TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2019

MATHEMATICAL LITERACY: PAPER II

EXAMINATION NUMBER

Time: 3 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 28 pages that include 3 pages at the back for extra calculations or rough work.
   - 4 questions
2. Please check that your question paper is complete.
3. Answer ALL the questions.
4. Answer on this question paper.
5. It is strongly suggested that all working details be shown.
6. Approved non-programmable calculators may be used in all questions.
7. It is in your own interest to write legibly and to present your work neatly.
8. Maps and diagrams are not necessarily drawn to scale, unless stated otherwise.

Question	**1**		**2**		**3**		**4**		**Total**	
	Marker	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**
Mark										
Signature										
Total	**52**		**45**		**20**		**33**		**150**	

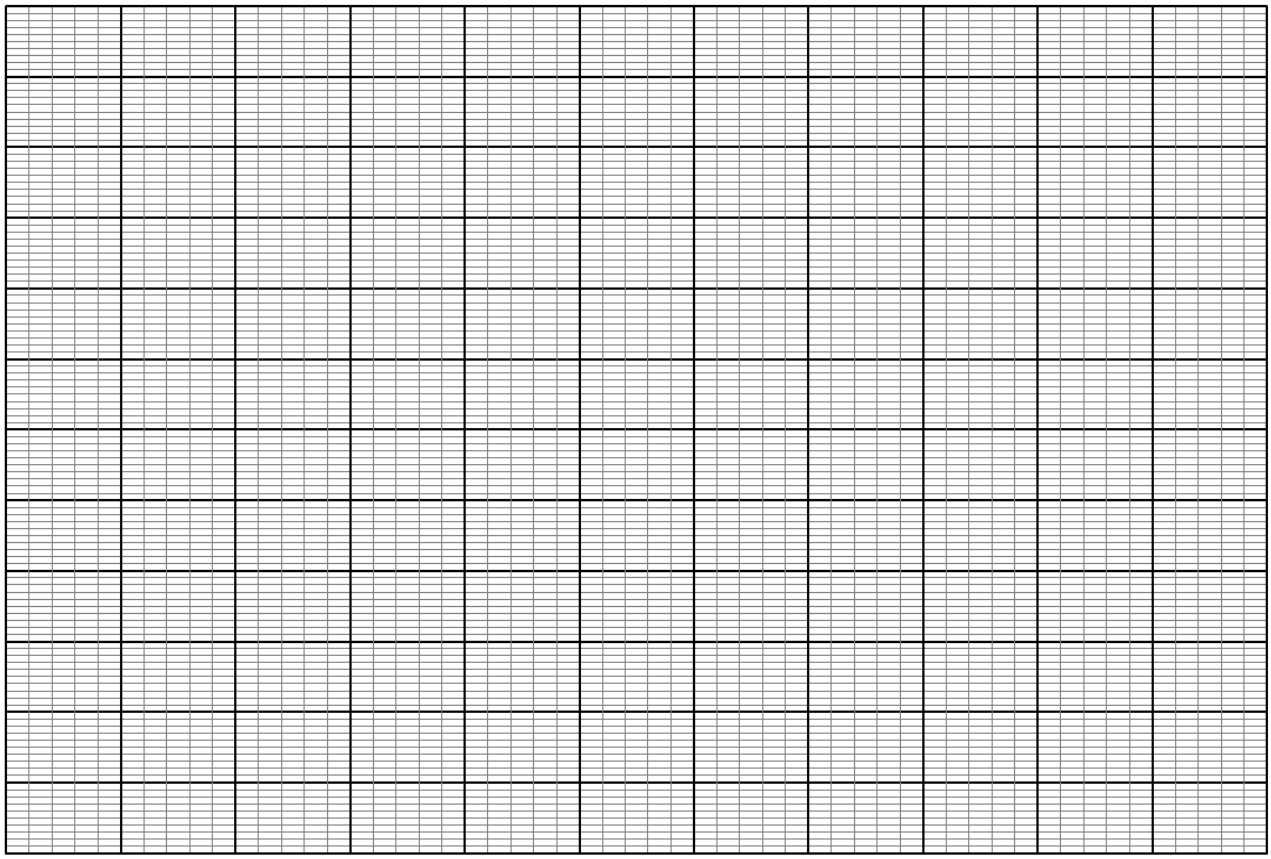
QUESTION 1

Quickety Wash laundromat is offering a special deal on the washing and ironing of laundry. According to this deal, they charge a R10 service fee and then R21 per kilogram (or part thereof) of laundry handed in for washing and ironing.

1.1 Determine the equation that represents the special deal offered by *Quickety Wash.* Let 'C' represent the cost and 'k' the number of kilograms of laundry handed in by a customer.

(3)

1.2 Using the equation you determined in Question 1.1, draw a graph that best represents the special deal offered by *Quickety Wash* for up to a maximum of 10 kg of laundry.



(10)

1.3 Use your graph to determine the cost of washing and ironing 5,5 kilograms of laundry. Write the value in rand on the line below **and** indicate with the letter '*A*' on your graph where you read this value from.

Value: _____

(2)

1.4 Leah wants to investigate whether it is cheaper to wash her laundry at home or to take it to the *Quickety Wash* laundromat. She has on average 6 kg of laundry per week.

Most high-efficiency washing machines **use** only 15 to 30 gallons (56,8 ℓ to 113,6 ℓ) of **water** per load.

[Source: <www.home-water-works.org>]

1.4.1 Leah checks on her washing machine and it says that her machine uses 45 gallons of water per load. Using the conversion table below, determine how many litres that is. Round your answer to the nearest litre.

1 ml	= 0,000264172 gallons

_____

_____

_____

_____

_____

(3)

1.4.2 The table below indicates the tariffs for water where Leah lives. In the table the % increase for 0–6 kilolitres is indicated as 15,9%. By using calculations, show whether this value is incorrect or correct.

RESIDENTIAL WATER TARIFFS – METERED AREAS			
Kilolitres per connection per month	**2017/2018 Tariff (R/kl)**	**% Increase**	**2018/2019 Tariff (R/kl)**
$0 < kl \leq 6$	R 7,14	15,9%	R 8,28
$6 < kl \leq 10$	R 7,58	15,9%	R 8,79
$10 < kl \leq 15$	R13,17	13,9%	R15,00
$15 < kl \leq 20$	R19,63	11,2%	R21,83
$20 < kl \leq 30$	R26,96	11,2%	R29,98
$30 < kl \leq 40$	R29,22	13,7%	R33,22
$40 < kl \leq 50$	R37,11	14,3%	R42,42
$50 < kl$	R38,72	16,7%	R45,19

(5)

1.4.3 Use the 2018/2019 tariff in the table to show that Leah would be paying less than R5 per week for water if she did her laundry at home. Her washing machine has the capacity to wash 2 kg of laundry per load.

(4)

1.4.4 Once Leah calculated the cost of the water, she realised she needed to add R129 for washing powder and electricity. Determine the total cost per week for Leah to do her laundry at home.

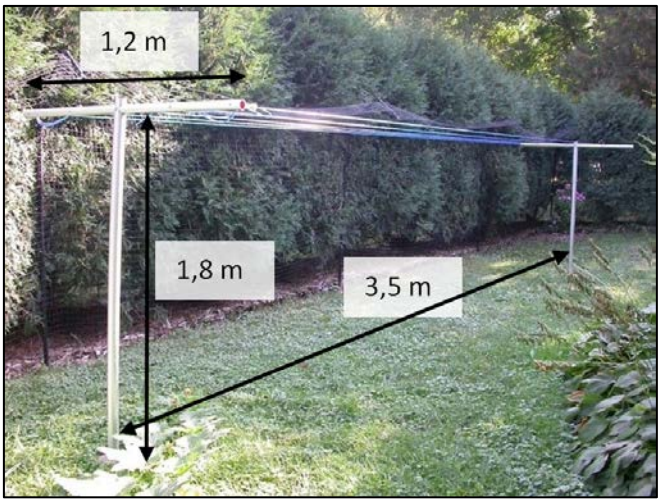
(2)

1.4.5 If the decision is based on the cost, state whether it is cheaper for Leah to do her laundry at home or to take it to the laundromat. Give a reason for your answer.

(2)

1.5 Leah wants to put up a washing line in her garden. The line consists of two poles that make a T-structure on both sides, with rope strung between the two Ts.

The picture below shows what the line must look like:



Leah will use the same poles for both parts of the T-structure and would like the upright poles to protrude 1,8 m above the ground. She needs the upright poles to be 30 cm longer than that to cement the poles into the ground. The crossbars at the top must be 1,2 m in length.

1.5.1 Calculate the total length of metal pole (in metres) that Leah will need for her washing line.

(6)

1.5.2 The metal poles that Leah would like to use are only sold in lengths of 4 m. Determine how much leftover metal pole Leah will have.

(2)

1.6 Leah would like to thread the washing line as shown in the picture below:

1.6.1 Leah must calculate how far apart the equally spaced holes need to be drilled on the crossbar. She needs to make eight holes and the first and last hole must be 2,5 cm from the edge of the crossbar.

Determine, using calculations, how far apart the holes need to be. Give your answer in cm and round your answer to one decimal place.

(6)

1.6.2 To thread the washing line as shown in the picture on the previous page, Leah will need one continuous piece of rope. Determine, with calculations, the length of the rope she will need. Round your answer up to the nearest metre to accommodate the knot she will tie at either end.

(7)
[52]

QUESTION 2

The Miss South Africa is a national beauty pageant for South African women that takes place annually. The winner is then able to compete internationally in the Miss World and Miss Universe competitions. The 2018 competition was the 60th Miss South Africa pageant.

There were 28 contestants. The list below shows the top 12 finalists and their final positions in the pageant.

Name	Age	Province	Final position in the competition
Akile Khoza	23	Mpumalanga (MP)	Top 12
Anzelle van Staden	24	Gauteng (GP)	Top 12
Bryoni Govender	21	Gauteng (GP)	Top 12
Daniëlle de Jager	20	Gauteng (GP)	Top 12
Karishma Ramdev	23	KwaZulu-Natal (KZN)	Top 5
Margo Fargo	25	Free State (FS)	Top 12
Noxolo Ndebele	24	KwaZulu-Natal (KZN)	Top 5
Tamarin Bensch	25	Gauteng (GP)	Top 12
Tamaryn Green	23	Western Cape (WC)	Winner (1st)
Tharina Botes	21	Gauteng (GP)	Top 12
Thulisa Keyi	26	Eastern Cape (EC)	First runner-up (2nd)
Thokozile Mbatha	26	Northern Cape (NC)	Top 5

2.1 Use the information in the table above to answer the following questions:

2.1.1 Calculate the range of the ages of the contestants in the top 12.

(2)

2.1.2 Calculate the mean age of the top 12 contestants.

(3)

2.1.3 Determine the modal age of the top 12 contestants.

(2)

2.1.4 Determine the median age of the top 12 contestants.

(2)

2.1.5 Using the information in the table, explain why you cannot say who was ranked in 3rd position in the competition.

(2)

2.1.6 Draw a suitable graph to represent the number of contestants by province.

(8)

2.2 Each of the finalists received a cash prize and sponsored prizes.

- The top 12 each received a cash prize of R25 000 and sponsored prizes worth R180 000.
- The first runner-up received a cash prize of R 250 000 and sponsored prizes worth R348 760.
- Miss South Africa 2018 received a total prize package of R3 million. This included R1 million in cash and a Nissan Qashqai car worth R445 500.

2.2.1 Determine the ratio, in its simplest form, of the cash prize money received for top 12 : first runner-up : winner.

(3)

2.2.2 Calculate how much the sponsored prizes (excluding the cash and the car) amounted to for the winner.

(4)

2.2.3 Show that the percentage increase of cash prize money from a top 12 contestant to that of a winner is 3 900%.

You may use the following formula:

$$\text{Percentage increase} = \frac{\text{difference}}{\text{original}} \times 100\%$$

(3)

2.3 Miss South Africa 2018, Tamaryn Green, competed for the Miss Universe title and did South Africa proud by claiming the runner-up title. The contest was held in Bangkok, Thailand.

The table below shows the flight options she had when travelling to Thailand.

	2:10 PM – 1:15 PM^{+1} **Ethiopian**	**18h 5m** **JNB–BKK**	**1 stop** **3h 30m ADD**	**R7 609** **round trip**	v
	5:25 PM – 1:30 PM^{+1} **Kenya Airways**	**15h 5m** **JNB–BKK**	**1 stop** **1h 29m NBO**	**R8 369** **round trip**	v
	10:20 PM – 8:50 PM^{+1} **Emirates**	**17h 30m** **JNB–BKK**	**1 stop** **3h 30m DXB**	**R8 640** **round trip**	v

2.3.1 Ethiopian Airlines departs from Johannesburg (JNB) and has a stop-over in Addis Ababa (ADD) before flying to Bangkok (BKK). The flight time from JNB to ADD was 5 hours 15 minutes and from ADD to BKK was $9\frac{1}{3}$ hours.

If Miss SA decided to travel using Ethiopian Airlines, show how the total travelling time given as 18 hours and 5 minutes was calculated.

(5)

2.3.2 South Africa is in the GMT+2 time zone and Thailand is ahead of South Africa in the GMT time zone. Use the information above and your calculations to determine the time zone Thailand falls into. (GMT: Greenwich Mean Time)

(6)

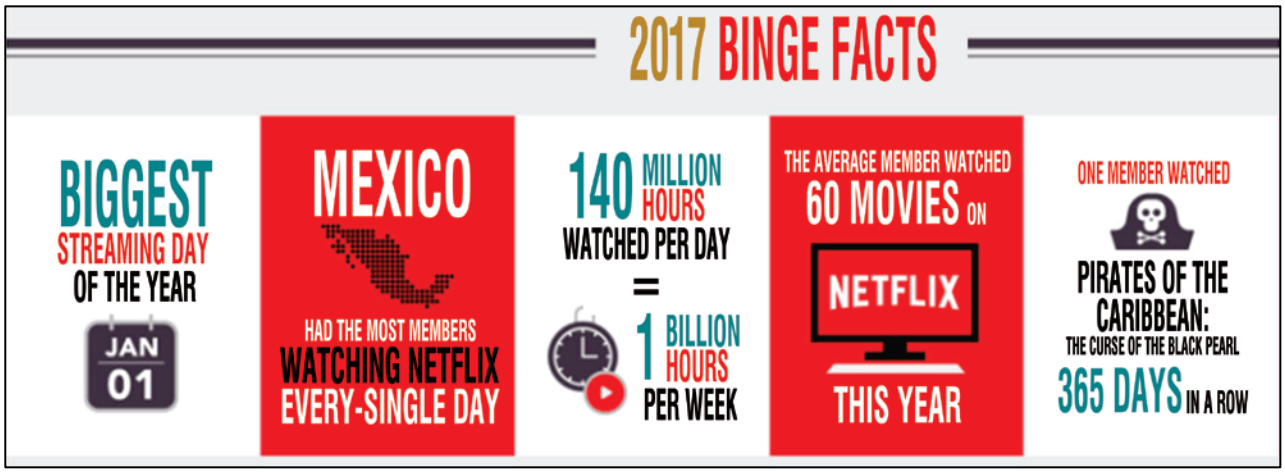
2.3.3 Miss South Africa needed to register at the Royal Paragon Hall in Bangkok, 27,9 km away from the airport, by 14:00. She took half an hour to get her bags and catch a taxi. The taxi she caught travelled at an average speed of 50 km/h. By means of calculations, show that she got there on time if she flew with Ethiopian airlines.

(5)
[45]

QUESTION 3

3.1 Netflix is a popular streaming service that allows subscribers to watch TV shows, movies and documentaries.

Use the infographic below to answer the questions that follow:



[Source: <www.buzzfeed.com>]

3.1.1 Netflix had 117,58 million subscribers in 2017. If we assume that each subscriber watched for the same amount of time per day, calculate how much time each subscriber watched per day. Write your answer in the format hours : minutes : seconds, rounded off to the nearest 10 seconds.

(4)

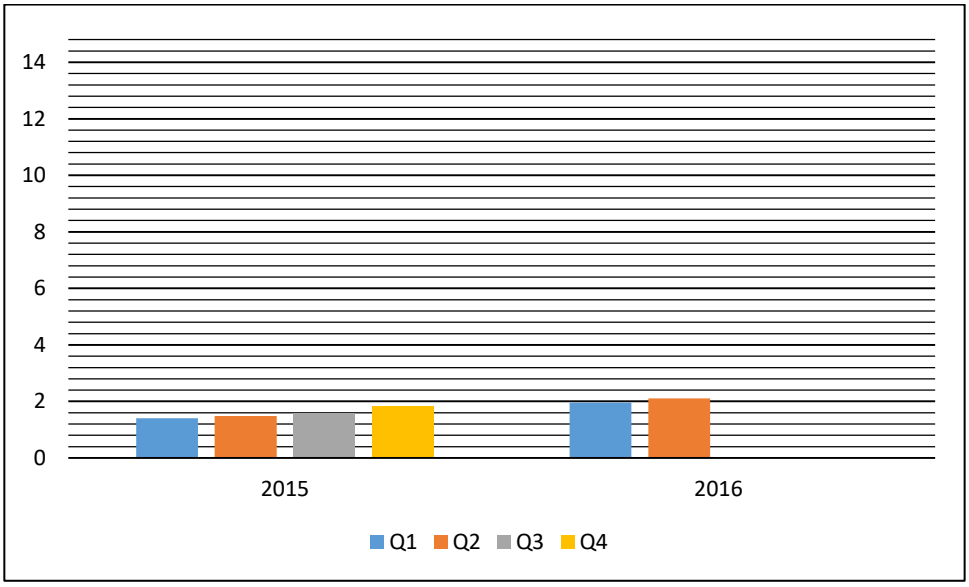
3.1.2 The infographic states "140 million hours watched per day = 1 billion hours per week". Use a calculation to prove if this statement is true.

(4)

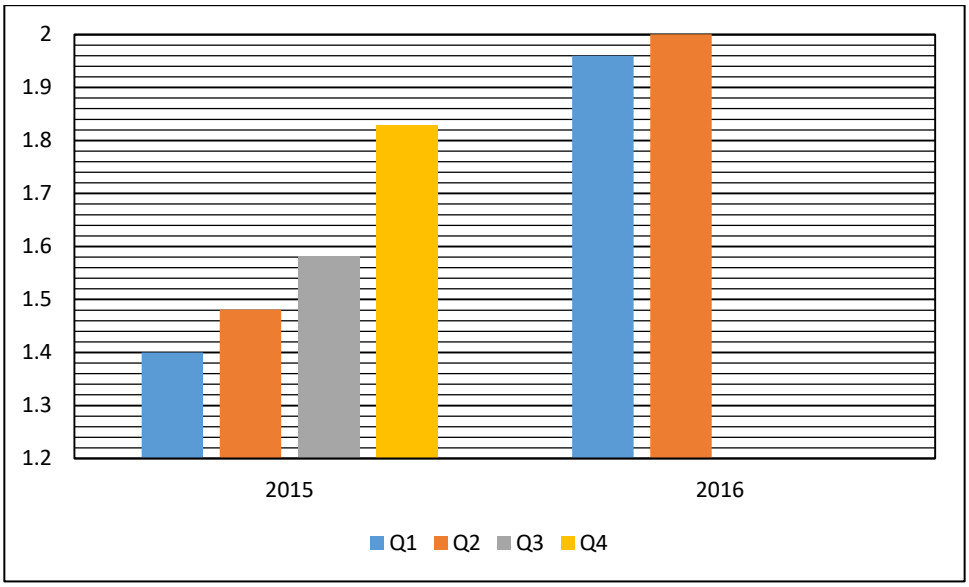
3.2 The two graphs below reflect Netflix's revenue, per quarter, for 2015 and 2016, in billions of U.S. dollars.

The two graphs represent the same information.

Graph A:



Graph B:



[Adapted from: <www.dsim.in>]

3.2.1 State two elements that are either missing or wrong on the graphs.

(2)

3.2.2 Name the one element on Graph B that has been changed, which causes it to look so different to Graph A despite showing the same information.

(2)

3.2.3 A Netflix employee wants to show his bosses how well the company is doing while the boss of Netflix wants to make his employees work harder. State which graph each of the two people would use and explain your choice.

(4)

3.2.4 The revenue for the second quarter (Q2) of 2015 was \$1,481 billion. This increased by 42,47% in the next year. Calculate what the revenue was for the second quarter of 2016.

(4)
[20]

QUESTION 4

4.1 Televisions (TVs) are often imported from Japan. Before fitting them into a box to transport them, the manufacturers wrap the TVs in protective packaging, making the TV's irregular shape a rectangular prism.

A 42-inch screen TV has the dimensions of 55 cm by 93 cm.

In the space below, draw a rectangle to represent the TV using a scale of 1 : 12. Round your scale measurements off to one decimal place. Include the scale (ruler) measurements on your diagram.

(5)

4.2 The TVs are boxed and packed into shipping containers before they are exported. The boxes the TVs are packaged into have the dimensions 97 cm × 10 cm × 59 cm. The shipping containers have the dimensions 6 m × 2,4 m × 2,6 m.

An employee calculates how many TVs will fit in one container.

His calculations are shown below:

$$\text{Volume of container} = 6 \times 2,4 \times 2,6$$
$$= 37,44 \text{ m}^3$$
$$\text{Volume of each TV box} = 0,97 \times 0,59 \times 0,1$$
$$= 0,05723 \text{ m}^3$$
$$\text{Number of TVs in container} = \text{Volume of container} \div \text{Volume of box}$$
$$= 37,44 \div 0,05723$$
$$= 654,2$$
$$\approx 654 \text{ TVs}$$

Neo, a Mathematical Literacy learner, recognises that the employee has made a common mistake in calculating the number of boxes that can fit.

4.2.1 Explain, in words, what the mistake is.

_____

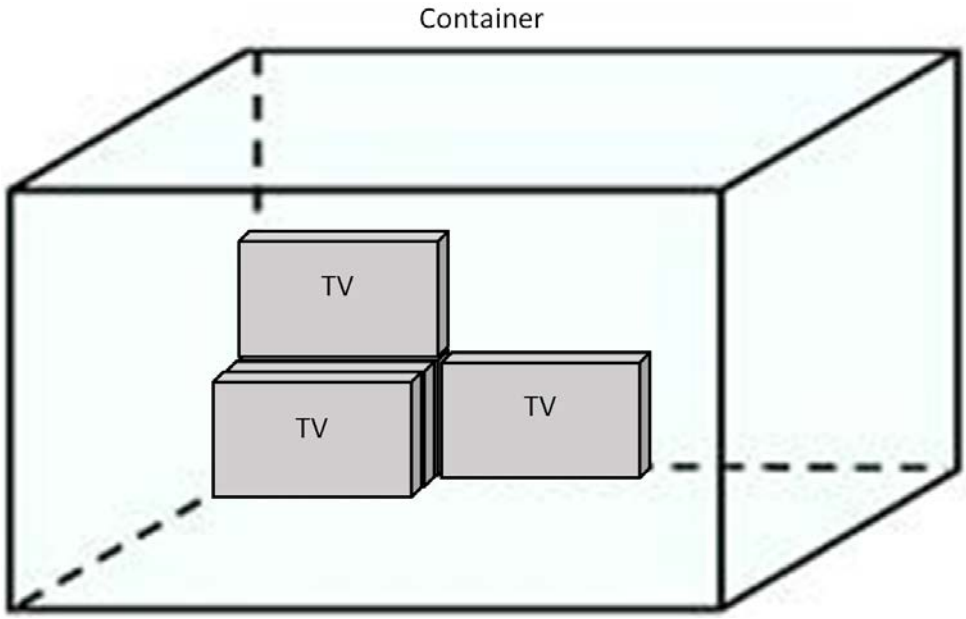
_____

_____

_____

(2)

4.2.2 Neo stated that 576 TVs can fit into this container if the boxes are packed in the following way as illustrated in the diagram below. By means of calculations, show whether he is correct or not.



Note: The diagram is not drawn to scale and shows only a few of the boxes so that you may see how they are packed.

(7)

4.3 4.3.1 For quality control purposes, containers A, B and C are randomly checked for defective TVs. If one in every 60 TVs is defective and the probability of finding a defective TV in any of the containers is equally likely, determine the probability of picking a defective TV in Container A.

(3)

4.3.2 All TVs in Container B have been checked and no defective TVs were found. If container A is now checked, will the probability of finding a defective TV in Container C increase, decrease or remain the same? Justify your answer with a calculation.

(3)

4.4 Apart from paying for the TVs to be transported to South Africa, the supplier also has to pay import taxes as declared by SARS (South African Revenue Service). This is calculated by determining 18,74% of the cost price. 576 TVs are shipped in one container and each TV costs ¥28 930 (Japanese Yen, JPY).

[Source: <www.customsdutyfree.com>]

4.4.1 Calculate how much the import tax will be in South African rand (ZAR) for one container, if the following is true:

1 ZAR = 7,82 JPY

(6)

4.4.2 Calculate what each TV would cost in ZAR if you had to include the import tax per TV.

(4)

4.4.3 Determine the VAT (15%) inclusive price on the amount you calculated in Question 4.4.2.

(3)
[33]

Total: 150 marks

ADDITIONAL SPACE (ALL questions)

REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.

