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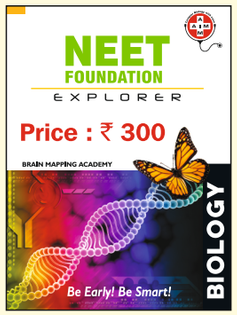

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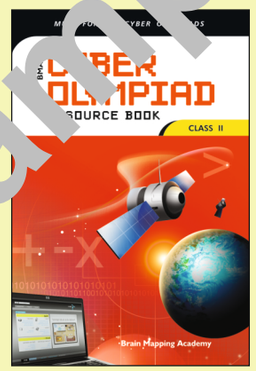

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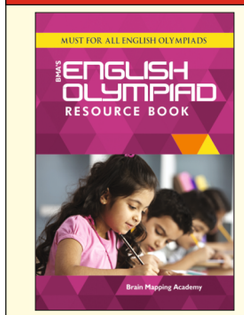

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Publisher's Note

Sometimes the understanding of fundamental concepts alone does not help the students to crack the competitive exams as most of them are objective in structure. Students need rigorous training to familiarize themselves to the style of the exams they are attempting. The board exams which are of qualifying, but not competitive, nature do not completely address the needs of students in testing them in objective type format.

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Care has been taken to design thought-provoking questions. These should help students to attain a deeper understanding of principles. The questions have been reviewed to fill the gaps in problem coverage and to build the confidence in the students. They have also been expanded to impart reasoning/logical/analytical skills.

This book will cater all the requirements of the students who are approaching national/ state level talent search examinations and all Olympiad exams. This book also complements the additional preparation needs of the students for the regular board exams.

We took utmost care to make this the best resource book available for the talent / olympiad exams aspirants. We welcome criticism from the students, teacher community and educators, especially concerning any errors and deficiencies which may have remained in this edition and the suggestions for improvement for the next edition.

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UIMO Unified International Mathematics Olympiad

Aim of these examinations

The focus on fundamentals is so important that without a firm understanding of them, a child cannot be expected to face the reality of the competitive world once he/she finishes the formal education. Even while opting for higher studies the student has to go through a complete scan of what he/she knows. Exams like IIT-JEE, AIEEE, AIIMS, AFMC, SAT, SAT, GRE, GMAT, etc. are so designed to test the fundamental strength of a student. Hence the need of the hour is building the fundamental base as strong as possible.

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Eligibility: Students of classes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12 are eligible to participate in this examination.

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Duration: 60 minutes

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Mathematics	:	15 marks
General Science	:	25 Marks

For Class 2

Mathematics	:	20 marks
General Science	:	30 Marks

For Classes 3 to 5

Mathematics	:	25 marks
General Science	:	30 Marks
Critical Thinking	:	05 Marks

For Classes 6 to 10

Mathematics	:	25 marks
Physics	:	10 marks
Chemistry	:	10 marks
Biology	:	10 marks
Critical Thinking	:	05 marks

For Class 11 & 12

Mathematics/Biology	:	25 marks
Physics	:	15 marks
Chemistry	:	15 marks
Critical Thinking	:	05 marks

UIMO

For Classes 1 & 2

Mathematics	:	0 marks
Logical Reasoning	:	10 Marks

For Classes 3 to 5

Mathematics	:	35 marks
Logical Reasoning	:	10 Marks
Critical Thinking	:	05 Marks

For Classes 6 to 12

Mathematics-1	:	30 marks
Mathematics-2	:	5 marks
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CONTENTS

1. Knowing our Numbers ..... 09 - 16
2. Whole Numbers ..... 17 - 26
3. Playing with Numbers ..... 27 - 36
4. Basic Geometric Ideas ..... 37 - 46
5. Understanding Elementary Shapes ..... 47 - 54
6. Integers ..... 55 - 65
7. Fractions ..... 66 - 72
8. Decimals ..... 73 - 82
9. Data Handling ..... 83 - 89
10. Mensuration ..... 90 - 96
11. Algebra ..... 97 - 102
12. Ratio and Proportion ..... 103 - 109
13. Symmetry ..... 110 - 114
14. Practical Geometry ..... 115 - 121

Questions@stimulating-minds ..... 122 - 123

Model Test Paper ..... 124 - 128

Key & Hints for Select Questions ..... 129 - 136

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CHAPTER 10

Mensuration

Synopsis

- A curve which begins and ends at the same point is called a **closed curve**. A closed polygon in which all sides and angles are equal are called **regular closed figures**.
- The length of the boundary of a figure is called its **perimeter**.
- The perimeter of a triangle is the sum of the lengths of the three sides, i.e., a + b + c.
- The perimeter of an isosceles triangle = 2a + b and perimeter of an equilateral triangle = 3a.
- The perimeter of a square is four times the length of its side, i. e., 4a.
- The perimeter of a rectangle is twice the sum of its length and breadth, i. e., 2 (l + b).
- Perimeter is expressed in units of length.
- Area of an enclosed plane is the number of square units that fit into it.
- Area is always expressed in square units.
- 1 m = 100 cm

  1 cm = 10 mm

  1 sq. m = 10000 sq. cm

  1 sq. cm = 100 sq. mm

  1 decimetre (dm) = 10 cm

  1 decametre (dam) = 1000 cm

  1 hectare = (100 m)^2 = 10000 mt^2

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Level - 1

[Each question has only one correct option]

01 **What do you call the total boundary length of a closed figure ?**

(A) Area (B) Volume

(C) Perimeter (D) Region

02 **What is the perimeter of a square of side 's' units ?**

(A) 4s units (B) s^4 units

(C) 4 + s units (D) s × s units

03 **What is the perimeter of a rectangle of length l and breadth b ?**

(A) $2l$ + b units (B) l × b units

(C) 2 (l + b) units (D) 2 (l – b) units

04 **What is the perimeter of an equilateral triangle of side 'a' units ?**

(A) 2a + b units (B) 3a units

(C) a + b + c units (D) a + 2b units

05 **What is the amount of surface enclosed by a closed figure called ?**

(A) Volume (B) Area

(C) Space (D) Perimeter

06 **An isosceles triangle has a measure of 'p' units for its equal side and 'q' units for its unequal side. What is its perimeter ?**

(A) 2 (p + q) units

(B) 2p + q units

(C) 2q + p units

(D) 2 (q + p) units

07 **What is the resultant of twice the sum of the length and breadth of a rectangle ?**

(A) Its area. (B) Its perimeter.

(C) Its length. (D) Its breadth.

08 **Which of the following is the perimeter of a triangle whose sides are 20 cm, 25 cm and 30 cm ?**

(A) 75 cm (B) 75 cm

(C) 150 cm (D) 60 cm

09 **A triangular wall hanging has sides measuring 50 cm, 55 cm and 75 cm. How much ribbon is required to give it a border ?**

(A) 80 m (B) 80 cm

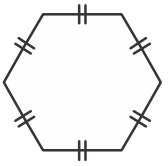
(C) 160 m (D) 160 cm

10 **A playground which is 250 m long and 120 m broad is to be fenced with wire. How much wire is needed ?**

(A) 370 m (B) 230 m

(C) 740 m (D) 540 m^2

11 **Find the perimeter of the following figure.**



100 m

(A) 800 m (B) 600 m

(C) 1200 m (D) 1000 m

12 **1 hectare = _____ m^2.**

(A) 10 (B) 100

(C) 1000 (D) 10000

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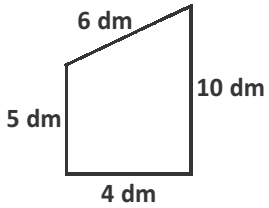
Level - 1

[Each question has only one correct option]

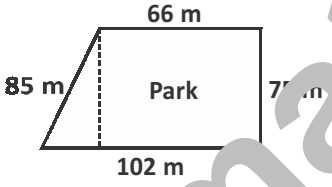
13 **What is the perimeter of the given figure ?**



(A) 25 cm (B) 21 dm

(C) 2 m 5 dm (D) 2 m 50 dm

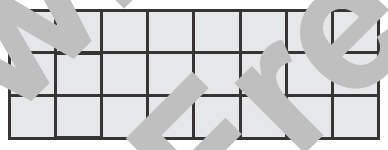
14 **Raghu walks around a park with dimensions given in the figure, every day. How far does he walk in two rounds ?**



(A) 328 m (B) 298 m

(C) 228 m (D) 656 m

15 **A wall shown in the figure is made up of square bricks of unit length. What is the area of the wall ?**



(A) 1 sq unit (B) 3 sq units

(C) 20 sq units (D) 24 sq units

16 **The side of a square shaped mirror is y units. How much of rubber sheet is required to cover it on the four sides ?**

(A) 6y units (B) 4y units

(C) 2y units (D) 8y units

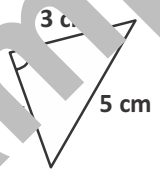
17 **A figure is formed by putting two squares one on the other as shown.**

If the length of each side of the two squares is 8 cm, what is the perimeter of the figure ?

(A) 56 cm (B) 64 cm

(C) 32 cm (D) [illegible] cm

18 **The perimeter of the triangle given is 12 cm. What does 3 cm measure ?**



(A) [illegible] cm (B) 4.5 cm

(C) 4 cm (D) 6 cm

19 **The perimeter of a rectangle is 170 m and its length is 50 m. What is its breadth ?**

(A) 80 m (B) 35 m

(C) 55 m (D) 60 m

20 **The area of a rectangle is 630 sq. cm and its breadth is 15 cm. What is its length ?**

(A) 40 cm (B) 60 cm

(C) 42 cm (D) 35 cm

21 **The perimeter of a square is 728 cm. Find the measure of its side.**

(A) 81 cm (B) 182 m

(C) 128 cm (D) 182 cm

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Level - 2

[Each question has only one correct option]

22 Samuel wanted to erect some vertical stones along the boundary of his plot at a distance of 10 m each. If the length of the plot is 30 m and the breadth is 20 m how many stones are required ?

(A) 450 (B) 45

(C) 9 (D) 10

23 80 students of the same height stand with both hands stretched all along the sides of a rectangular garden, each student covering a length of 1.75 m. What is the perimeter of the garden ?

(A) 1400 m (B) 140 m

(C) 14 m (D) 1400 km

24 A table top is covered with 25 squares of equal size. The side of the square is [illegible] cm. What is the area of the table top ?

(A) 300 sq. cm (B) [illegible] cm

(C) 225 sq. cm (D) 300 cm

25 The length and breadth of a rectangle are 3.2 m and 15 cm. What is its area ?

(A) 48 sq cm (B) 4.8 cm

(C) 48 sq m (D) 48

26 The length and breadth of a rectangular plot are 900 m and 7[illegible] m respectively. If three rounds of fence are fixed around the field at the cost of ₹ 8 per metre, what is the total amount spent ?

(A) ₹ 768 (B) ₹ 7680

(C) ₹ 76,800 (D) ₹ 768,000

27 How many sq. cm make a sq. m ?

(A) 100 (B) 1000

(C) 10000 (D) 10

28 A wooden plank measures 6 m in length and 3 m in breadth. If five such wooden planks are arranged in order, what is the area occupied by them ?

(A) 18 sq. m (B) 90 sq. m

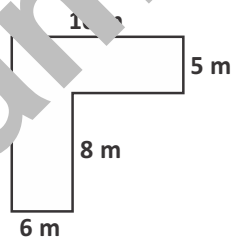
(C) 5 sq. m (D) 15 sq. m

29 On a wall of dimensions 10.5 m long and 8.5 m wide, a square shaped wall poster is stuck at the centre whose side measure is 2.5 m. If the remaining part of the wall is to be painted with pink colour costing ₹ 12 per sq m, how much does it cost ?

(A) ₹ 89.25 (B) ₹ 996

(C) ₹ 830 (D) ₹ 12

30 What is the area of the given figure ?



(A) 2400 sq. m (B) 48 sq. m

(C) 50 sq. m (D) 98 sq. m

31 In a square shaped park,whose side measures 28 m, a rectangular pond is located at the centre with dimensions 3 m and 2 m. What is the area of the park excluding the pond ?

(A) 784 sq. m (B) 6 sq. m

(C) 778 sq. m (D) 708 sq. m

32 Four square plots of side 30 m each are in a row. What length of barbed wire is required to fence the plots ?

(A) 300 m (B) 3000 m

(C) 30 m^2 (D) 300 m^2

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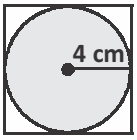
Level - 2

[Each question has only one correct option]

33 **The length of wire used to fence a square field is 144 m. What is the side of the field ?**

(A) 34 m (B) 36 m (C) 44 m (D) 38 m

34 **A circle is inscribed in a square as shown. If the radius of the circle is 4 cm, what is the perimeter of the square ?**



(A) 28 cm (B) 24 cm

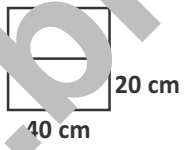
(C) 32 cm (D) 36 cm

35 **Four square mats of side 25 cm each are placed in such a way that they form a square. What is the area covered by the mats ?**

(A) 2500 m (B) 5[illegible] m

(C) 50 sq. cm (D) [illegible] cm

36 **Two rectangular plots of length 40 m and width 20 m are as shown.**

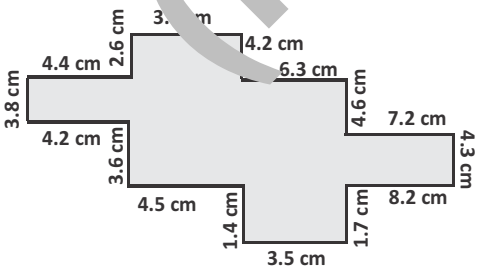


What is the cost of fencing the plots at ₹ 1 per metre ?

(A) ₹ 16000 (B) ₹ 1600

(C) ₹ 640 (D) ₹ 6400

37 **Find the perimeter of the figure.**



(A) 68.2 cm (B) 68.1 cm

(C) 86.3 cm (D) 6[illegible] m

38 **If the length and breadth of a rectangle are doubled, how does its perimeter change ?**

(A) Tripled (B) Doubled

(C) Halved (D) Becomes 4 times.

39 **A rectangular photo of dimension 12 cm × 18 cm has to be framed by placing a cardboard behind it. If the cost of cardboard is ₹ 1.2[illegible] per square centimetre, how much does it cost to frame the photo ?**

(A) ₹ 259.[illegible] (B) ₹ 292.52

(C) ₹ [illegible]5.2[illegible] (D) ₹ 252.90

40 **A rectangular box is of length l units and width b units. The length of another box is twice the length of the first box and its width is half the width of the first box. How are their areas related ?**

(A) The area of first box is twice the area of the second box.

(B) The area of second box is twice the area of the first box.

(C) The areas of both the boxes are equal.

(D) The area of first box is tripled.

41 **The length of a rectangular hall is 16 metres. If it can be partitioned into two equal square rooms, what is the length of the partition ?**

(A) 16 m (B) 8 m

(C) 4 m (D) 32 m

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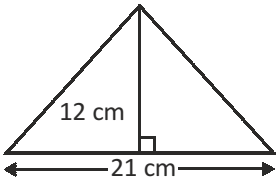
Multiple-answer Questions

[Each question has more than one correct option]

42 **What is the area of the triangle shown in the figure ?**



(A) 126 cm^2 (B) 0.0126 m^2

(C) 12600 mm^2 (D) $\frac{1}{2} \times 21 \times 12\ cm^2$

43 **Identify the true statements.**

(A) The distance around a 2 dimensional shape is perimeter.

(B) The length and breadth of a rectangular field are [illegible] m and 5 cm respectively then the area is 30 cm^2.

(C) The perimeter of a regular pentagon is 50 cm then its each side is [illegible] m.

(D) If l and b of a rectangle are [illegible]3 cm and [illegible]7 cm then its perimeter is 24.[illegible]1 cm.

44 **Length and breadth of a rectangle are tripled then**

(A) its new perimeter is double the original perimeter.

(B) its new perimeter is triple the original perimeter.

(C) its new area is 3 times to the original area.

(D) its new area is 9 times to the original area.

Previous Contest Questions

[Each question has only one correct option]

45 **The area of a rectangle is 650 sq. m and one of its sides is 13 cm, what is the perimeter of the rectangle ?**

(A) 186 cm (B) [illegible] cm

(C) 162 cm (D) [illegible]26 cm

46 **The total cost of flooring a room at ₹ 8.50 per sq. metre is ₹ 510. If the length of the room is [illegible], what is its breadth ?**

(A) [illegible] cm (B) 7.5 [illegible]

(C) [illegible]7 cm (D) 7.6 [illegible]

47 **What is the cost of cultivating a rectangular field [illegible] m long and 18 m wide at ₹ 4.50 per square metre ?**

(A) ₹ 25[illegible] (B) ₹ 2475

(C) ₹ 2[illegible]5 (D) ₹ 2754

48 **The length of a rectangle is $\frac{6^{th}}{5}$ of its breadth. If its perimeter is 132 m, what is its area ?**

(A) 1080 sq. m (B) 640 sq. m

(C) 1620 sq. m (D) 2160 sq. m

49 **When the perimeter and area of a square are numerically equal, what is the numerical value of the measure of its side ?**

(A) 1 (B) 2

(C) 4 (D) 8

50 **The side of a square tile is 10 cm. How many tiles can be fixed on one side of a wall which is 2.5 m long and 2 m high ?**

(A) 100 (B) 400

(C) 5000 (D) 500

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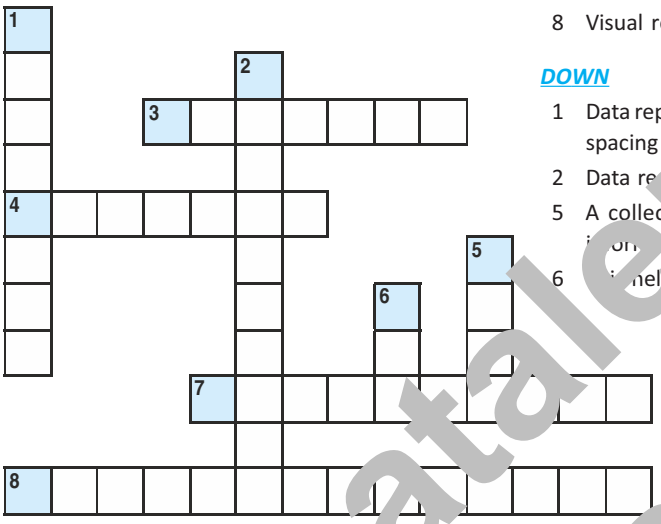
9. Data Handling



ACROSS

3 The width of the bars in the bar graph.

4 Data obtained in the original form.

7 These are used for tabulation of data.

8 Visual representation of numerical data.

DOWN

1 Data represented by drawing rectangles with equal spacing between them.

2 Data represented in the form of pictures.

5 A collection of numbers gathered to give some information.

6 Unit used in reading a pictograph.

10. Mensuration

ACROSS

1 The figure which has all sides and angle equal.

4 We use this to measure the area of an irregular shape.

8 Perimeter of a circle.

9 Ten thousand square metres.

DOWN

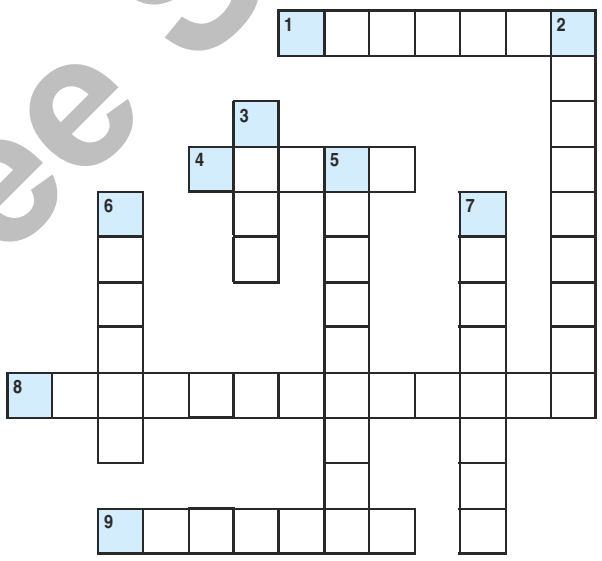
Perimeter of a four side figure twice the sum of length and breadth.

3 The amount of surface enclosed by a closed figure.

6 Its perimeter is four times to its side.

5 The boundary of a closed figure.

7 It is half of the area of rectangle.



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