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TOTAL MARKS

INTERNATIONAL SECONDARY CERTIFICATE EXAMINATION
NOVEMBER 2023

QUANTITATIVE REASONING: PAPER I

EXAMINATION NUMBER													

Time: 3 hours | 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 20 pages which includes one additional page at the end for rough work and calculations if necessary.
   - An Appendix which includes Annexure A, B and C.
   - 5 questions.
2. Please check that your question paper is complete.
3. **Answer ALL the questions on the question paper and hand it in at the end of the examination. Remember to write your examination number in the space provided.**
4. It is strongly recommended that all working details be clearly shown where necessary.
5. An approved non-programmable calculator may be used where necessary.
6. It is in your own interest to write legibly and to present your work neatly.
7. Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
8. ONE lined page (page 20) is included at the end of the question paper. If you run out of space for a question, use this page. Clearly indicate the number of your answer should you use this extra space.

Question	**1**		**2**		**3**		**4**		**5**		**Total**	
	Marker	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**	**Marker**	**Mod**
Mark												
Signature												
Total	**32**		**29**		**21**		**39**		**29**		**150**	

QUESTION 1

1.1 Mr Valentyn takes pride in his appearance. He receives his monthly statement via email from one of the shops where he buys his clothes. Refer to his statement on **ANNEXURE A** and answer the questions that follow.

1.1.1 State the name of the store from which Mr Valentyn received his statement.

(2)

1.1.2 What must Mr Valentyn do to receive a R50 voucher?

(2)

1.1.3 State two payment methods that are accepted in the store.

(2)

1.1.4 How many times did Mr Valentyn go into the store during April?

(2)

1.1.5 Circle the word in brackets to make the following statement true.

*The value '**– 1 800**' is a (debit / credit) in this context.*

(2)

1.1.6 What is the monthly instalment due on the account?

(2)

1.1.7 Calculate the cost of one pair of Happy Sox.

(2)

1.1.8 Mr Valentyn purchased an item which cost R489. What did he purchase?

(2)

1.2 Refer to the infographic on **ANNEXURE B**, showing the online shopping habits of South Africans, to answer the questions that follow.

1.2.1 State the percentage of online shoppers that make use of their computer for their transactions.

____

(2)

1.2.2 Which mobile platform has an average order value of R417?

____

(2)

1.2.3 State the gender of the largest group of online shoppers.

____

(2)

1.2.4 Which age group makes use of online shopping the least? Justify your answer by stating the percentage of the population this group represents.

____

(2)

1.2.5 Is the following statement true or false?

There are twice as many online shoppers between the ages of 25 and 34 compared to those between the ages of 18 and 24.

☐ True ☐ False

(2)

1.2.6 People place orders using various devices. The survey shows a noticeable difference in order value when using certain devices.

(a) How much more do people spend, on average, if they use a tablet and not their smartphone when shopping online?

____

____

(2)

(b) Write the tablet average order value to the smartphone average order value as a ratio, in simplest form.

____

____

(2)

1.2.7 Research showed that the average order value of a South African shopper was the highest in December at R625. If there were approximately 22 million online shoppers in SA, calculate the amount of money spent by them in December.

(2)

[32]

QUESTION 2

Carmen, a young entrepreneur, started '***Brown Bag Shoes***' shortly after Covid. She decorates, paints and *embellishes sneakers, slip-ons and wedding shoes. Carmen buys plain shoes which are then handcrafted to client specification. The embellished, designer shoes are packed in unique ***brown bags*** and *couriered to the client.

**embellish – make something more attractive by the addition of decorative details or features.*
**courier – make use of a company to send/deliver goods or documents.*

Carmen completes her Projected Budget for the month of May and then fills in her Actual Budget at the end of May. Refer to her budget below to answer the questions that follow.

Income for the month	**Budgeted (May)**	**Actual (May)**
• Sneakers	R63 500,00	R69 850,00
• Slip-ons	**A**	R21 840,00
• Wedding shoes	R10 500,00	R11 550,00
Expenditure for the month	**Budgeted**	**Actual**
Operating Costs		
Electricity	R500,00	**B**
Communication system (cell phone, internet)	R750,00	R741,30
Loan repayment	R1 505,00	R1 505,00
Salaries	R25 600,00	R25 600,00
Production costs		
Shoes (sneakers, slip-ons, wedding shoes)	R40 000,00	R38 450,00
Glue, beading, paint	R1 500,00	R1 463,95
Brown Bags (200 bags)	R500,00	R465,00
NET BALANCE		

2.1 Explain how Carmen has divided her **expenses** for the month and explain the reason for doing so.

(3)

2.2 Carmen expects to sell 50 pairs of slip-ons in May. Calculate the budgeted value, indicated by the letter '**A**' in the table, if she sells each pair for R420.

____

____

(2)

2.3 The ***actual*** electricity bill was 8,26% less than the budgeted amount. Calculate the actual amount she paid for electricity in May as indicated by the letter '**B**' in the table.

____

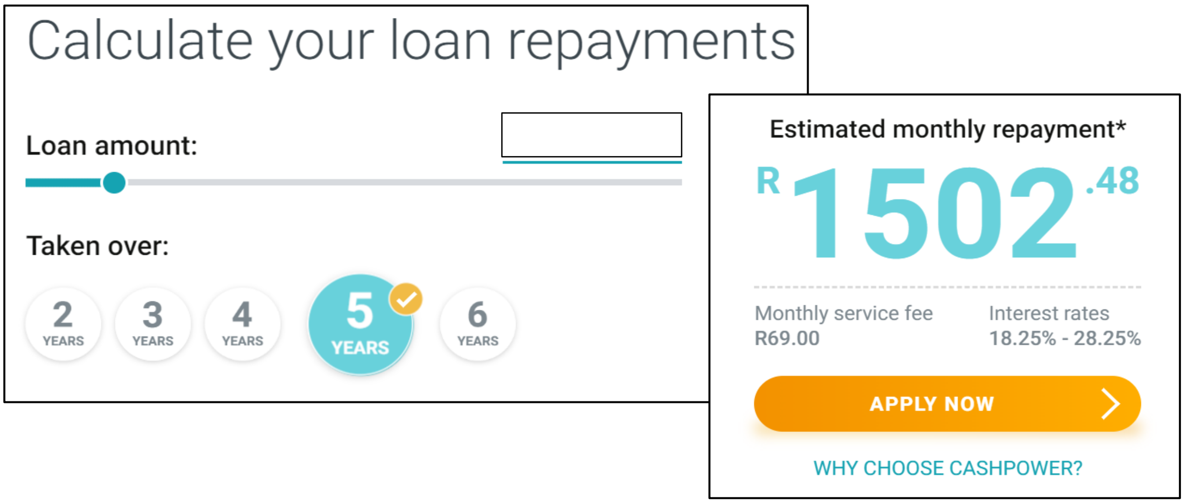
____

____

(3)

2.4 Included in Carmen's budget is a monthly loan repayment of R1 505. When she applied for the loan, she made use of an online loan calculator to get an estimate of her monthly repayments.

A screenshot of the online calculator is shown below. Refer to it to answer the questions that follow.



[<https://www.wesbank.co.za/home/cashpower-personal-loans>]

2.4.1 State the maximum interest rate that could be charged on this loan.

____

(2)

2.4.2 Calculate the total amount Carmen will repay, including all fees, if she chooses this option.

____

____

____

____ (4)

2.5 Complete the sentences by filling in the missing values and circling the relevant word in brackets:

The budgeted production costs total ***R*** ____________________ *while the actual production costs total* ***R*** ____________________ *. This will affect her profit in a (positive / negative) way.*

(3)

2.6 Calculate the percentage profit / loss Carmen made for the month of May. Show all the necessary calculations.

$$\% \text{ profit } = \frac{\text{profit}}{\text{income}} \times 100\%$$

____

____

____

____

____

____

____

____

____ (7)

2.7 Carmen sold 52 pairs of slip-ons and 11 pairs of wedding shoes in May. Determine how many pairs of sneakers she sold and hence check if she had enough ***brown bags*** for all the shoes she sold in May. Each pair of sneakers costs R635.

(5)

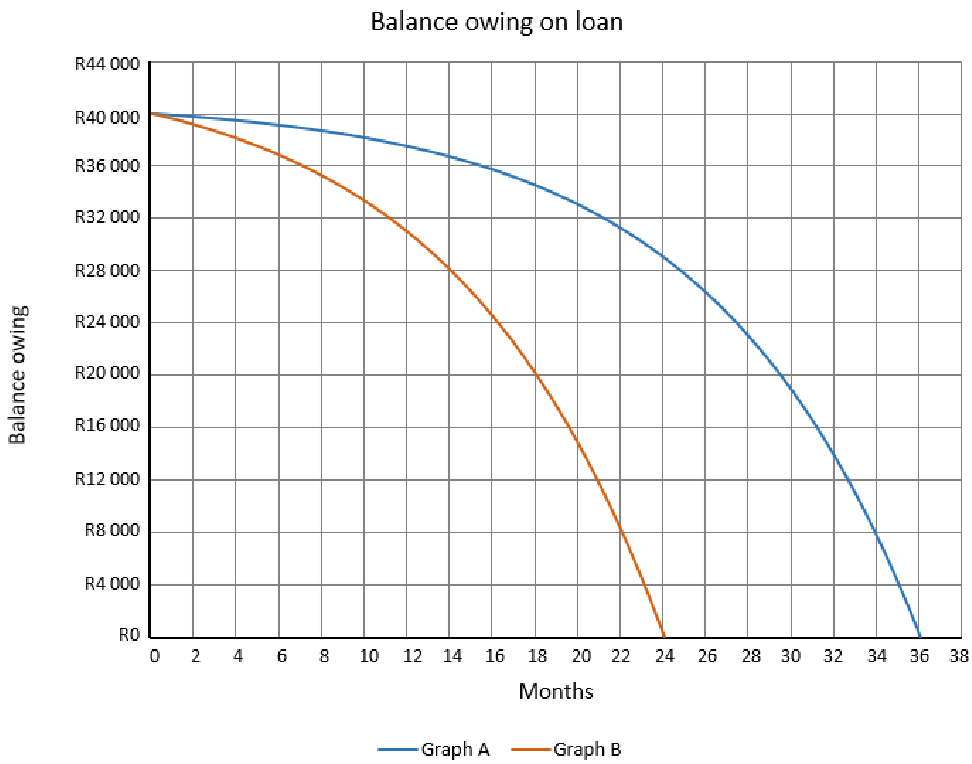
[29]

QUESTION 3

Carmen's business is thriving, and she considers taking out another loan to extend her workshop area.

The graphs below show two repayment options for the same loan amount.

Refer to the graphs to answer the questions that follow.



3.1 State the value of the loan Carmen is considering.

(2)

3.2 Determine the duration of the loan, in years, indicated by Graph A.

(2)

3.3 Refer to Graph B. After how many months will the balance owing be half of the total loan amount?

(2)

3.4 Determine the difference in the amount still owing on each of these loans after $1\frac{1}{2}$ years.

Indicate on the y-axis (vertical axis), using the letters '**X** and **Y**', where you read the values, you used in the calculation.

____

____

____

____

____

(6)

3.5 Carmen considers the 36-month loan and is given the following information:

Interest rate	17,6% p.a. compounded monthly
Monthly repayments	R1 925

3.5.1 Explain the difference between compound interest and simple interest.

____

____

____

____

(2)

3.5.2 Carmen draws up the following table for the life of the loan.

Month	Opening balance	Interest	Monthly repayment	Closing balance
1	R40 000,00	R586,67	R1 925,00	R38 661,67
2	**A**	**B**	**C**	**D**
….	**….**	**….**	**….**	**….**
36	R1 832,11	R26,87	R1 858,98	R0,00

Determine the values for **A–D** in the table, showing calculations where necessary.

A

B

C

D

(7)
[21]

QUESTION 4

Carmen analyses the sneaker sales of ***Brown Bag Shoes*** for the two most popular items, i.e. Men's High-Top sneakers and Ladies' Chunky sneakers.

4.1 Carmen considers the following information:

Fixed costs for both types of sneakers	R14 500
Cost price per pair of sneakers	R235
Selling price per pair	
• Men's High-Top sneakers	R750
• Ladies' Chunky sneakers	R520

The equation to calculate the income from selling Ladies' Chunky sneakers is given below.

Income (Ladies' Chunky sneakers) = Number of sneakers × R520

Write the equation to calculate the following:

4.1.1 Income (Men's High-Top sneakers) = ______________________________ (2)

4.1.2 Expenditure (sneakers) = ______________________________ (2)

4.2 Complete the table relating to the income from and expenditure for sneakers by calculating the values **A–G** below.

Pairs of sneakers	0	1	2	28	44	**G**	80
Income from Ladies' Chunky	**A**	R520	R1 040	**B**	R22 880	R39 000	R41 600
Income from Men's High-top	**C**	R750	R1 500	R21 000	**D**	R56 250	R60 000
Expenditure	**E**	R14 735	**F**	R21 080	R24 840	R32 125	R33 300

A ______________________________

B ______________________________

C ______________________________

D ______________________________

E ______________________________

F ______________________________

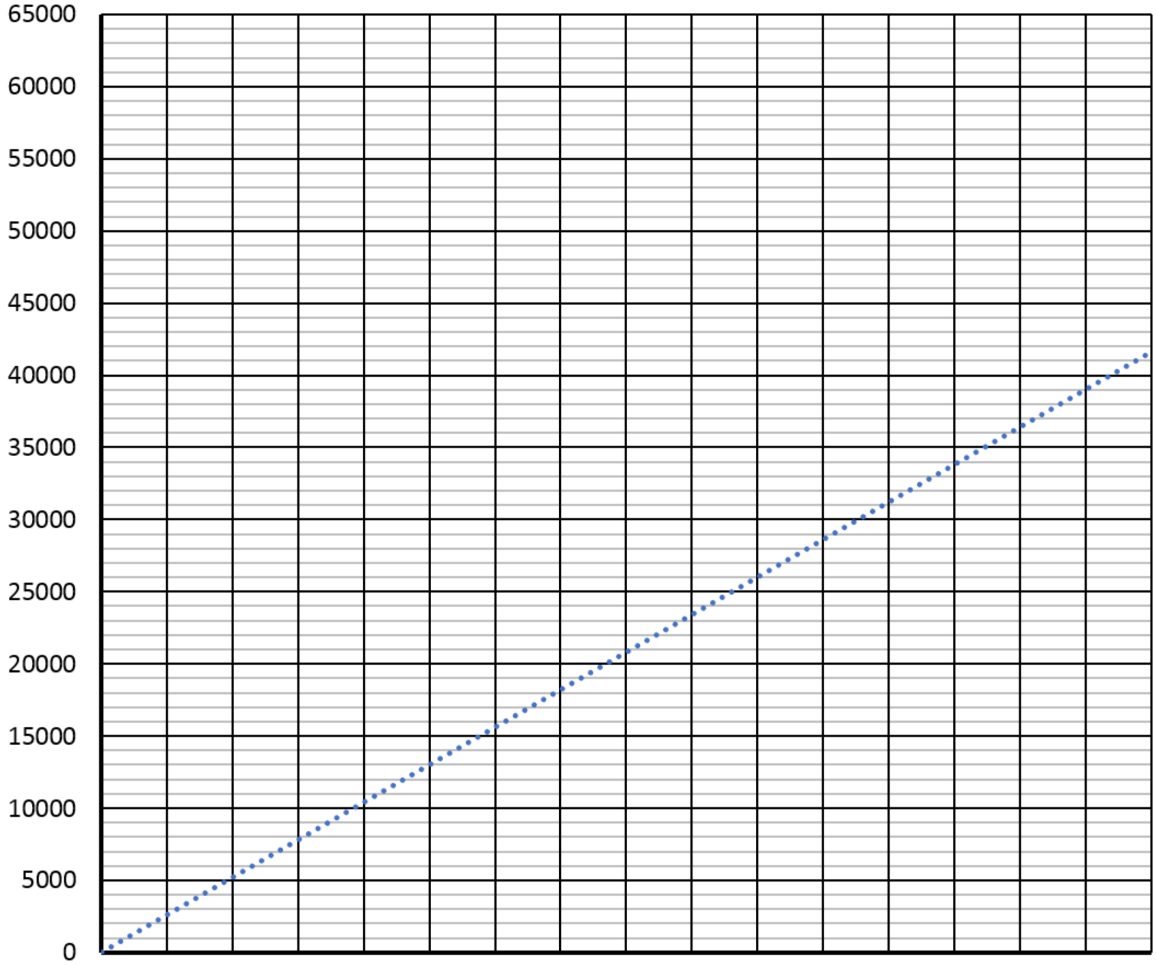
G ______________________________

(7)

4.3 The graph showing the income from Ladies' Chunky sneakers has been plotted on the axes given below.

Use the information in the table to draw the graphs showing the income for Men's High-Top sneakers as well as the expenditure for both types of sneakers.

Include all the missing information.



(8)

4.4 ***Use the graphs only*** to answer the following questions.

4.4.1 Each of the pairs of sneakers has its own break-even point. Using the letter '**X**', identify the break-even point on the graph for the Ladies' Chunky sneakers.

(2)

4.4.2 Explain, using values, what this break-even point means in the ***Brown Bag Shoes*** business.

(2)

4.4.3 State the minimum number of Men's High-top sneakers that must be sold to make a profit. Indicate where you took your reading on the graph using the letter '**Y**'.

(2)

4.4.4 Calculate the profit / loss after 65 pairs of Ladies Chunky sneakers are made and 40 pairs are sold.

(3)

4.4.5 ***Brown Bag Shoes*** has an end of season sale. The men's High-Top sneakers are discounted by 5%, while the ladies' sneakers are discounted by 15%. Do you think this is a wise business decision? Justify your answer by referring to the break-even point from the graphs.

(3)

4.5 To plan for the next year and to be able to order stock in advance, Carmen conducted a survey to understand the popularity of custom designed sneakers. Refer to the table below that she drew up to summarise her data.

Sneaker design	**Age and gender**						
	14–25		**26–35**		**40+**		**TOTAL**
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	
High-top	102	32	26	12	18	0	**190**
Chunky	48	120	35	10	28	45	**286**
Slip-on	30	28	13	52	4	5	**132**
TOTAL	**180**	**180**	**74**	**74**	**50**	**50**	**608**

4.5.1 How many survey respondents were in the 14–25 age group?

(2)

4.5.2 Calculate the probability, as a percentage, that a randomly selected respondent will choose High-Top sneakers. Round your answer off to the nearest whole number.

(4)

4.5.3 According to the data in the table, who is the least likely to buy sneakers from Carmen? State the gender, age group and design.

(2)
[39]

QUESTION 5

The 2022 FIFA World Cup was an international football competition that took place in Qatar from 20 November to 18 December 2022. It was the first World Cup held in an Arab country.

5.1 According to Nostrabet.com, the 2022 FIFA World Cup was the most expensive competition in the history of football. The investment (cost) covered by FIFA was $1,7 billion.

Refer to the graphs, on **ANNEXURE C** and answer the questions that follow.

5.1.1 Show how the total of $1,7 billion was calculated.

(3)

5.1.2 State the biggest expense and calculate the percentage it represents in the budget.

(4)

5.1.3 Determine the size of the sector, in degrees, represented by 'Operational expenses'.

(3)

5.2 The tournament featured 32 teams. Refer to the bar-of-pie chart to complete the following questions.

5.2.1 Supply the unit for '**Revenue**' which has been omitted.

____

(2)

5.2.2 Calculate what each team that reaches the quarterfinal will earn.

____

____

____

(3)

5.2.3 The final of the 2022 Soccer World Cup was played on 18 December 2022. Argentina beat France to be crowned the World Champions. At that time the rand / dollar exchange rate was R17,638 / $.

Calculate the prize money, in rand. Write your answer out in full without the word 'million'.

____

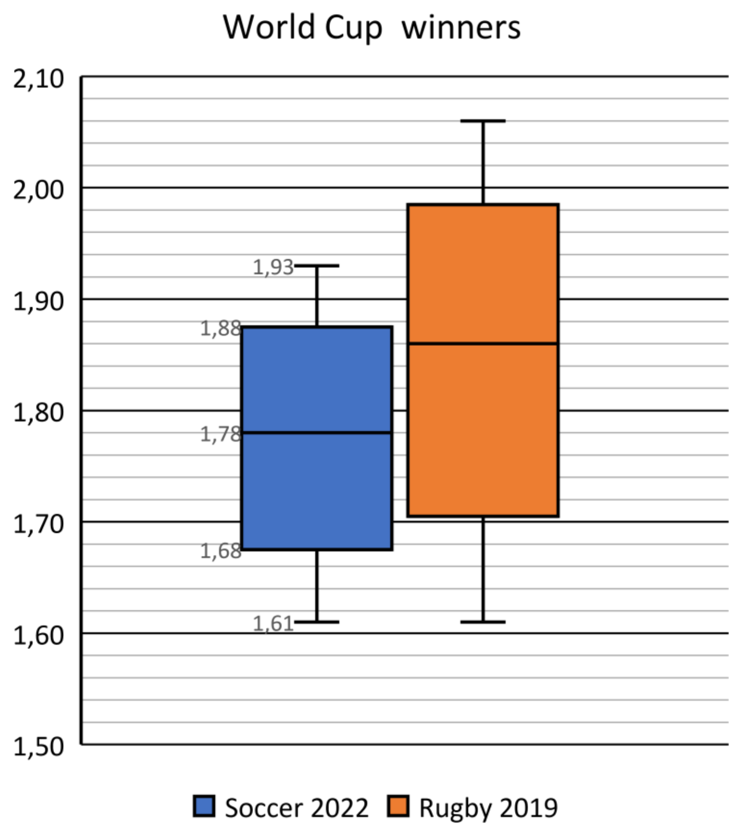
____

____

____

(3)

5.3 Refer to the box-and-whisker plot below that compares the heights of players in their respective squads at a World Cup event to answer the questions that follow.



The soccer team is a 26-man squad whilst the rugby team is a 31-man squad.

5.3.1 Explain, without using calculations, how the graph shows that the range in height of rugby players is larger than that of the soccer players.

____

____ (2)

5.3.2 Determine the range in height of the rugby players, showing all necessary calculations.

____

____ (3)

5.3.3 Complete the paragraph below by filling in the missing words or values to make the statements true.

Write your answers in the spaces provided below the paragraph.

The median height of the rugby squad is ___**A**___, which would lie on the ___**B**___ percentile. This means that ___**C**___ (actual number) rugby players in the squad are ___**D**___ than the median height. Compared to the rugby players, approximately ___**E**___ % of the soccer players are taller than the median height of the rugby players.

The interquartile range (IQR) of the height of the soccer players is ___**F**___ m while the IQR of the rugby players is 0,28 m.

A ______________________________

B ______________________________

C ______________________________

D ______________________________

E ______________________________

F ______________________________

(6)

[29]

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.