabo and Thandi decide to get married. They want to go to Cairo (Egypt) for their honeymoon.

1.1 Thabo and Thandi are excited about visiting many of the tourist attractions. Table 1 below shows a list of places of interest that they wish to visit along with the entrance fees per person, given in Egyptian pounds (EGP).

Table 1: List of places of interest

Cairo Attractions	Normal Entry Fee in EGP	Honeymoon specials in EGP
Agricultural Museum	20,00	18,00
Egyptian Antiquities Museum	50,00	45,00
Antiquities Museum Mummies Hall	100,00	90,00
Cairo Museum	30,00	27,00
Entrance to Mummies Room inside the Cairo Museum	100,00	90,00
Islamic Art Museum	30,00	27,00
National Museum of Egyptian Modern Art	20,00	18,00
Pyramids of Giza	50,00	45,00
Entering Pyramid of Khufu	100,00	90,00
Entering Pyramid of Khafre	25,00	22,50
Entering Pyramid of Menkaure	25,00	22,50
Railway Museum	1,50	1,00
Solar Boat Museum	40,00	36,00

Use the above table to answer the following questions:

1.1.1 (a) Calculate the normal cost per person of visiting the Antiquities Museum Mummies Hall and the Railway Museum. (2)

(b) Determine the total saving that Thabo would make if he and Thandi visited the Antiquities Museum Mummies Hall and the Railway Museum, using the honeymoon special. (4)

1.1.2 Of the attractions that they wish to visit, which is the cheapest to enter? (2)

1.1.3 Thabo insists that they have to go inside the Mummies Room, which is located inside the Cairo Museum. Determine the total entrance fee for **each** of them to visit the Mummies Room if they make use of the honeymoon special. (3)

1.2 "Revenues from ancient Egyptian monuments such as the pyramids have fallen by 95% since Egypt's 2011 revolution. Revenues fell from 3 billion Egyptian pounds in 2010 to just 125 million in 2014", Mamdouh el-Damty told al-Mehwar, a private Egyptian television channel.

Determine the difference in revenue between 2010 and 2014. (3)

1.3 Thabo and Thandi estimate that they will each need a total of R150 per day spending money. They plan to be in Egypt for 9 days.

1.3.1 (a) Determine the estimated amount of money (in rand) they will need altogether for their stay. (3)

(b) Using the currency rates in Table 2 below, convert this amount to the nearest Egyptian pound. (3)

Table 2: Currency Exchange Rates

1 ZAR (South African rand)	= 0,09 USD (United States Dollar)
1 EGP (Egyptian pound)	= 0,13 USD (United States Dollar)

1.3.2 Thabo and Thandi knew three years ago that they would be going on honeymoon, as a result they deposited R5 000 into a fixed deposit account at the beginning of each year for 3 years. An interest rate of 4,1% p.a., compounded annually, was earned. Determine the values of *a*, *b* and *c*.

Year	**Amount in the bank at the start of the year**	**Interest gain over the year at 4,1%**	**Amount in the bank at the end of the year**
1	R5 000	R205,00	R5 205,00
2	R10 205,00	*a*	R10 623,41
3	*b*	R640,56	*c*

(6)

1.4 Once Thabo and Thandi arrive at the airport in Egypt, they will have to take a taxi to their hotel. There are three taxi options that they could choose from:

- Taxi Egypt : Charges a 50 EGP call-out fee and 10 EGP per kilometre
- Purple Cabs: Charges no call-out fee but 15 EGP per kilometre
- Maximum Taxis: Charges a set fee of 70 EGP for the first 5 kilometres and an additional 16 EGP per kilometre thereafter

1.4.1 Complete the table in the Answer Booklet. (5)

1.4.2 A line graph for Taxi Egypt has already been drawn on the grid provided in your Answer Booklet. Now draw line graphs for Purple Cabs and Maximum Taxis on the same grid provided in the Answer Booklet. (7)

1.4.3 Indicate with the letter 'A' the point on the graph where Taxi Egypt and Purple Cabs will cost the same. (2)

1.4.4 From your graph, determine which taxi option is the better option if the hotel is 8 km away from the airport. (2)

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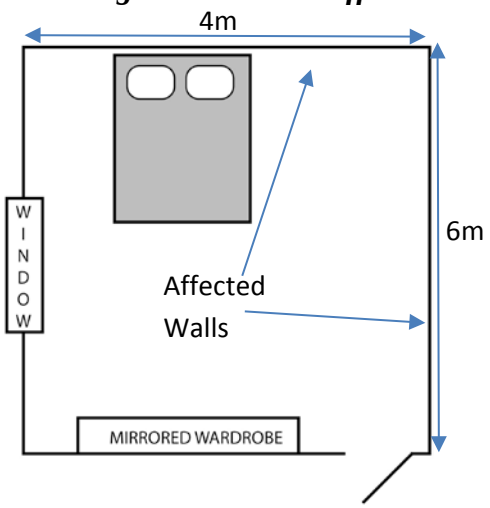
QUESTION 2

Paree has bought herself a house. Unfortunately, three months after moving in, she notices dampness on two of the walls in one of the bedrooms. The dimensions of this bedroom are 6 m × 4 m with the walls having a height of 3 m. (See sketch below).

Paree is advised to have these walls replastered.

* Dampness: the presence of unwanted moisture in the structure of the building.

Sketch showing bedroom with affected walls



2.1 Calculate the total surface area of the two walls that need to be replastered. Give your answer in cm^2. (6)

2.2 If the plaster needs to be 2 cm thick on the walls, determine in cm^3 the volume of plaster required to re-plaster these two walls. (2)

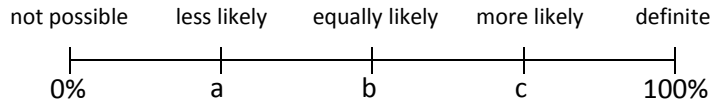
Volume = Area of wall × thickness of plaster

2.3 Paree finds out that the 'ready-mix plaster' is available in bags, each able to plaster 4 000 cm^3. Determine the number of bags Paree will need to plaster the two walls. (2)

2.4 Paree is advised to choose a recommended brand of ready-mix plaster available at the store. At the store, there are five different brands and Paree forgets the recommended brand name. If she randomly chooses one of the brands, determine the probability that she has chosen the recommended brand. (2)

2.5 2.5.1 There is a 0,75 probability that the dampness will return if the wrong brand of ready-mix plaster is used. What is the probability that the dampness will not return, having used the incorrect plaster? (2)

2.5.2 With reference to the number line below, indicate the percentage values for a, b and c.



(3)

2.5.3 With the use of the number line in Question 2.5.2, suggest which of the 'likelihoods' of probability would best describe the probability for your answer in Question 2.5.1. (2)

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QUESTION 3

Every year, the IEB uses the Birchwood Conference Centre in Boksburg, Johannesburg to host their conference. In Appendix A, you will find a site map of the conference centre. Use it to answer the questions that follow.

3.1 Determine how many entrances lead into the conference centre. (2)

3.2 State which gate is known as the Main Entrance. (2)

3.3 Name the road on which Gate 4 is found. (2)

3.4 State in which compass direction 'tazza caffé' (80) lies from Gate 2. (2)

3.5 The Birchwood Conference Centre has on-site accommodation and has room numbers from 101 to 5036.

In the block labelled 49 on the map, the room numbers range from 5031 – 5036. Determine the number of rooms found in block 49. (2)

3.6 3.6.1 Using your ruler, determine (in cm) the length of the road on the map, from point 'A' to point 'B', which is found between Gates 2 and 3. (2)

3.6.2 Using the scale on the map, determine the actual length of the road measured in Question 3.6.1. Give your answer in metres. (3)

3.7 On the day of the conference delegates travelling from Durban (KZN) have the following flight options:

Flight Option	Departure	Arrival
A	04:45 am	06:00 am
B	05:10 am	06:15 am
C	05:30 am	06:40 am
D	06:10 am	07: 15 am

The Birchwood Conference Centre provides shuttle services from the airport to arrive at the Birchwood Conference Centre by 08:00 am in time for the start of the conference. The times below are those of the three shuttles offered.

Shuttle Number	Departure time from the Airport
1	06:45 am
2	07:15 am
3	07:50 am

3.7.1 How long is the duration of flight D? (2)

3.7.2 A delegate arrives on flight C. It takes a delegate 45 minutes to disembark from the plane, collect his luggage and get to the shuttle departure point. Which shuttle number will the delegate need to use? (2)

3.7.3 The Shuttle driver gets to the Mercedes Benz in East Rand Mall (grid reference C6 on the map found in the Answer Booklet) and now does not know how to get to Birchwood Conference Centre (Hotel).

(a) On the map in your Answer Booklet, highlight or indicate the shortest route from the Mercedes Benz in East Rand Mall to the Birchwood Conference Centre (Birchwood Hotel) entrance found in grid reference H3. (2)

(b) Unfortunately, the driver does not have a map, so you need to give him directions. Explain the route he needs to follow. (3)

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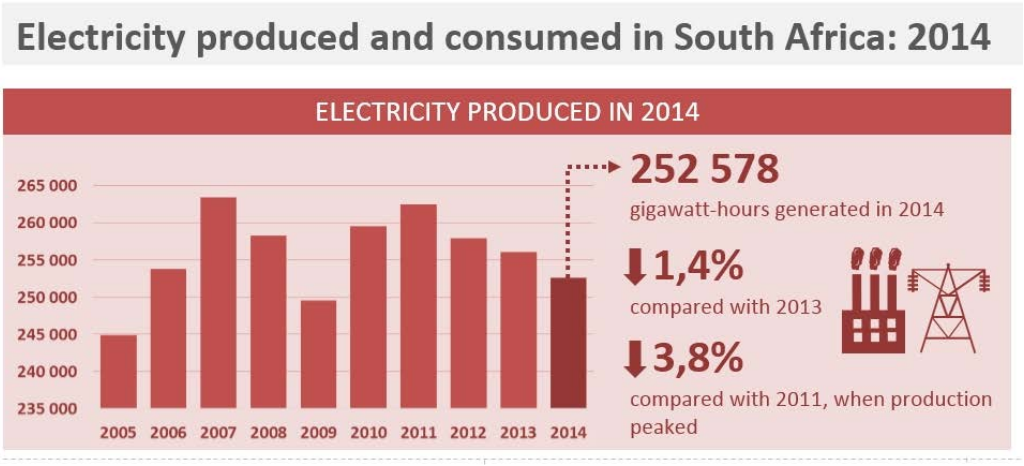
QUESTION 4

4.1 The following data was provided by Statistics South Africa on electricity production and consumption.



Graph 1

4.1.1 Name the type of graph being used above. (2)

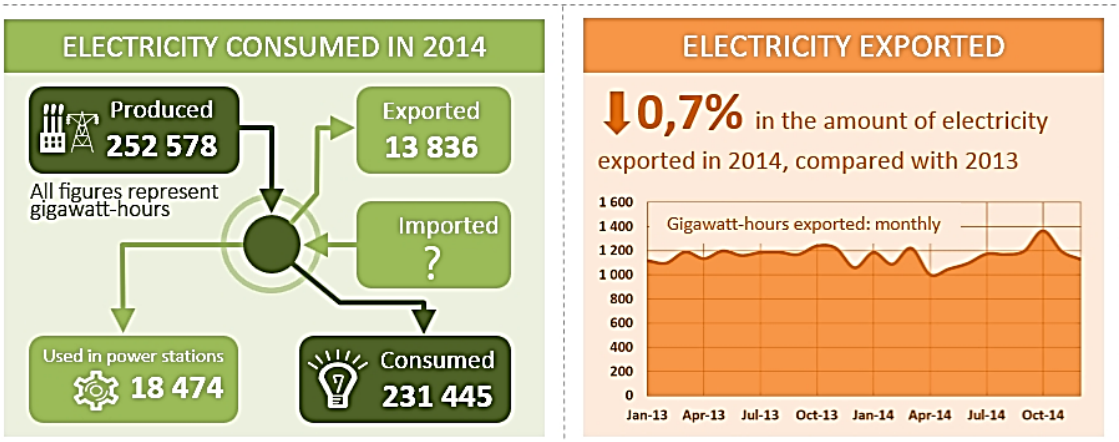
4.1.2 There are no labels for the axes on Graph 1. Provide suitable labels for the:

(a) horizontal axis
(b) vertical axis. (4)

4.1.3 According to Graph 1, in which year was the most electricity produced? (2)

4.1.4 The information alongside this graph indicates that there were 252 578 gigawatt hours produced in 2014 and that there was a 1,4% decrease. Determine how much electricity was produced in 2013. Round your answer to the nearest gigawatt hour. (3)

4.2 The graphs shown below, represent the amount of electricity generated and available for distribution.



Electricity generated and available for distribution, December 2014 http://www.statssa.gov.za

Graph 2

4.2.1 Use the information above to determine the percentage electricity produced that was exported. Round off to two decimal places. (4)

4.2.2 Determine how much electricity is to be imported in order to meet the required demands. (4)

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QUESTION 5

5.1 The invoice below is that of a municipal account for electricity. Study it and answer the questions that follow:

TAX INVOICE

COUNCIL VAT REGISTRATION No. 488 910 5648

Copy Account

Mr P. George 12 Penguin Ave Durban 4052	Account Number 895 999 6845	Date of Account 19/06/2015

Reference	Account details	Amount
	Balance Brought Forward	2095,09
13/06/2015	Payment – Thank you	2095,09 CR
	Electricity Account	
E 665 7891	Scale 004 – Residential Meter number: 8794763 From 14/05/2015 to 14/06/2015 3073 5442 2369 kWh	2731,93
	Less Estimated charges from 14/05/2015 to 14/06/2015	575,75 CR
	Estimated amount: From 14/06/2015 to 19/06/2015	192,58
	VAT Raised on items:	328,83
	IMPORTANT NOTICE Please ensure that dogs are locked away when our meter reader calls at your premises.	
	TOTAL AMOUNT PAYABLE by 15/07/2015	2 677, 59

5.1.1 Where does Mr George live? (2)

5.1.2 Did Mr George pay his account the previous month? Provide evidence for your answer. (2)

5.1.3 What do the letters 'CR' in the amount column indicate? (2)

5.1.4 Calculate the amount payable before VAT was added. (4)

5.1.5 Determine the 14% VAT amount for the answer in Question 5.1.4 to confirm that the VAT amount in the invoice is correct. (2)

5.2 Municipalities also bill for water. There are several different types of water meters from which the municipality reads the amount of water used by a household.

5.2.1 Nowadays, water meters are electronic and resemble the one below. Determine the reading on the water meter below in kilolitres, and write this number out in words.

(2)

5.2.2 P. George used 36 kl of water in a particular month. Using the tariff table below, complete the table on the Answer Booklet to determine the total amount payable for the 36 kl of water used.

Table 3:

Municipality Tariff Structure	
Water Consumption	
Volume	**Charge per *kl***
$\leq$ 6 kl	R 0,00
6 kl $< x \leq$ 15 kl	R 8,35
15 kl $< x \leq$ 30 kl	R 10,16
30 kl $< x \leq$ 45 kl	R 12,53
45 kl $< x \leq$ 60 kl	R 12,98
> 60 kl	R 14,34
All tariffs exclude 14% VAT	

(11)

5.3 Since September 2014, the North Coast of KwaZulu-Natal (KZN) has experienced drought conditions. The level of water in the dams in and around KZN have decreased, especially Hazelmere Dam. Water restrictions are implemented dependent on the fullness of the dam, given as a percentage.

The following information in Table 4 reports on the levels of all the dams in KZN province:

Table 4:

System	***Dam***	***Capacity Million m^3***	***Percentage fullness***	***Outflow (m^3/s)***	***Rainfall (mm)***	***Last updated on***
Mooi/Mgeni System	Albert Falls Dam	290.1	72.34 %	6.26	4.2	03 Feb 2015
	Inanda Dam	251.6	89.98 %	0.6	6.6	03 Feb 2015
	Mearns Dam	5.11	108.32 %	1.22	7.5	03 Feb 2015
	Midmar Dam	235.4	73.76 %	0.92	0.4	03 Feb 2015
	Nagle Dam	24.6	86.74 %	0.0	2.4	03 Feb 2015
	Spring Grove	139.5	%			03 Feb 2015
North Coast System	Hazelmere Dam	17.9	37.3 %	0.08	15.0	03 Feb 2015
Other (Inland)	Henley Dam	1.52	84.69 %		0.0	03 Feb 2015
	Ixopo Dam	0.56	101.8 %		5.18	03 Feb 2015
South Coast System	E.J. Smith Dam	0.98	%			03 Feb 2015
	Nungwane Dam	2.22	%			03 Feb 2015
	Umzinto Dam	0.48	%			03 Feb 2015

5.3.1 Identify which dam has the largest capacity and state what that capacity is. (2)

5.3.2 Hazelmere Dam has a capacity of 17,9 million cubic metres. Write this number out without the decimal comma and the word million. (2)

5.3.3 Hazelmere Dam is 37,3% full. Calculate the number of cubic metres that make up this 37,3%. (3)

5.3.4 If the dam is 50% full, there would be less of a water restriction. Determine the amount of water (in m^3) in Hazelmere Dam if it were 50% full. (2)

5.3.5 Determine, in m^3, how much more water the Hazelmere Dam would need to bring it to 50% of its capacity from its current 37,3%. (2)

5.3.6 If a tanker truck can hold 43,9 m^3 of water, how many trucks would it take to fill the Hazelmere Dam to 50% from the current 37,3%? (3)

5.4 The graph on Annexure B shows the rainfall at Hazelmere Dam.

5.4.1 Determine the range of the volume of the rainfall shown on the graph. (2)

5.4.2 Calculate the mean rainfall per day over the period indicated (28 October – 11 November) on the graph. (5)

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Total: 150 marks