

Shapes, plane & solid

Student Book - Series H

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Date completed

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Author of The Topics and Topic Tests: AS Kalra

Shapes, plane and solid

Topic 1 - Lines and angles

QUESTION 1 Draw the following.

- a A point _____
- b A straight line _____
- c A ray _____
- d An interval _____
- e A curved line _____
- f A vertical line _____

QUESTION 2 Draw the following.

- a Parallel lines _____
- b Perpendicular lines _____
- c An acute angle _____
- d A right angle _____
- e An obtuse angle _____
- f A straight angle _____
- g A reflex angle _____
- h A revolution _____


QUESTION 3 Draw the following.

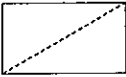
- a Vertically opposite angles _____
- b Complementary angles _____
- c Supplementary angles _____
- d Alternate angles _____
- e Corresponding angles _____
- f Co-interior angles _____

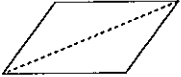
Shapes, plane and solid


Topic 2 - Triangles, quadrilaterals and polygons


QUESTION 1 Two identical shapes have been joined to form a polygon. In each of the following, name the polygon.

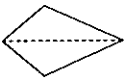
a  _____

b  _____

c  _____

d  _____


e  _____

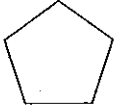
f  _____


QUESTION 2 Complete the following table.


| | Number of sides | Name of shape | | Number of sides | Name of shape |
|---|-----------------|---------------|---|-----------------|---------------|
| a | 3 | | f | 8 | |
| b | 4 | | g | 9 | |
| c | 5 | | h | 10 | |
| d | 6 | | i | 11 | |
| e | 7 | | j | 12 | |

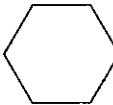
QUESTION 3 Divide the following polygons into the shapes written below them.

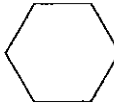
a  a triangle and a trapezium

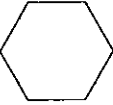
b  3 triangles


c  a rectangle and 2 triangles

d  2 trapeziums

e  6 triangles

f  4 triangles


g  2 triangles and 2 rhombuses


h  a quadrilateral and 2 triangles


Shapes, plane and solid


Topic 3 - Circles


QUESTION 1 Name the following parts of the circle.


a  _____

b  _____


c  _____


d  _____


e  _____


f  _____


QUESTION 2 Name the following.


a  _____

b  _____

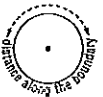
c  _____


d  _____


e  _____

f  _____


QUESTION 3 Name the following.

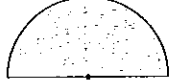
a  _____

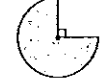
b  _____

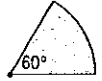
c  _____

QUESTION 4 Find the fraction of the circle given.

a  _____

b  _____

c  _____

d  _____

Shapes, plane and solid

Topic 4 - Properties of angles and parallel lines

QUESTION 1 Complete the following sentences.

- a An acute angle is less than _____.
- b A right angle is equal to _____.
- c An obtuse angle is greater than _____ but less than _____.
- d A straight angle is equal to _____.
- e A reflex angle is greater than _____ but less than _____.
- f A revolution is equal to _____.

QUESTION 2 Complete the following statements.

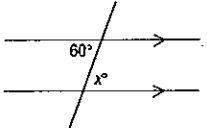
- a Vertically opposite angles are _____.
- b Complementary angles add up to _____.
- c Supplementary angles add up to _____.
- d The angle sum of a triangle is equal to _____.
- e The angle sum of a quadrilateral is equal to _____.

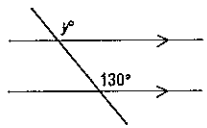
QUESTION 3 Complete the following statements.

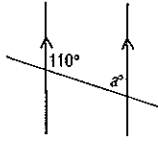
If two parallel lines are intersected by a transversal, ...

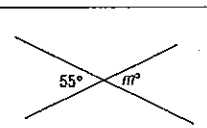
- a the alternate angles are _____.
- b the corresponding angles are _____.
- c the co-interior angles are _____.

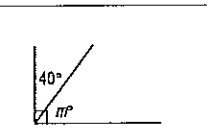
QUESTION 4 Find the value of the pronumeral in each of the following.

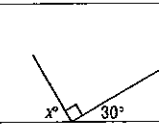
a  _____

b  _____

c  _____

d  _____


e  _____


f  _____


Shapes, plane and solid


Topic 5 - Axis of symmetry and point symmetry


QUESTION 1 How many axes of symmetry do the following shapes have?

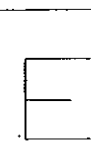
a  _____

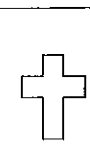
b  _____

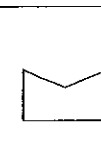
c  _____

d  _____

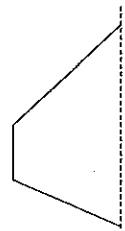
e  _____


f  _____

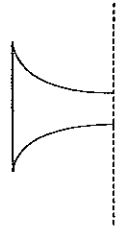
g  _____

h  _____

QUESTION 2 Complete the following half-pictures. The dotted line is the axis of symmetry.

a  _____


b  _____


c  _____


QUESTION 3 Draw capital letters of the alphabet that have ...

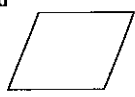
- a more than one axis of symmetry _____
- b no axis of symmetry _____


QUESTION 4 Which of the following shapes have point symmetry?

a  _____

b  _____

c  _____

d  _____

e  _____

Shapes, plane and solid

Topic 6 - Types of triangles

QUESTION 1 Complete the following sentences.

- a An equilateral triangle is a triangle in which _____ sides are equal.
- b An isosceles triangle is a triangle in which _____ sides are equal.
- c A scalene triangle is a triangle in which _____ sides are equal.
- d An acute-angled triangle has _____ angles acute.
- e An obtuse-angled triangle has _____ obtuse angle.
- f A right-angled triangle has _____ right angle.

QUESTION 2 Complete the following statements.

- a The interior angles of an equilateral triangle are _____.
- b The base angles of an isosceles triangle are _____.
- c The angle sum of a triangle is _____.
- d A triangle has all angles of equal size. The size of each angle is _____.
- e An exterior angle of a triangle is always equal to the sum of the _____ angles.

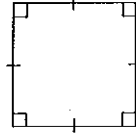
QUESTION 3 There are six members of the triangle family. Complete the following table.

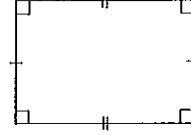
| | Name of triangle | Diagram | Number of equal sides | Number of axes of symmetry | Angle sum |
|---|------------------|---------|-----------------------|----------------------------|-----------|
| a | Equilateral | | | | |
| b | Isosceles | | | | |
| c | Scalene | | | | |
| d | Acute-angled | | | | |
| e | Right-angled | | | | |
| f | Obtuse-angled | | | | |


Shapes, plane and solid

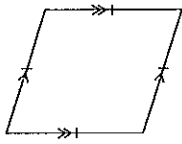
Topic 7 - Types of quadrilaterals

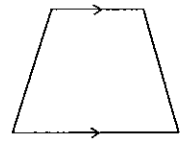
QUESTION 1 Name the following quadrilaterals.

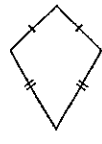
a 

b 

c 

d 

e 

f 

QUESTION 2 Complete the table by writing 'yes' or 'no' in the space provided.

| | Properties | Square | Rectangle | Parallelogram | Rhombus | Trapezium | Kite |
|---|---|--------|-----------|---------------|---------|-----------|------|
| a | Opposite sides are equal | | | | | | |
| b | Opposite sides are parallel | | | | | | |
| c | Opposite angles are equal | | | | | | |
| d | Each angle is 90° | | | | | | |
| e | Angle sum is 360° | | | | | | |
| f | Diagonals are equal | | | | | | |
| g | Diagonals bisect each other | | | | | | |
| h | Diagonals bisect each other at 90° | | | | | | |
| i | All sides are equal | | | | | | |

Shapes, plane and solid

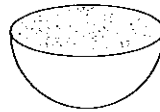
Topic 8 - Solids

QUESTION 1 Complete the following statements.

- Solids that have only square faces are _____.
- Solids that have rectangular faces are _____.
- Solids with some triangular faces are _____.
- Solids with circular faces are _____.

QUESTION 2

- Name the solid. _____
- How many surfaces does it have? _____
- How many flat surfaces does it have? _____
- How many curved surfaces does it have? _____
- How many vertices does it have? _____
- How many edges does it have? _____



QUESTION 3 Complete the following table.

| | Name of solid | Diagram | Number of faces (f) | Number of vertices (v) | Number of edges (e) | $f + v - 2 = e$ |
|---|--------------------|---------|-------------------------|----------------------------|-------------------------|-----------------|
| a | Cube | | | | | |
| b | Rectangular prism | | | | | |
| c | Triangular prism | | | | | |
| d | Pentagonal prism | | | | | |
| e | Square pyramid | | | | | |
| f | Triangular pyramid | | | | | |

Shapes, plane and solid

Topic 9 - Problem solving and shapes

1 Write true or false for the following.

- A rectangle is a solid. _____
- All triangles have three interior angles. _____
- Regular faces have equal sides and equal angles. _____
- All polygons have more than five sides. _____
- A cylinder has two edges. _____
- A prism and pyramid are the same. _____

2 Write the size of each angle of a rectangle.

3 Write the size of each angle of an equilateral triangle.

4 If the vertical angle of an isosceles triangle is 40° , find the size of each of its base angles.

5 The angle sum of a quadrilateral is 360° . A parallelogram is a quadrilateral. If one of its angles is 80° , find the size of the other three angles.

6 If two angles of a triangle add up to 130° , find the size of the third angle.

7 Write the name of a solid that has all square faces.

8 Write the name of a solid that does not have any edges.

9 Are all parallelograms rhombuses?

10 Are all rhombuses parallelograms?

Shapes, plane and solid

Topic Test

PART A

Instructions This part consists of 12 multiple-choice questions
 Each question is worth 1 mark
 Fill in only ONE CIRCLE for each question
 Calculators are NOT allowed

Time allowed: 15 minutes

Total marks = 12

| | Marks |
|---|-------|
| 1 A rectangle is a <input type="radio"/> A prism <input type="radio"/> B pyramid <input type="radio"/> C cube <input type="radio"/> D plane shape | 1 |
| 2 The number of vertices of a cube is <input type="radio"/> A 5 <input type="radio"/> B 6 <input type="radio"/> C 7 <input type="radio"/> D 8 | 1 |
| 3 The minimum number of sides of a polygon is <input type="radio"/> A 2 <input type="radio"/> B 3 <input type="radio"/> C 4 <input type="radio"/> D 5 | 1 |
| 4 The number of faces of a triangular pyramid is <input type="radio"/> A 2 <input type="radio"/> B 3 <input type="radio"/> C 4 <input type="radio"/> D 5 | 1 |
| 5 The number of parallel sides of a trapezium is <input type="radio"/> A 2 <input type="radio"/> B 3 <input type="radio"/> C 4 <input type="radio"/> D none of these | 1 |
| 6 The number of dimensions of a plane figure is <input type="radio"/> A 1 <input type="radio"/> B 2 <input type="radio"/> C 3 <input type="radio"/> D none of these | 1 |
| 7 The angle sum of a triangle is <input type="radio"/> A 90° <input type="radio"/> B 180° <input type="radio"/> C 270° <input type="radio"/> D 360° | 1 |
| 8 The angle sum of a quadrilateral is <input type="radio"/> A 90° <input type="radio"/> B 180° <input type="radio"/> C 270° <input type="radio"/> D 360° | 1 |
| 9 The number of edges of a cylinder is <input type="radio"/> A 1 <input type="radio"/> B 2 <input type="radio"/> C 3 <input type="radio"/> D 4 | 1 |
| 10 The number of equal sides in an isosceles triangle is <input type="radio"/> A 0 <input type="radio"/> B 1 <input type="radio"/> C 2 <input type="radio"/> D 3 | 1 |

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Topic Test

PART A continued

| | Marks |
|--|-------|
| 11 The number of acute angles in an acute-angled triangle is <input type="radio"/> A 1 <input type="radio"/> B 2 <input type="radio"/> C 3 <input type="radio"/> D none of these | 1 |
| 12 The number of obtuse angles in an obtuse-angled triangle is <input type="radio"/> A 1 <input type="radio"/> B 2 <input type="radio"/> C 3 <input type="radio"/> D none of these | 1 |
| 13 Vertically opposite angles are <input type="radio"/> A equal <input type="radio"/> B unequal <input type="radio"/> C complementary <input type="radio"/> D supplementary | 1 |
| 14 An equilateral triangle has <input type="radio"/> A 2 sides equal <input type="radio"/> B all sides equal <input type="radio"/> C all sides different <input type="radio"/> D one obtuse angle | 1 |
| 15 The number of faces of a cube is <input type="radio"/> A 3 <input type="radio"/> B 4 <input type="radio"/> C 5 <input type="radio"/> D 6 | 1 |
| Total marks achieved for PART A | |
| 15 | |

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Topic Test

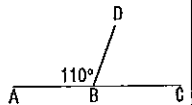
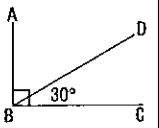
PART B

Instructions This part consists of 15 questions
 Each question is worth 1 mark
 Write answers in the answers-only column

Time allowed: 20 minutes

Total marks = 15

| Questions | Answers only | Marks |
|---|--------------|-------|
| 1 How many faces does a rectangular prism have? | _____ | 1 |
| 2 How many edges does a cone have? | _____ | 1 |
| 3 Name two complementary angles in the diagram. | _____ | 1 |
| 4 What is the size of $\angle ABD$ in the diagram? | _____ | 1 |
| 5 Name two supplementary angles in the diagram. | _____ | 1 |
| 6 What is the size of $\angle DBC$ in the diagram? | _____ | 1 |
| 7 What is the angle sum of a triangle? | _____ | 1 |
| 8 What is the angle sum of the two acute angles in a right-angled triangle? | _____ | 1 |
| 9 How many axes of symmetry does a rectangle have? | _____ | 1 |
| 10 Write the type of angle that measures 65° . | _____ | 1 |
| 11 Write the name of the plane shape with eight sides. | _____ | 1 |
| 12 How many axes of symmetry does a square have? | _____ | 1 |
| 13 What is the size of each angle of an equilateral triangle? | _____ | 1 |
| 14 Are all rectangles squares? | _____ | 1 |
| 15 Are all squares rectangles? | _____ | 1 |



Total marks achieved for PART B

15

Shapes, plane and solid

Topic Test

PART C

Instructions This part consists of 4 questions
 Each question is worth 5 marks
 Show all necessary

Time allowed: 20 minutes

Total marks = 20

| Questions | Marks |
|---|-------|
| 1 Write the type of angle that measures ... a 33° _____ b 90° _____ c 155° _____ d 265° _____ e 360° _____ | 5 |
| 2 Write the name of the plane shape with ... a three sides _____ b five sides _____ c eight sides _____ d ten sides _____ e twelve sides _____ | 5 |
| 3 Complete the following sentences. a A triangular pyramid has _____ faces. b A cylinder has _____ circular faces. c A square pyramid has _____ edges. d A cone has _____ faces. e A triangular prism has _____ vertices. | 5 |
| 4 Draw the following solids and colour the base of each one. a Rectangular prism b Cube c Cylinder d Sphere e Pentagonal pyramid | 5 |

Total marks achieved for PART C

20

Shapes, plane and solid

Topic Test

PART A

Instructions This part consists of 12 multiple-choice questions
 Each question is worth 1 mark
 Fill in only ONE CIRCLE for each question
 Calculators are NOT allowed

Time allowed: 15 minutes

Total marks = 12

| | Marks |
|---|-------|
| 1 A rectangle is a (A) prism (B) pyramid (C) cube (D) plane shape | 1 |
| 2 The number of vertices of a cube is (A) 5 (B) 6 (C) 7 (D) 8 | 1 |
| 3 The minimum number of sides of a polygon is (A) 2 (B) 3 (C) 4 (D) 5 | 1 |
| 4 The number of faces of a triangular pyramid is (A) 2 (B) 3 (C) 4 (D) 5 | 1 |
| 5 The number of parallel sides of a trapezium is (A) 2 (B) 3 (C) 4 (D) none of these | 1 |
| 6 The number of dimensions of a plane figure is (A) 1 (B) 2 (C) 3 (D) none of these | 1 |
| 7 The angle sum of a triangle is (A) 90° (B) 180° (C) 270° (D) 360° | 1 |
| 8 The angle sum of a quadrilateral is (A) 90° (B) 180° (C) 270° (D) 360° | 1 |
| 9 The number of edges of a cylinder is (A) 1 (B) 2 (C) 3 (D) 4 | 1 |
| 10 The number of equal sides in an isosceles triangle is (A) 0 (B) 1 (C) 2 (D) 3 | 1 |

Shapes, plane and solid

Topic Test

PART A continued

| | Marks |
|--|-------|
| 11 The number of acute angles in an acute-angled triangle is (A) 1 (B) 2 (C) 3 (D) none of these | 1 |
| 12 The number of obtuse angles in an obtuse-angled triangle is (A) 1 (B) 2 (C) 3 (D) none of these | 1 |
| 13 Vertically opposite angles are (A) equal (B) unequal (C) complementary (D) supplementary | 1 |
| 14 An equilateral triangle has (A) 2 sides equal (B) all sides equal (C) all sides different (D) one obtuse angle | 1 |
| 15 The number of faces of a cube is (A) 3 (B) 4 (C) 5 (D) 6 | 1 |
| Total marks achieved for PART A | |
| 15 | |

Shapes, plane and solid

Topic Test

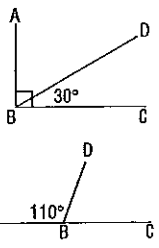
PART B

Instructions This part consists of 15 questions
Each question is worth 1 mark
Write answers in the answers-only column

Time allowed: 20 minutes

Total marks = 16

| Questions | Answers only | Marks |
|---|--------------|-------|
| 1 How many faces does a rectangular prism have? | _____ | 1 |
| 2 How many edges does a cone have? | _____ | 1 |
| 3 Name two complementary angles in the diagram. | _____ | 1 |
| 4 What is the size of $\angle ABD$ in the diagram? | _____ | 1 |
| 5 Name two supplementary angles in the diagram. | _____ | 1 |
| 6 What is the size of $\angle DBC$ in the diagram? | _____ | 1 |
| 7 What is the angle sum of a triangle? | _____ | 1 |
| 8 What is the angle sum of the two acute angles in a right-angled triangle? | _____ | 1 |
| 9 How many axes of symmetry does a rectangle have? | _____ | 1 |
| 10 Write the type of angle that measures 65° . | _____ | 1 |
| 11 Write the name of the plane shape with eight sides. | _____ | 1 |
| 12 How many axes of symmetry does a square have? | _____ | 1 |
| 13 What is the size of each angle of an equilateral triangle? | _____ | 1 |
| 14 Are all rectangles squares? | _____ | 1 |
| 15 Are all squares rectangles? | _____ | 1 |



Total marks achieved for PART B

15

Shapes, plane and solid

Topic Test

PART C

Instructions This part consists of 4 questions
Each question is worth 5 marks
Show all necessary

Time allowed: 20 minutes

Total marks = 20

| Questions | Marks |
|--|-------|
| 1 Write the type of angle that measures ... a 33° _____ b 90° _____ c 155° _____ d 285° _____ e 360° _____ | 5 |
| 2 Write the name of the plane shape with ... a three sides _____ b five sides _____ c eight sides _____ d ten sides _____ e twelve sides _____ | 5 |
| 3 Complete the following sentences. a A triangular pyramid has _____ faces. b A cylinder has _____ circular faces. c A square pyramid has _____ edges. d A cone has _____ faces. e A triangular prism has _____ vertices. | 5 |
| 4 Draw the following solids and colour the base of each one. a Rectangular prism b Cube c Cylinder d Sphere e Pentagonal pyramid | 5 |

Total marks achieved for PART C

20

Answers – Shapes, plane and solid

PAGE 1 1 a • b c d e f 2 a // b c d e

PAGE 2 1 a square b rectangle c parallelogram d rhombus e hexagon f kite 2 a triangle b quadrilateral c pentagon d hexagon e heptagon f octagon g nonagon h decagon i undecagon j dodecagon 3 a

b c d e f g h

PAGE 3 1 a circle b centre c radius d diameter e arc f chord 2 a semi-circle b minor segment c major segment d sector e tangent f secant 3 a circumference b concentric circles c quadrant 4 a $\frac{1}{4}$ b $\frac{1}{2}$ c $\frac{3}{4}$ d $\frac{1}{6}$

PAGE 4 1 a 90° b 90° c 90° , 180° d 180° e 180° , 360° f 360° 2 a equal b 90° c 180° d 180° e 360° 3 a equal b equal c supplementary 4 a 60° b 130° c 70° d 55° e 50° f 60°

PAGE 5 1 a 1 b 2 c 4 d f e 1 f 1 g 1 h 1 2 a b c

b F, G, J, L, H, P, Q, R, S, Z 4 b, c, d

PAGE 6 1 a all b two c no d all e one f one 2 a equal b equal c 180° d 60° e opposite interior

3 a 3, 3, 180° b 2, 1, 180° c 0, 0, 180° d 0, 0, 180° e 0, 0, 180° f 0, 0, 180°

PAGE 7 1 a square b rectangle c parallelogram d rhombus e trapezium f kite 2 a yes, yes, yes, yes, no, no b yes, yes, yes, yes, no, no c yes, yes, yes, yes, no, no d yes, yes, no, no, no, no e yes, yes, yes, yes, yes, yes f yes, yes, no, no, no, no g yes, yes, yes, yes, no, no h yes, no, no, yes, no, no i yes, no, no, yes, no, no

PAGE 8 1 a cubes b rectangular or triangular prisms c triangular prisms or pyramids d cylinders or cones

2 a hemisphere b 2 c 1 d 1 e 0 f 1 3 a 6, 8, 12, yes b 6, 8, 12, yes c 5, 6, 9, yes

d 7, 10, 15, yes e 5, 5, 8, yes f 4, 4, 6, yes

PAGE 9 1 a false b true c true d false e true f false 2 90° 3 60° 4 70° 5 80° , 100° , 100° 6 50° 7 cube 8 sphere 9 no 10 yes

PAGES 10 & 11 1 D 2 D 3 B 4 C 5 A 6 B 7 B 8 D 9 B 10 C 11 C 12 A 13 A 14 B 15 D

PAGE 12 1 6 2 1 3 $\angle ABD$, $\angle CBD$ 4 60° 5 $\angle ABD$, $\angle CBD$ 6 70° 7 180° 8 90° 9 2 10 acute 11 octagon 12 4 13 60° 14 no 15 yes

PAGE 13 1 a acute b right angle c obtuse d reflex e revolution 2 a triangle b pentagon c octagon d decagon

e dodecagon 3 a four b two c eight d two e six 4 a b c d e