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TOTAL
MARKS

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INTERNATIONAL SECONDARY CERTIFICATE EXAMINATION
MAY 2024

QUANTITATIVE REASONING: PAPER I

EXAMINATION NUMBER

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Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

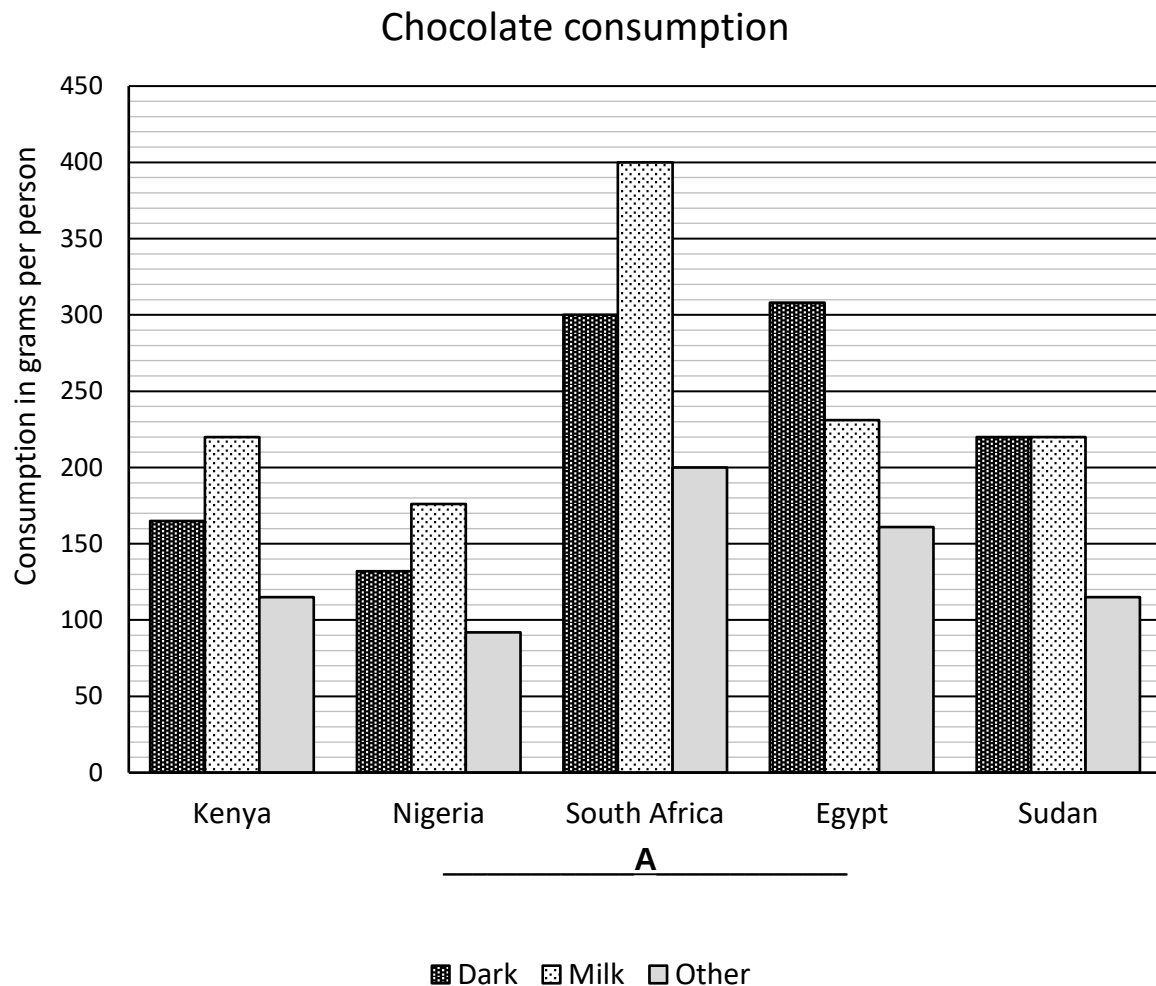
- This question paper consists of:
 - 21 pages that include 1 additional page at the end for rough work and calculations if necessary.
 - 5 questions.
 - an appendix which includes Annexure A.
- Please check that your question paper is complete.
- Answer ALL the questions on the question paper and hand it in at the end of the examination. Remember to write your examination number in the space provided.**
- It is strongly recommended that all working details be clearly shown.
- An approved non-programmable calculator may be used.
- It is in your own interest to write legibly and to present your work neatly.
- Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
- 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	30		32		33		30		25		150	

QUESTION 1

- 1.1 Every year, thousands of varied chocolate products – new slabs, pralines or bars – are launched in shops around the world. Consumers crave novelty.

Refer to the graph below to answer the questions that follow.



- 1.1.1 State the type of graph that has been used to display this data.

(2)

- 1.1.2 State the unit used to measure chocolate consumption.

(2)

- 1.1.3 Supply the label indicated by the letter 'A' on the graph.

(2)

1.1.4 The range of consumption for 'dark chocolate' and 'other' in Nigeria is:

_____ – _____ = _____ (3)

1.1.5 In which country are equal amounts of dark chocolate and milk chocolate consumed?

_____ (2)

1.1.6 Complete the following statement to make it true by supplying the missing word indicated by the letters '**B–D**'.

_____ **B** chocolate is preferred in all the countries except in _____ **C** where the preference is _____ **D** chocolate.

B _____

C _____

D _____

(3)

1.1.7 State the amount of dark chocolate consumed in South Africa as a rate.

_____ (2)

1.2 Refer to ANNEXURE A.

Jacob is a businessman who supplies the **rag trade* with all types of fasteners. He placed his order and received the financial document seen in **ANNEXURE A** from his supplier. Use the information in the financial document to answer the questions that follow.

**the clothing or fashion industry*

1.2.1 Name the type of financial document Jacob received.

(2)

1.2.2 State the name of Jacob's company.

(2)

1.2.3 From which country does Jacob's supplier run his business?

(2)

1.2.4 State the date on which Jacob's order was placed.

(2)

1.2.5 Which item has the greatest unit price?

(2)

1.2.6 Which item costs 3 cents per unit?

(2)

1.2.7 How long does Jacob have to settle the payment for this order?

(2)

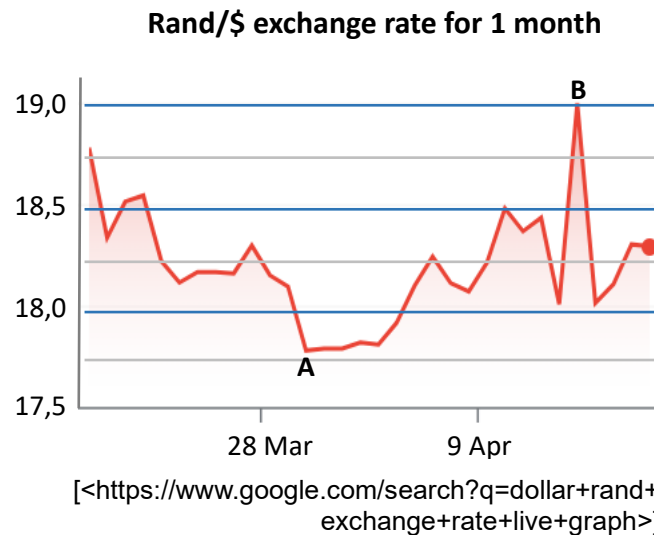
[30]

QUESTION 2

Refer to **ANNEXURE A**.

Jacob sells fasteners. He checks the rand/dollar exchange rate regularly because he must pay his supplier in dollars. The exchange rate affects the relative cost of the fasteners on a daily basis.

- 2.1 Jacob uses the graph below to see whether he chose the right time to place the order as seen in **ANNEXURE A**. Refer to the graph to answer the questions that follow.



- 2.1.1 Fill in the missing information, indicated by **i** and **ii**, and choose the appropriate word, indicated by **iii** and **iv**, to complete the true statement.

Write your answers in the appropriate spaces labelled **i to iv** provided below the paragraph.

The value at **B** is **i** . This means that the exchange rate is **ii** and that the rand is at its **iii** (strongest/weakest) because the cost of the goods will be **iv** (more/less) expensive on this day during the month.

- (i) _____
- (ii) _____
- (iii) _____
- (iv) _____

(5)

2.1.2 Calculate the missing values indicated by the letters '**D–F**' on the financial document in **ANNEXURE A**. Show all calculations.

D _____

(2)

E _____

(2)

F _____

(2)

2.1.3 Jacob placed the order seen in **ANNEXURE A** and paid it in full on 21 March when the exchange rate was R18,55 per dollar (\$).

(a) Indicate on the graph, using the letter '**C**', where this rate is. (2)

(b) Show that the total amount, in rands, for this order is R295 546,39.

(3)

- (c) Calculate what Jacob will have to pay, including penalties, if he only pays the full amount of R295 546,39, 17 days after the invoiced date.

(6)

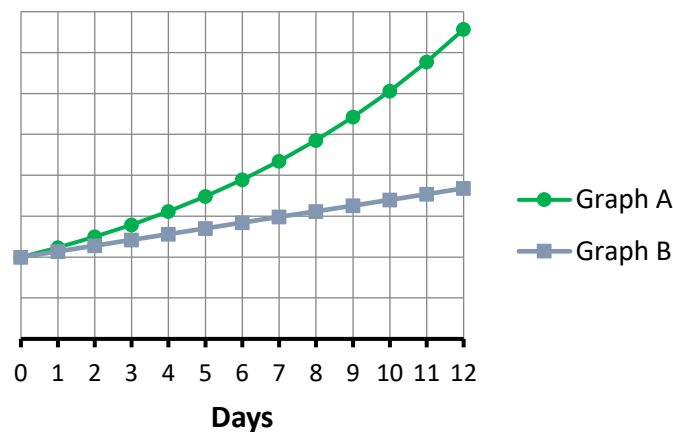
- (d) Write the daily penalty rate as an annual interest rate.

(2)

- (e) The graphs below represent interest calculations. State which graph depicts the penalty payments levied for late payments. Explain how you know this.

(2)

Interest calculations



- 2.1.4 Once the order arrives at Durban Harbour there are additional costs to be paid. This payment is handled by a clearing agent, who then bills Jacob for his services. Calculate the final additional costs that must be paid using the information below.

Value of imported goods R295 546,39

Agent fees R2 000

Import duty on fasteners is 16% of the value of the goods.

VAT @ 15% is only charged on the value of imported goods.

(6)
[32]

QUESTION 3

- 3.1 Sammy considers installing solar power in his home and looks at his current electricity consumption to see if it will justify the cost to install the system.

Refer to the section from his utility bill below to answer the questions that follow.

Electricity VAT No. 4710191182	Subtotal	Total
(Reading period = 2023/09/01 to 2023/10/02 = A) Estimated reading Energy meter readings and consumption: METER no. ALS0611441 Start reading 75 629,015 and end reading 76 641,724 Consumption = 1 012,709 kWh Daily average consumption in kWh = B Charges for 1 012,709 kWh are based on a sliding scale for a 42-day period Step 1: up to 500 kWh @ R1,5742 (billing period 2019/20) Step 2: > 500 kWh to 1 000 kWh @ R1,8174 Step 3: > 1 000 kWh to 2 000 kWh @ R1,9567 Step 4: > 2 000 kWh to 3 000 kWh @ R2,0685 Step 5: > 3 000 kWh to 4 000 kWh @ R2,1735	C	
Service charge	181,94	
Network charge	535,98	
VAT: 15,00%	D	

- 3.1.1 Calculate the number of days Sammy has been billed for, indicated by the letter 'A', on the document.

(2)

- 3.1.2 Show how the electricity consumption of 1 012,709 kWh has been calculated.

(2)

- 3.1.3 Calculate the average daily consumption, indicated by the letter 'B', on the document.

(2)

- 3.1.4 Calculate the cost of electricity consumed, indicated by the letter 'C', on the document. Hence, calculate the VAT amount due on this electricity bill, indicated by the letter 'D' on the document.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

(6)

- 3.2 Sammy's sister lives in a complex called Ambervale Heights. Simple Solar Solutions, a renewable energy company, approaches the Management Committee of Ambervale Heights to offer them solar power at a reasonable rate. Before the offer can be finalised electricity consumption for the entire complex needs to be determined.

The Management Committee looks at the electricity consumption of each of the units in the complex over the past year.

Refer to the list below showing the average monthly consumption for each unit in the complex.

884	1266	1762	934	1266	1850	1018	1542	842	120	1146	1799
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- ### 3.2.1 Sort the data in ascending order.

(2)

3.2.2 Use the sorted data to answer the following questions.

- (a) Calculate the mean monthly electricity consumption per unit.

(3)

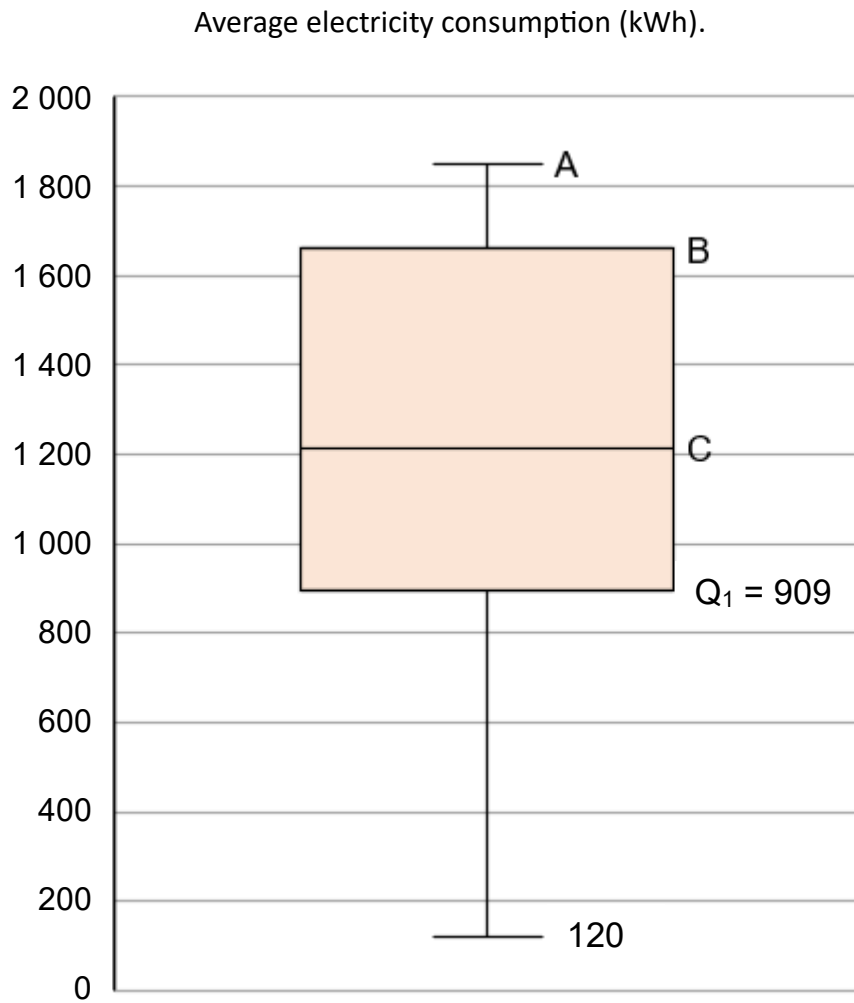
- (b) State the modal monthly electricity consumption.

(2)

- (c) Determine the range in monthly electricity consumption of the units.

(2)

3.2.3 Use the sorted data to determine the values '**A–C**' on the box-and-whisker plot below. Show all calculations where necessary.



A _____

(2)

B _____

(2)

C _____

(2)

3.2.4 For this set of data:

- (a) Determine the interquartile range (IQR).

(2)

- (b) Explain what the IQR says about the residents' electricity consumption.

(2)

- (c) Which measure of central tendency, mean or median, would be the best to describe the average, monthly consumption per unit? Justify your answer.

(2)
[33]

QUESTION 4

Simple Solar Solutions offers the following solar solution:

We install, own, operate and maintain the solar system offering an alternative to ownership and expensive purchases through our *Simple Solar Solutions Lease Agreement. Our expertise lies in custom-made energy solutions that (i) reduce your electricity costs, and (ii) provide electricity whether you need it in the day or night. Our solutions require no upfront costs from you.

**The lease agreement states that at the end of the duration of the lease with Simple Solar Solutions the ownership of the system will be transferred to Ambervale Heights.*

4.1 State who owns the solar system for the life (duration) of the lease.

(2)

4.2 How much money is a customer expected to pay upfront for the solar system?

(2)

4.3 Simple Solar Solutions draws up the following document and presents it to the Management Committee.

Simple Solar Solutions Proposal	
Ambervale Heights current tariff (average) per kWh	R2,0544
Simple Solar Solutions' tariff per kWh	R1,1299
Term	20 years
Exit options	10 years

4.3.1 State the term of the lease agreement, i.e. the duration of the lease.

(2)

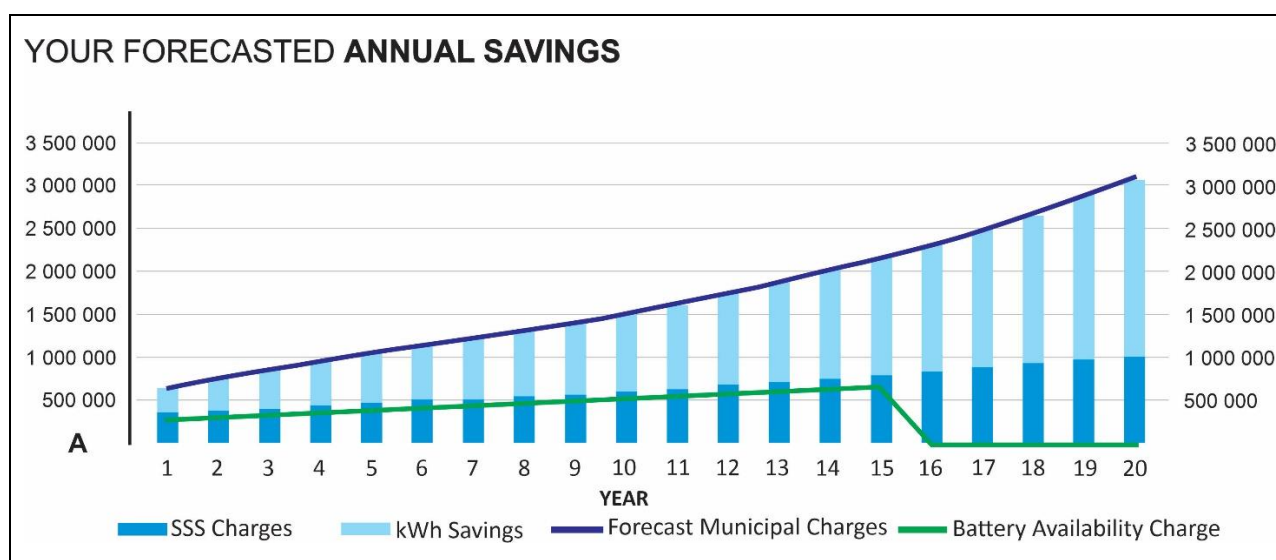
4.3.2 Calculate the savings per kWh, as a percentage, that Ambervale Heights would experience if they took up the solar offer.

(3)

- 4.3.3 The total monthly electricity consumption of the complex is rounded off to 14 500 kWh. Calculate how much will be saved, in total, in a year if the Management Committee accepted the lease agreement offered by Simple Solar Solutions.

(5)

- 4.4 Simple Solar Solutions (SSS) presented the graph below to the Management Committee, to highlight the savings that can be expected by installing solar power. Refer to the graph below to answer the questions that follow.



- 4.4.1 State the unit of measurement on the vertical axis.

(2)

- 4.4.2 State the value that should appear at 'A'.

(2)

- 4.4.3 On average, solar batteries last between 5 and 25 years. How long does SSS expect their batteries to last? Justify your answer.

(2)

- 4.4.4 The Management Committee has an *exit option after 10 years.
'The kWh savings is double the SSS charges at this point.'
Prove the statement is true using actual values from the graph.

**choice to quit or change their decision*

(4)

- 4.4.5 What trend do you notice on this graph?

(2)

- 4.4.6 Do you think it was a good marketing tactic to include the graph? Justify your answer.

(2)

- 4.4.7 What can the Management Committee expect to pay for their annual electricity consumption in 20 years' time if they do not install solar power?

(2)
[30]

QUESTION 5

- 5.1 A school's Valentine's Day Committee drew up the following shopping list to fulfil their orders for delivery on Valentine's Day.

Chocolate brand	Lindt Truffles	KitKat	Cadbury Slab	Sally Williams	Total
Dark chocolate	A	30	10	15	B
Milk chocolate	25	15	C	20	72
Ruby chocolate	5	0	13	12	30
TOTAL	50	45	35	47	D

- 5.1.1 Determine the missing values in the table indicated by the letters '**A–D**'.

A _____

B _____

C _____

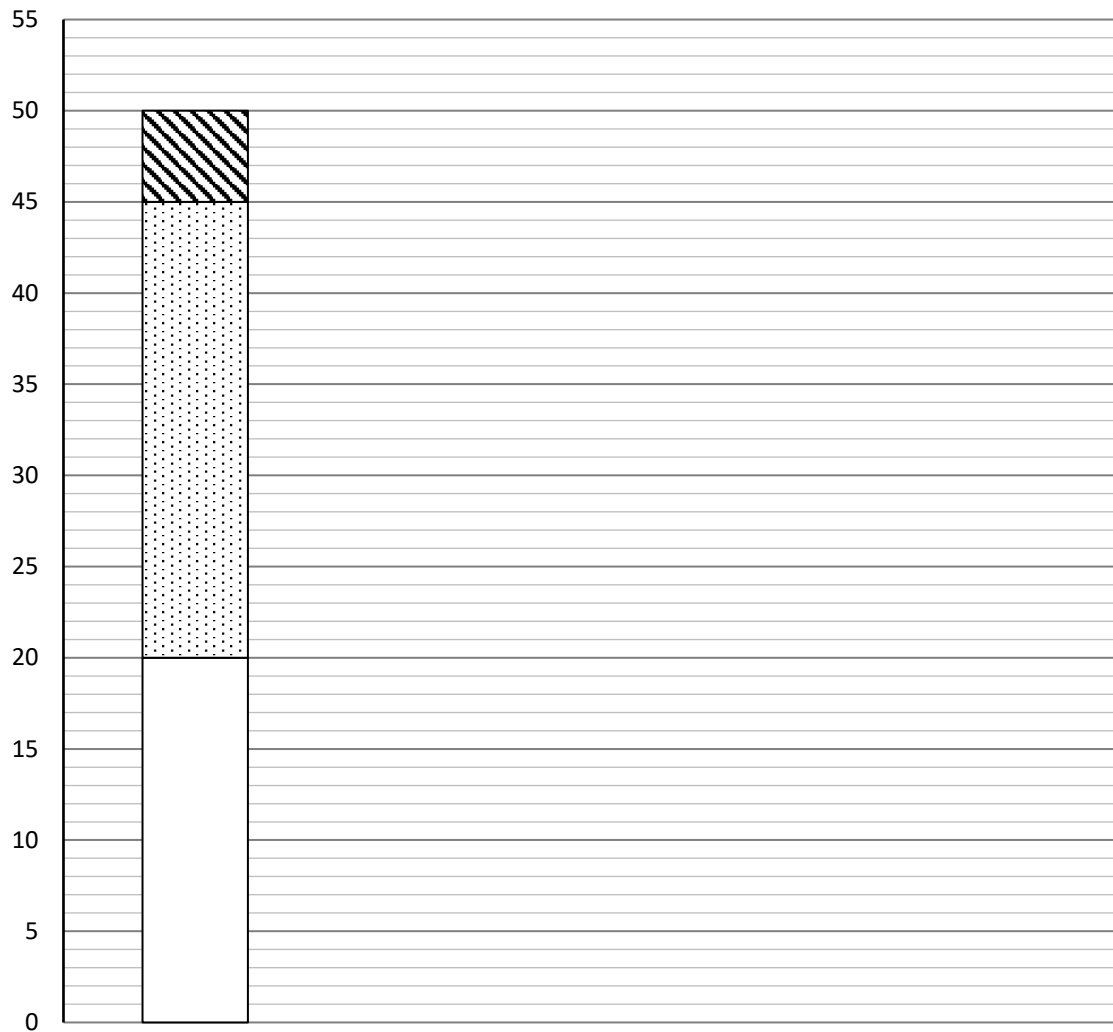
D _____

(4)

- 5.1.2 The committee decided to buy 200 additional chocolates to sell at the Valentine's Ball. They used the values in the table, keeping the same ratio, to determine which chocolates to buy. Calculate the total number of milk chocolates they must buy.

(3)

5.1.3 Draw a stacked bar graph on the pair of axes below to represent the information in the table. The first bar has been drawn for you.



(9)

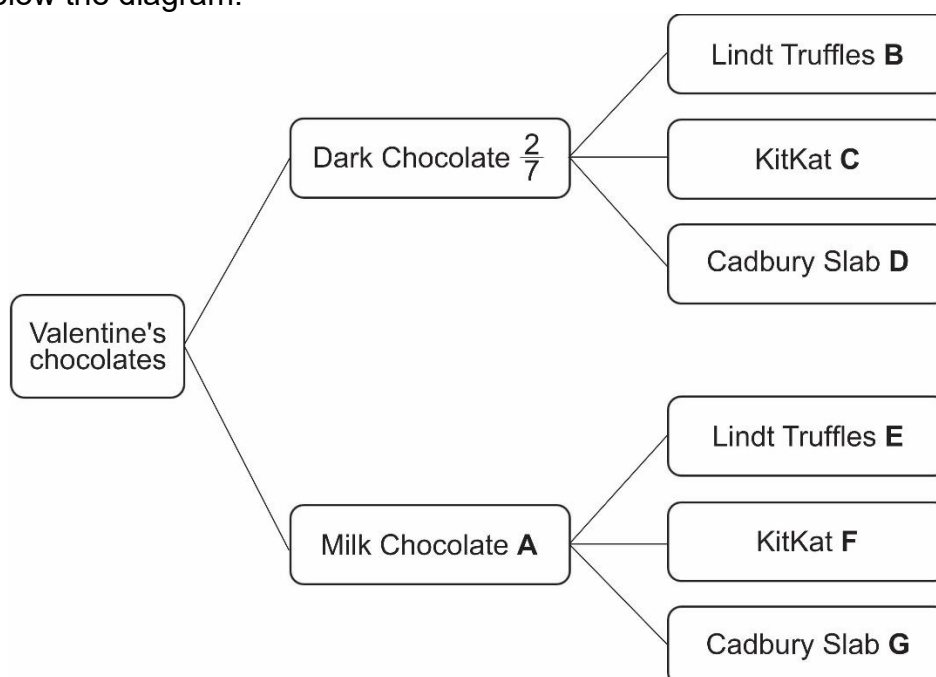
- 5.2 The Valentine's Day Committee makes up orders of either dark chocolate or milk chocolate to be delivered to your Valentine. There are 3 options for each type of chocolate. You can choose a KitKat, a slab of chocolate or Lindt Truffles.

The probability of a person choosing dark chocolate is $\frac{2}{7}$.

If the person chooses dark chocolate, the probability of selecting Lindt Truffles is 60%, while the probability of selecting a KitKat is 20%.

If the person chooses milk chocolate, the probability of selecting a KitKat is 0,5 and the probability of selecting 200 g Cadbury slab is 0,4.

- 5.2.1 Complete the tree diagram by stating the values indicated by the letters 'A–G'. Write your answers in the appropriate spaces labelled 'A to G' provided below the diagram.



A =	B =
C =	D =
E =	F =
G =	

(7)

- 5.2.2 Fill in the missing information in the equation below to calculate the probability, as a fraction, that a person will choose a KitKat made with dark chocolate.

$$\frac{2}{7} \times \frac{\boxed{}}{\boxed{}} = \frac{2}{35}$$

(2)

[25]**Total: 150 marks**

ADDITIONAL SPACE (ALL QUESTIONS)

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

[illegible]