

SECTION A [30 MARKS]
ANSWER ALL QUESTION

Question 1

[30]

Direction: For each question, there are four alternatives: A, B, C, and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there is more than one choice circled, No score will be awarded.

i. What is the equivalent value of the expression $2 \times 10^{-6} + 3 \times 10^{-3} + 2 \times 10^2$?

- A 200.003002
- B 20.003002
- C 2.020302
- D 0.023002

ii. The average distance between Earth and Mars is about 1.52×10^8 km. It can also be expressed as

- A 15,200,000 km.
- B 152,000,000 km.
- C 1,520,000,000 km.
- D 15,200,000,000 km.

iii. A square field has an area of $4,900 \text{ m}^2$. What will be its perimeter?

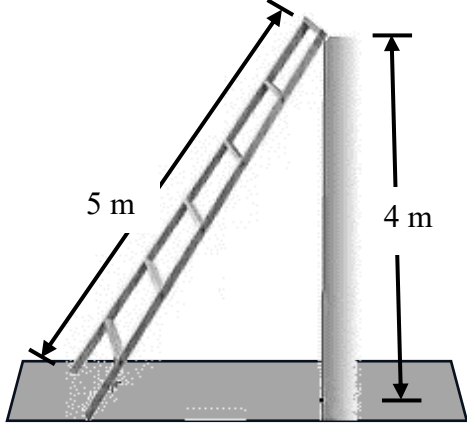
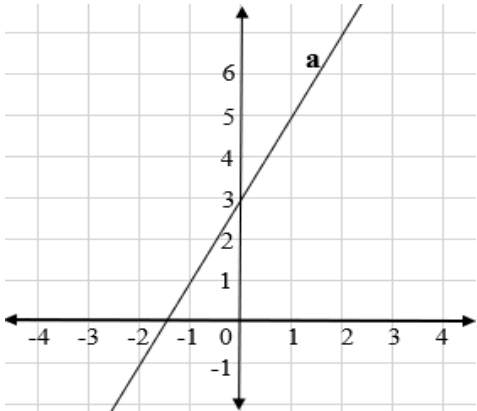
- A 49 m.
- B 70 m.
- C 280 m.
- D 298 m.




iv. The average mileage of different cars and their distance travelled is given in the table below.

| Car | Mileage (km per litre of fuel) | Distance (km) |
|-----|--------------------------------|---------------|
| I | 20 | 240 |
| II | 16 | 208 |
| III | 18 | 252 |
| IV | 22 | 275 |

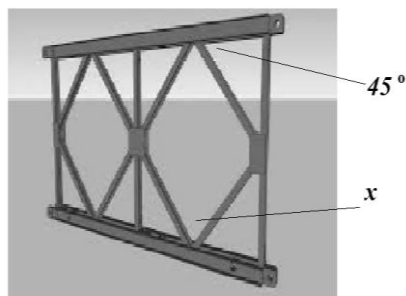
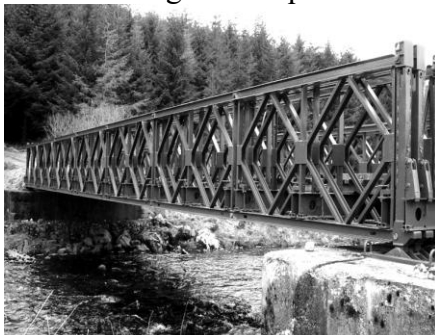
Which statement below is true based on information given in above table?

- A Car I consumed more fuel than car II
- B Car II consumed minimum fuel
- C Car III consumed maximum fuel
- D Car IV consumed maximum fuel

| | |
|---|--|
| <p>v. A sales person is paid monthly salary of Nu 12,000 with 5% commission on sales up to Nu 30,000 and 3% on the sales exceeding Nu 30,000. The next month, the sales person sets earning target of Nu 19,500. What must be the total sale amount to achieve this target?</p> | |
| <p>A Nu 9,600. B Nu 37,500. C Nu 200,000. D Nu 230,000.</p> | |
| <p>vi. What will be the slope of the ladder given in the picture below?</p>  | |
| <p>A $\frac{4}{5}$ B $\frac{4}{3}$ C 4 D 5</p> | |
| <p>vii. Which of the following equation represents line 'a' in the graph below.</p>  | |
| <p>A $y = x + 3$ B $y = 2x + 3$ C $y = 2x + 1.5$</p> | |

| | |
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| <p>D $y = 2x - 1.5$</p> | |
| <p>viii. A 30 m long rope was bent to form a rectangle such that its side lengths were in whole numbers.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>Which of the following is the best possible area covered by the rope?</p> | |
| <p>A 15 m^2 B 30 m^2 C 44 m^2 D 60 m^2</p> | |
| <p>ix. Wheel cover of a car with an area of 154 cm^2 is damaged.</p> <div style="text-align: center;">  </div> <p>What should be the diameter of cover so it exactly fits into the wheel?</p> | |
| <p>A 5.5 cm B 7.5 cm C 12.0 cm D 14.0 cm</p> | |
| <p>x. Which of the following set is the side lengths of a right-angled triangle?</p> | |
| <p>A $1, 2, 3$ B $3, 5, 9$ C $6, 9, 12$ D $9, 12, 15$</p> | |

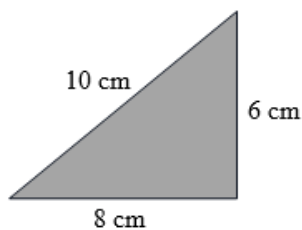
xi. Similar triangles and quadrilaterals are used to build truss of a baily bridge.



What could be the measure of angle x shown above on the truss?

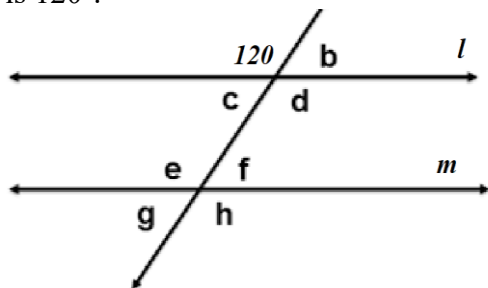
- A 45°
- B 60°
- C 90°
- D 135°

xii. The triangle shown below is dilated with a scale factor of 1.5. Which set represents the lengths of the sides of the dilated triangle?



- A 9 cm, 12 cm, 15 cm
- B 4 cm, 5.33 cm, 6.67 cm
- C 6 cm, 8 cm, 10 cm
- D 7.5 cm, 9.5 cm, 11.5 cm

xiii. Line ' l ' and ' m ' are parallel lines cut by a transversal and one of the angles formed is 120° .

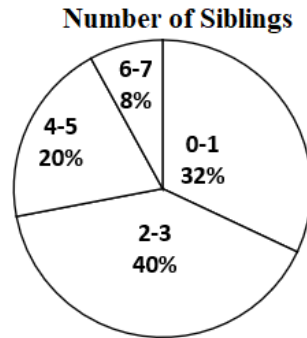


Which of the following option is true about other angles?

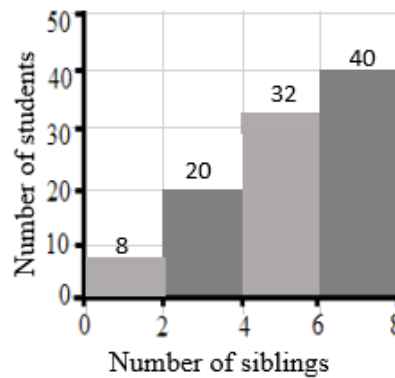
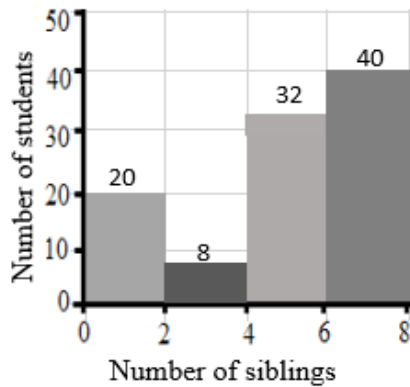
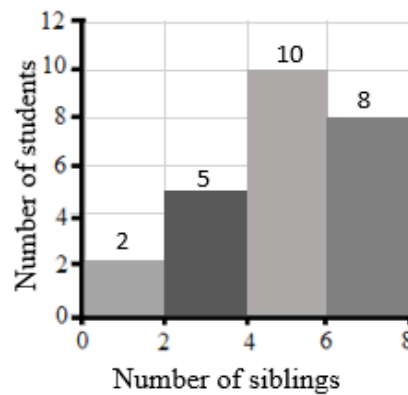
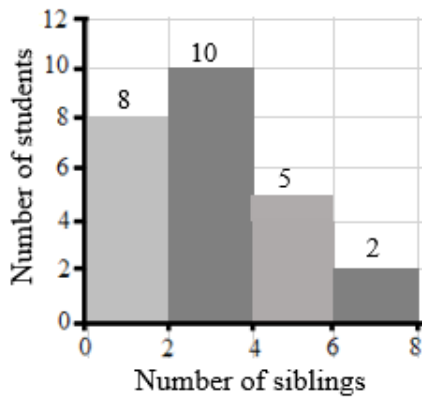
- A $\angle b = 120^\circ$
- B $\angle e = 60^\circ$
- C $\angle d + \angle f = 120^\circ$

D $\angle b + \angle d = \angle d + \angle f$

xiv. The circle graph below represents a survey in a class.



Which of the histogram below represents the same data as shown in the circle graph below?



xv. The complementary probability of spinning 2 in the spinner below is

- A $\frac{2}{5}$
- B $\frac{2}{8}$
- C $\frac{4}{5}$



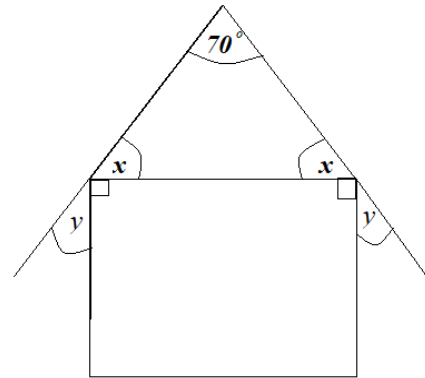
D $\frac{6}{8}$

SECTION B [50 MARKS]
ANSWER ALL QUESTIONS

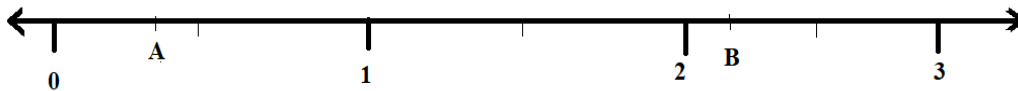
Question 2

a) Calculate angle x and y in the given diagram

[2]



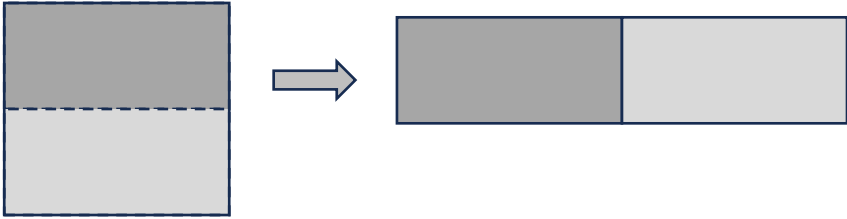
b) Point A and B were placed in a number line.



The numbers were: $A = \frac{1}{2} \times \frac{3}{6} + \frac{2}{5} \div 4$ and $B = \left(\frac{2}{3} + \frac{1}{5} - \frac{1}{2}\right) + \frac{5}{6}$

i) Solve them and find which point is **NOT** in correct place.

[2]

| | |
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| ii) Draw the number line placing both points in correct place. | [1] |
| | |
| Question 3 | |
| <p>a) A square sheet with side length of 10 cm is cut from middle and joined along its side.</p>  | |
| i) Calculate and find what has happened to its area. | [1] |
| | |
| ii) Calculate and find what has happened to its perimeter. | [1] |
| | |

| <p>b) Electromagnetic waves are categorized into seven types based on their wavelength. Long exposure to wavelength less than 300 nanometres is usually harmful.</p> <p style="text-align: right;">(1 nanometre = 1.0×10^{-9}metre)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Electromagnetic(EM) Waves</th> <th>Wavelength</th> </tr> </thead> <tbody> <tr> <td>Type I</td> <td>3.0×10^0 to 3.0×10^3</td> </tr> <tr> <td>Type II</td> <td>1.0×10^{-2} to 1.0×10^1</td> </tr> <tr> <td>Type III</td> <td>7.5×10^{-7} to 1.0×10^{-2}</td> </tr> <tr> <td>Type IV</td> <td>4.0×10^{-7} to 7.0×10^{-7}</td> </tr> <tr> <td>Type V</td> <td>1.0×10^{-8} to 4.0×10^{-7}</td> </tr> <tr> <td>Type VI</td> <td>1.0×10^{-10} to 1.0×10^{-8}</td> </tr> <tr> <td>Type VII</td> <td>1.0×10^{-12} to 1.0×10^{-10}</td> </tr> </tbody> </table> | Electromagnetic(EM) Waves | Wavelength | Type I | 3.0×10^0 to 3.0×10^3 | Type II | 1.0×10^{-2} to 1.0×10^1 | Type III | 7.5×10^{-7} to 1.0×10^{-2} | Type IV | 4.0×10^{-7} to 7.0×10^{-7} | Type V | 1.0×10^{-8} to 4.0×10^{-7} | Type VI | 1.0×10^{-10} to 1.0×10^{-8} | Type VII | 1.0×10^{-12} to 1.0×10^{-10} | |
|--|--|------------|--------|--|---------|---|----------|--|---------|--|--------|--|---------|---|----------|--|--|
| Electromagnetic(EM) Waves | Wavelength | | | | | | | | | | | | | | | | |
| Type I | 3.0×10^0 to 3.0×10^3 | | | | | | | | | | | | | | | | |
| Type II | 1.0×10^{-2} to 1.0×10^1 | | | | | | | | | | | | | | | | |
| Type III | 7.5×10^{-7} to 1.0×10^{-2} | | | | | | | | | | | | | | | | |
| Type IV | 4.0×10^{-7} to 7.0×10^{-7} | | | | | | | | | | | | | | | | |
| Type V | 1.0×10^{-8} to 4.0×10^{-7} | | | | | | | | | | | | | | | | |
| Type VI | 1.0×10^{-10} to 1.0×10^{-8} | | | | | | | | | | | | | | | | |
| Type VII | 1.0×10^{-12} to 1.0×10^{-10} | | | | | | | | | | | | | | | | |
| i) Which type of EM waves should we avoid? How do you know? | [2] | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| ii) EM waves with wavelength about 500 nanometers are visible to our eyes. Which type is visible? How do you know? | [1] | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Question 4 | | | | | | | | | | | | | | | | | |
| a) There are different properties of multiplication which can be applied to get products. What property is applied in each of multiplication below? | | | | | | | | | | | | | | | | | |
| i) $24 \times -2 = (20 + 4) \times -2$ $= (-2 \times 20) + (-2 \times 4)$ | [1] | | | | | | | | | | | | | | | | |
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| ii) $-25 \times 8 = -50 \times 4$ | [1] |
| | |
| b) Dorji had Nu 65 and Dhan Bdr had Nu 30. They save Nu 5 and Nu 10 per day, respectively. | |
| i) On which day will they have the same amount saved? | [1.5] |
| | |
| ii) Predict who will have more savings on 9 th day. | [1.5] |
| | |

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| | |
| Question 5 | |
| <p>a) Two numbers are $(5 \times 10^{-3} + 2 \times 10^{-4} + 3 \times 10^{-2})$ and 0.0052. Which number is greater? By how much?</p> | [2] |
| | |
| <p>b) How is the volume affected, if the length and width of a rectangular prism is doubled? Show your work with an example.</p> | [3] |
| | |

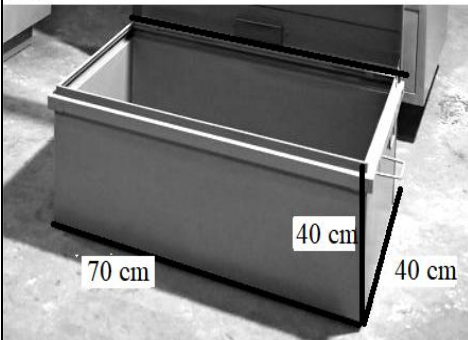
Question 6

- a) A dealer marks his good 10% above cost price and offers 10% discount. Assume a cost price and calculate profit or loss percent.

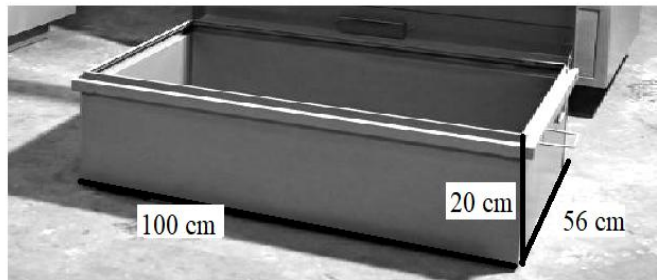
[2]

- b) Khandu painted two containers as shown below. Which of the two containers required less paint? Show your work.

[3]




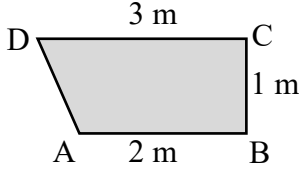
Container A



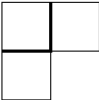
Container B

| | | |
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| Question 7 | | |
| a) | A rectangular garden is $(3x + 2)$ m long and $(2x + 5)$ m wide. Find the perimeter of the garden in terms of x ? | [2] |
| | | |
| b) | A deck of cards contains four suits (Club, Diamond, Heart and Spade). In each suit there is one Ace, three face cards and nine number cards. | |
| i) | What is the probability of selecting a face card? | [1] |
| | | |
| ii) | What is the probability of NOT selecting a face card? | [1] |
| | | |
| iii) | What is the complement event of selecting a club? | |
| | | [1] |
| Question 8 | | |
| a) | Subtract $(2x + 4)$ from $(-2x - 6)$. | [2] |
| | | |

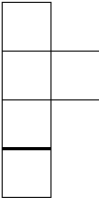
| | |
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| b) Construct a triangle ABC with AB= 6 cm, $\angle A = 60^0$ and AC= 4 cm. | [3] |
| | |
| Question 9 | |
| a) A boy is operating a set of numbers given below: $(2 + 3\frac{2}{5} + \sqrt{64} - 2) \div 5^2$ He got $11\frac{2}{5}$ as solution. Carry out the operations to check his solution. | [2] |
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| <p>b) The flower bed designed by landscape architect is as shown below.</p>   | |
| <p>i) Enlarge the bed applying the following combination of transformations.</p> <ul style="list-style-type: none"> • Step 1: dilate it by a scale factor of 1.5 with dilatation center at A. • Step 2: rotate $\frac{1}{2}$ turn with turn center at image of C. • Step 3: reflect the flower bed across a longer base. | [2] |
| | |
| <p>ii) Describe the changes in the dimensions or orientation of the final shape.</p> | [1] |
| | |
| Question 10 | |
| <p>a) A pole is at center of 18 m by 24 m rectangular play field. How far is the pole from its corner?</p> | [2] |
| | |

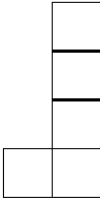
b) The following are orthographic face views of a structure made from linking cubes. Use the face views and create an isometric drawing. [3]



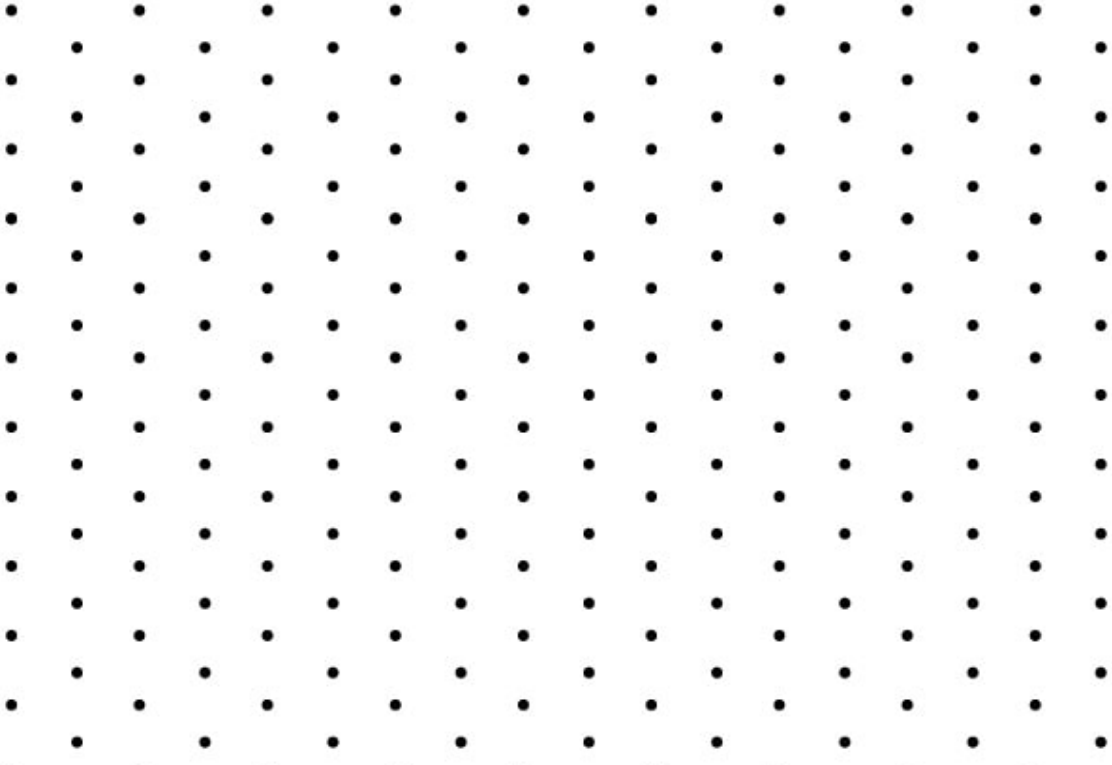
TOP



FRONT



RIGHT



Question 11

a) 200 students sat for mathematics test, 60% of the participants correctly solved a challenging problem

i) Calculate the number of participants who solved the problem correctly. [1]

ii) 40 participants did not try the question. What percent of the total participants did this group represent? [1]

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b) The data collected for 200 students is shown in the circle graph below. [3]



Write three interpretations from the graph above.

| | |
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Measurement References and Relations

Perimeter and Circumference

Rectangle : $2(\text{length} + \text{width})$

Square : $4 \times \text{side length}$

Circle : πd or $2\pi r$

Area

Triangle : $\frac{1}{2} \times \text{base} \times \text{height}$

Rectangle : $\text{Length} \times \text{width}$

square : $\text{side length} \times \text{side length}$

parallelogram : $\text{base} \times \text{height}$

Trapezoid : $\frac{1}{2} \times (\text{sum pf parallel side}) \times \text{height}$

Circle : πr^2

Rectangular Prism : $2 (\text{Length} \times \text{height} + \text{Height} \times \text{width} + \text{Length} \times \text{width})$

Volume

Rectangular prism : $\text{Area of base} \times \text{height}$ **OR** $V = l \times w \times h$

Pythagorean Theorem : $a^2 + b^2 = c^2$

Relation : $1\text{Km} = 100,000 \text{ cm}$

ROUGH WORK

ROUGH WORK

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