

SECTION A [20 Marks]

Answer **all** the questions

Use OMR sheet for Question I only

Question I

[20]

1. What happens to the value of a digit when you move one column to the right on a place value chart?

TTh	Th	H	T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

Identify the most appropriate rule.

- Added by 10
 - Subtracted by 10
 - Multiplied by 10
 - Divided by 10
2. The table shows the rule set by the candidates on zero exponent.

Candidate	Rule
Candidate I	$a^0 = 0$
Candidate II	$a^0 = a$
Candidate III	$a^0 = + 1$
Candidate IV	$a^0 = - 1$

Which candidate provided the correct rule?

- Candidate I
- Candidate II
- Candidate III
- Candidate IV

3. The smallest organism is about 3.25×10^{-7} m in diameter.
Which value correctly represent the diameter of the organism?
- A 0.00000325 m
 - B 0.000000325 m
 - C 32,500,000 m
 - D 3,250,000,000 m
4. A number that can be written as a fraction $\frac{p}{q}$ where p and q are integers and $q \neq 0$
Select the number that best describes the above statement.
- A Whole numbers
 - B Natural numbers
 - C Irrational numbers
 - D Rational numbers
5. A bakery sold 40 loaves of bread on first day. On second day, he sold 300% more compared to first day.
How many loaves did the baker sell on the second day?
- A 120 loaves
 - B 160 loaves
 - C 750 loaves
 - D 1,200 loaves
6. A playground has an area of 185 square metre.
How long is one side of the playground to the nearest whole number?
- A 12 m
 - B 13 m
 - C 14 m
 - D 15 m
7. A jeweller applies a 35% mark-up on a necklace that costs Nu 85,000.
Calculate the selling price of the necklace.
- A 29,750
 - B 114,750
 - C 297,500
 - D 382,500

8. A group of students is recording their elevation while hiking up a mountain. The table shows the record of their progress:

Horizontal Distance (x)	Elevation (y)
2 km	500 m
5 km	1,100 m
8 km	1,700 m

Evaluate the slope of the hiking trail.

- A 200 m per km
B 220 m per km
C 600 m per km
D 800 m per km
9. The diagram represents the rectangular garden.



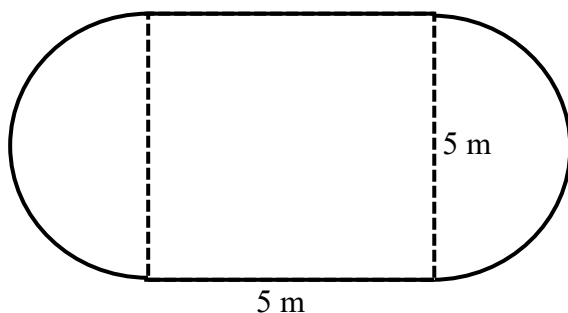
Which expression represents the total perimeter of the garden?

- A $+3x + 5$
B $-3x - 5$
C $+6x + 10$
D $+14x + 18$
10. A set of tiles is laid out such that the number of tiles in pattern n is expressed as $7n + 3$.
How many tiles will be in the 11th pattern?
- A 3
B 7
C 40
D 80

11. A standard doorway in a building is 2.1 metres tall. The designer orders for a mirror that is 80 inches tall.

Which of the following statements is true regarding the mirror and the doorway?
(Take 1 inch = 2.54 cm)

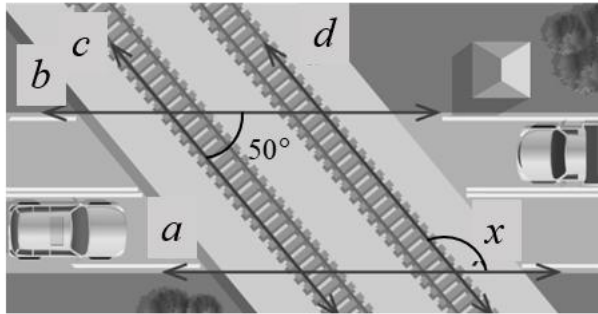
- A The mirror will not fit because doorway is small.
 - B The mirror is about 2.7 inches taller than the doorway.
 - C The mirror is exactly the same height as the doorway.
 - D The mirror will fit through the doorway with about 2.7 inches of space to spare.
12. A circular fountain in a park has a diameter of 14 metres. A gardener wants to cover the entire surface of the fountain with water proof material.
- Calculate the water proof material required for the entire surface. (Use $\pi \approx \frac{22}{7}$)
- A 22
 - B 44
 - C 153
 - D 154
13. A restaurant wants to paint the dining table top with blue.



Calculate the total surface to be painted to the nearest whole number.

- A 20 m^2
 - B 45 m^2
 - C 196 m^2
 - D 1963 m^2
14. A rectangular aquarium has a base measuring 50 cm by 40 cm. Water is poured into the aquarium until it reaches 30 cm high.
- Calculate the mass of the water in the aquarium in kilogram.
- A 60 kg
 - B 600 kg
 - C 6,000 kg
 - D 60,000 kg

15. A store owner wants to install floor tiles shaped with regular octagon. What is the measure of one exterior angle of the tile?
- A 40°
 B 45°
 C 60°
 D 135°
16. The picture shows the railway tracks.



What is the measure of angle x ?

- A 50°
 B 130°
 C 180°
 D 210°
17. 17 m long ladder is leaned against a vertical wall. If the base of the ladder is 8 m away from the wall, how high up the wall does the ladder reach?
- A 9
 B 15
 C 18
 D 25
18. A school wants to know if students prefer day meal or not. Evaluate the best method to avoid biased results.
- A Surveying only the 8th-grade soccer team.
 B Surveying the first 20 students in the lunch line.
 C Randomly select 50 students from the school roster.
 D Posting a survey on a school media page and asking students to reply.

19. The table shows the survey carried out on 120 people.

Sports	Sector Angle
Archery	120°
Basketball	60°
Football	150°
Other	30°

How many students chose football?

- A 50
B 60
C 150
D 360
20. In a bag of marbles, the probability of picking a red marble is $\frac{3}{10}$.

What is the complementary event of picking red marbles?

- A $\frac{3}{10}$
B $\frac{7}{10}$
C 3
D 7

SECTION B [60 Marks]

Answer **all** the question

Question II

1. The table shows stalls preparing cold drink.

Stall	Recipe	
A	3 parts of lemon juice	6 parts of water
B	7 parts of lemon juice	13 parts of water

- a. Which stall has the greater proportion of lemon juice? Explain your answer. [2]

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- b. If stall A needs to prepare cold drink of 120 cups, how much lemon do they need to add? [1]

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2. A scientist found that the initial number of bacteria is 3^5 . Next moment he saw the changes in the population and represented as $(3^5) \times (5^3)$.

Express the new population in standard form and in expanded form.

[2]

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3. A school constructed a square garden with the total area of $5,625 \text{ m}^2$.

- a. What is the measurement of one side of the garden?

[1]

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- b. A student measured and said that the outer boundary of the garden is exactly 150 m. Do you agree? Explain your work. [2]

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4. A local bakery is testing a new recipe. The total weight of the batter is calculated as given below.

$$[(4.8 + 0.2)^2 \div 0.5] - (2.5 \times 4)$$

Evaluate the total weight of the batter.

[2]

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Question III

1. The table represents the depth of the Mariana Trench and the height of the Mt. Everest.

Mariana Trench	$1.1009 \times 10^4 \text{ m}$
Mt. Everest	$8.848 \times 10^3 \text{ m}$

- a. Identify the greater length. [1]

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- b. How many times the greater length is compared to the smaller length. Evaluate to the nearest whole number. [2]

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2. The price of the fuel per litre was about Nu 64, following next day price hike to over about 153 % per liter.

What is the new price of the fuel? (Calculate to the nearest whole number)

[2]

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3. A real estate agent sells a house for Nu 7.5 million with the commission of Nu 37,500. The agent says the rate of commission is 5%.

a. Do you agree? Justify your answer.

[2]

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b. How much does the seller keep after paying the agent?

[1]

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4. A teacher placed 5 books and 5 paper sheets in a stack. The thickness of each book as 20 mm and a sheet with 0.095 mm.

He measured thickness of the stack and recorded as 100.457×10^{-3} .

Justify his measurement.

[2]

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Question IV

1. The table gives of the weekly saving of a family.

Week (n)	Saving in thousand (Nu)
1	15
2	25
3	35
4	45

- a. Create the equation to represent the savings shown in the pattern. [1]

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- b. Plot the points and identify the pattern. [2]

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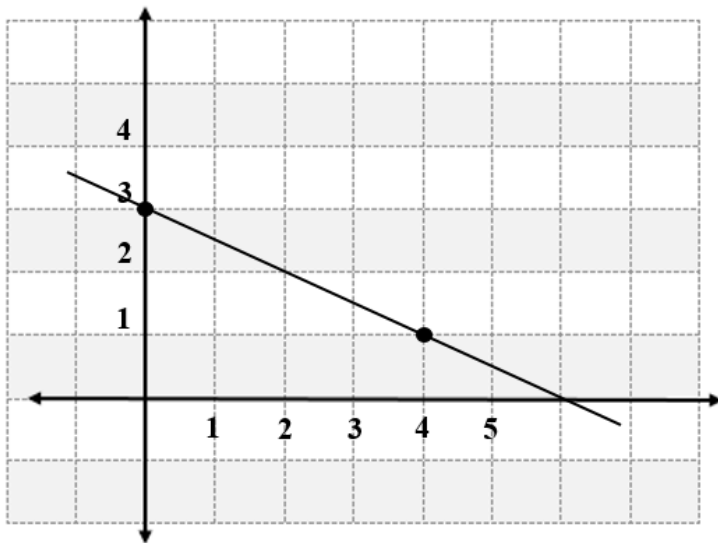
2. Gym A charges a one-time registration fee of Nu 450 and a monthly fee of Nu 180. [2]
Gym B charges a one-time registration fee of Nu 180 and a monthly fee of Nu 270.

After how many months will the total cost of both gym memberships be exactly the same?

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3. Study the graph and answer the question that follows:

[3]



The straight line, when passes through given two points as shown in the graph will give us the positive slope. Do you agree? Evaluate your work.

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4. The total revenue from sales of the items is Nu $(5x + y - 8)$. The cost to produce these items is Nu $(2x - 3y + 4)$.

A worker calculated the factory's profit as given below.

$$(5x + y - 8) + (2x - 3y + 4) = (7x - 2y - 4)$$

Evaluate the calculation done by the worker.

[2]

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Question V

1. A circular garden has a diameter of 12 metres. One bag of mulch covers 18 square metres. A gardener brought 6 bags to cover entire garden. [3]
Is it enough to cover the entire garden? How do you know? (Use $\pi=3.14$)

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2. A rectangular box has a length of 10 cm, a width of 6 cm, and a height of 4 cm. [2]
A student bought 250 cm² cover paper to wrap the whole box.
Do you think the paper is enough to cover the whole box? Justify your work.

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3. After the activity, kids filled 277 cubed shaped objects given below into the container that measures 25 cm by 15 cm by 20 cm. [3]



3 cm

Do you think all the objects will fit in the container? Explain your answer.

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4. A playground is in the shape of regular octagon. Sport instructor calculated the sum of the interior angle of the playground as 720 . [2]

Is the calculation done correctly? How do you know?

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Question VI

1. A farmer places a wooden pole against a 12-foot-high vertical wall. The base of the pole is 9 feet away from the wall. The farmer estimates that the pole is 14 feet long. [3]

Is the farmer's estimate correct? Justify your answer using the Pythagorean theorem.

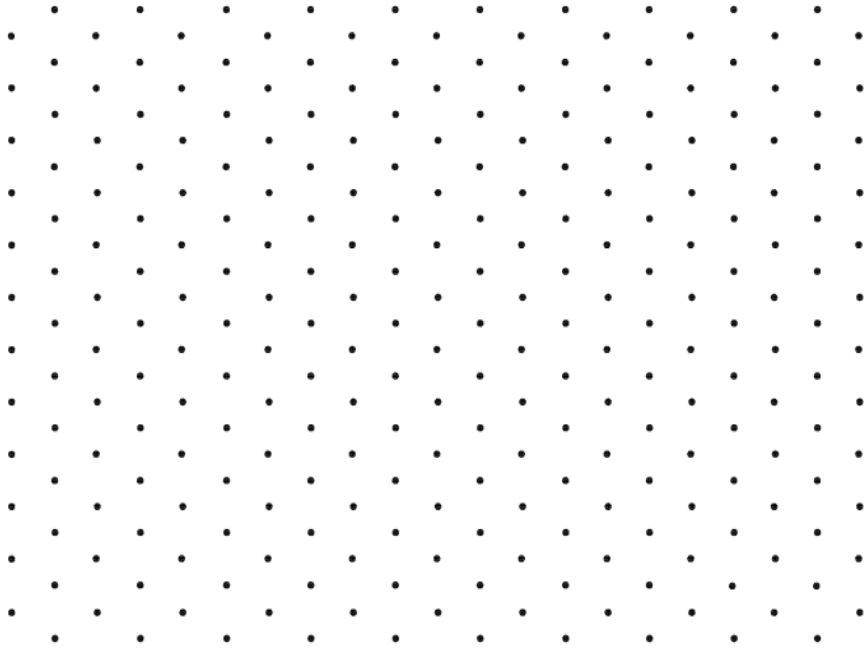
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2. The mini playfield is a rectangle of 10 metres by 13 metres. The coach asks players to run 16 metres from one corner to the other corner diagonally. [2]

Do you think the players cover the actual distance? Evaluate your answer.

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3. Design a house using dot paper and label all the possible features related to the house. [3]

	
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4. A blueprint of a triangular park is given with the vertices at A (2, 2), B (10, 2), and C (6, 8). The council wants to build a larger version of this park that is exactly 2 times the size of the original. [2]
 Perform a dilation of the park's coordinates using the origin (0, 0) as the center of dilation and find the new coordinate.

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Question VII

1. Which one is discrete and continuous data sets? Justify your answer. [3]
- First group of students is collecting the Plant Count. (e.g., School garden has 25 rose bushes)
 - Second group of students measuring the Sunflower Height. (like 155.2 cm, 155.24 cm... so on)

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2. A high school track coach recorded the distance (in metres) that 25 students threw a softball during practice. The recorded distances were:
22, 35, 18, 42, 28, 31, 12, 27, 39, 44, 21, 15, 33, 29, 36, 48, 19, 24, 30, 41, 17, 38, 26, 43, 23

- a. Organize the data into a grouped frequency table using intervals of 10 meters. [1]

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b. Use the table to construct a histogram. [1]

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3. At a local Tshechu, there is a game called "Colour and Number". To win a prize, a player must spin a spinner and then flip a fair coin.
The Spinner: Divided into 5 equal sections: White, Yellow, Red, Green, and Blue.
The Coin: Has two sides: Khorlo and Tashi Tagye.
What is the theoretical probability that a player will spin Blue and flip Tashi Tagye together? [3]

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4. The probability that it will rain on Saturday is $\frac{3}{10}$.

a. What is the probability that it will not rain on Saturday? [1]

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b. Explain the type of event being calculated. [1]

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Formulas and relationships

Simple Interest

$$I = \frac{PRT}{100} \text{ or } I = \frac{PRT}{100}$$

Slope

$$\text{slope} = \frac{\text{rise}}{\text{run}} \text{ or } \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Perimeters and circumference

$$\text{Perimeter of a triangle} = a + b + c$$

$$\text{Perimeter of a rectangle} = 2(l + w)$$

$$\text{Perimeter of a square} = 4s$$

$$\text{Circumference of a circle} = 2\pi r$$

Area

$$\text{Area of a triangle} = \frac{b \times h}{2}$$

$$\text{Area of a rectangle} = l \times w$$

$$\text{Area of a square} = s \times s$$

$$\text{Area of a circle} = \pi r^2$$

$$\text{Area of a trapezoid} = \frac{(a + b)h}{2}$$

$$\text{Total Surface area of a rectangular prism} = 2(l \times w) + 2(l \times h) + 2(w \times h)$$

$$\text{Sum of the interior angles of a polygon} = 180^\circ(n - 2)$$

$$\text{Each interior angles of a regular polygon} = \frac{180^\circ(n - 2)}{n}$$

Volume

$$\text{Volume of a rectangular prism} = l \times w \times h$$

Pythagorean theorem

$$c^2 = a^2 + b^2$$

Theoretical Probability

$$P(E) = \frac{\text{number of favourable outcomes}}{\text{number of possible outcomes}}$$

Complementary Event

$$P(\text{Not}E) = 1 - P(E)$$

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