

Shapes, plane and solid

Student Book - Series H

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Author of The Topics and Topic Tests: AS Kalra

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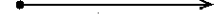
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Shapes, plane and solid

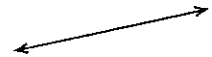
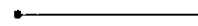
Topic 1: Lines and angles

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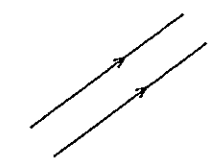
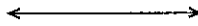
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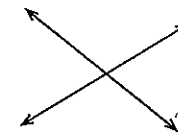
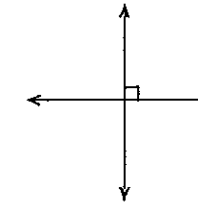
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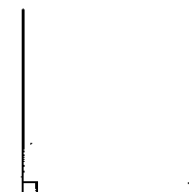
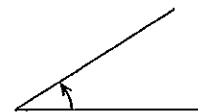
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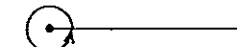
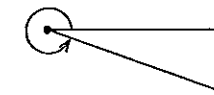
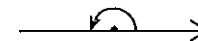
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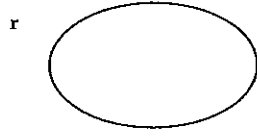
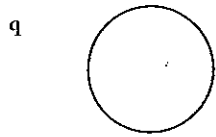
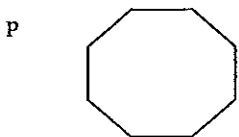
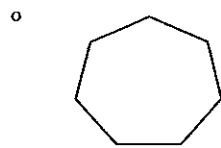
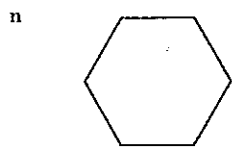
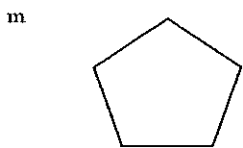
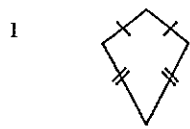
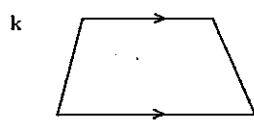
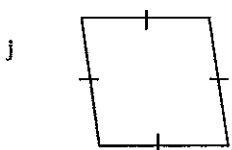
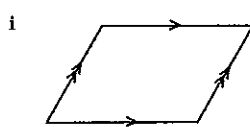
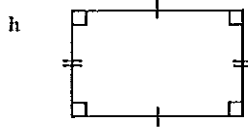
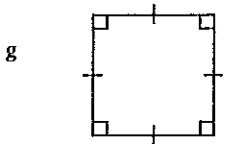
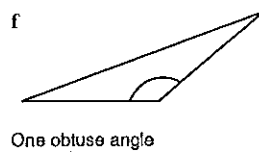
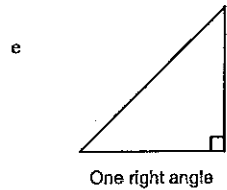
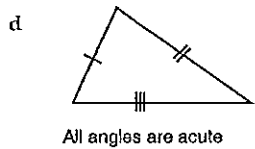
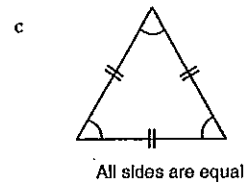
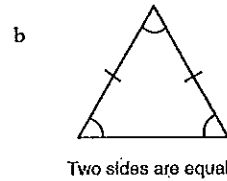
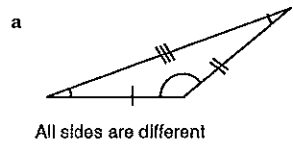
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Shapes, plane and solid

Topic 2: Triangles, quadrilaterals, polygons and circles

Name the following plane shapes.

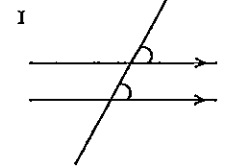
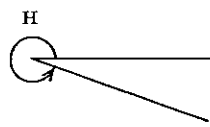
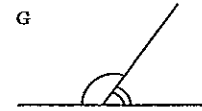
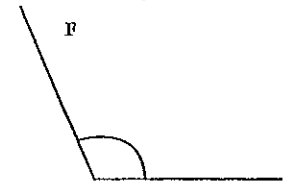
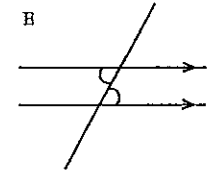
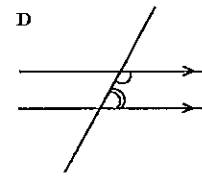
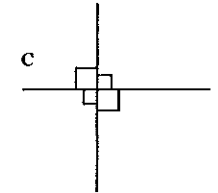
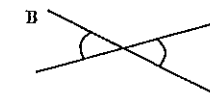
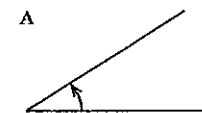


Shapes, plane and solid

Topic 3: Properties of angles and parallel lines

QUESTION 1 Match the following figures with their correct names.

- | | | |
|------------------------------|------------------------|------------------------|
| a Alternate angles | b Right angles | c Supplementary angles |
| d Vertically opposite angles | e Corresponding angles | f Obtuse angle |
| g Co-interior angles | h Acute angle | i Reflex angle |

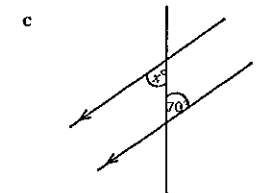
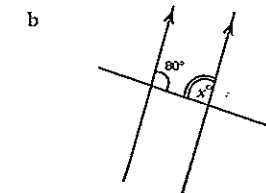
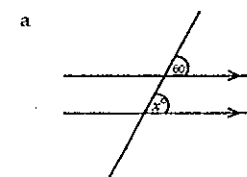


QUESTION 2 Complete the following statements.

If two parallel lines are intersected by a transversal,

- the alternate angles are _____.
- the corresponding angles are _____.
- the co-interior angles add up to _____.

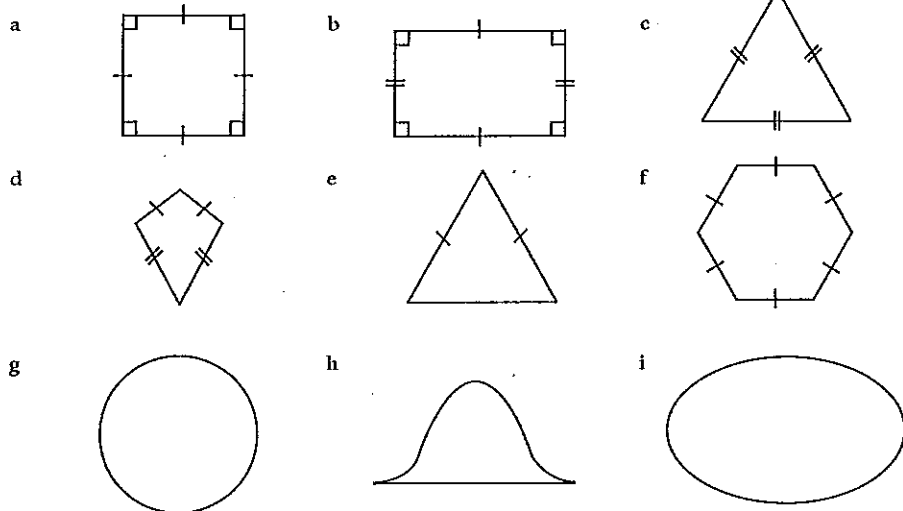
QUESTION 3 In each of the following diagrams, two angles are shown. Use one word to name these angles and find the size of angle x .



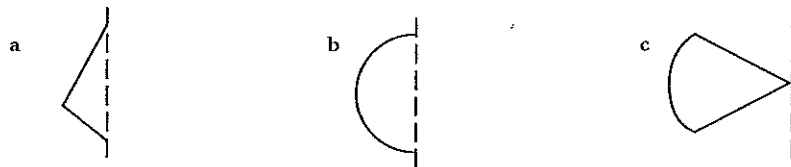
Shapes, plane and solid

Topic 4: Axis of symmetry and point symmetry

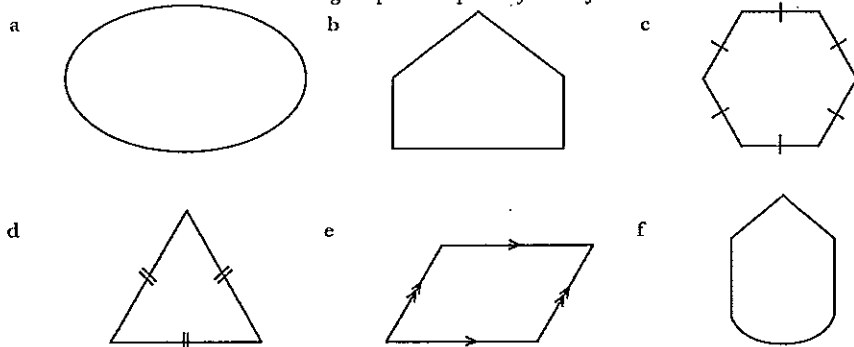
QUESTION 1 How many axes of symmetry do the following shapes have?



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



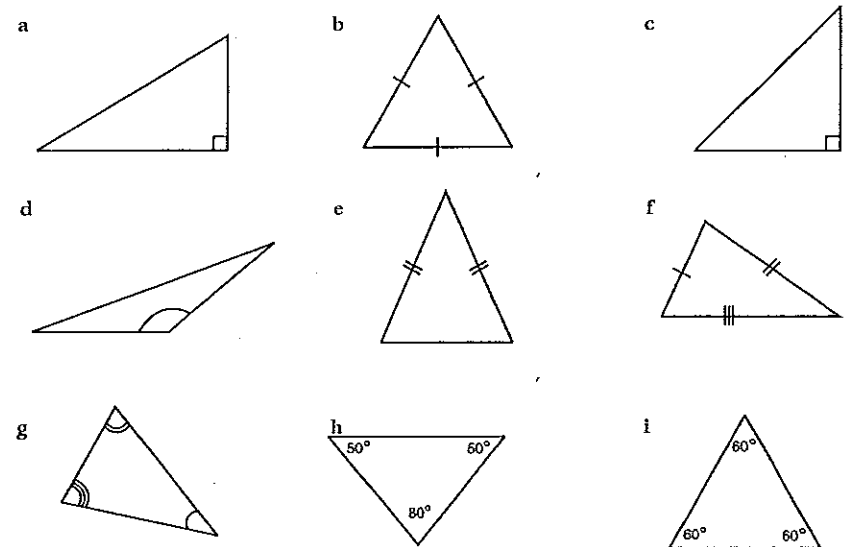
QUESTION 3 Which of the following shapes have point symmetry?



Shapes, plane and solid

Topic 5: Types of triangles

QUESTION 1 Write the types of triangles drawn below.



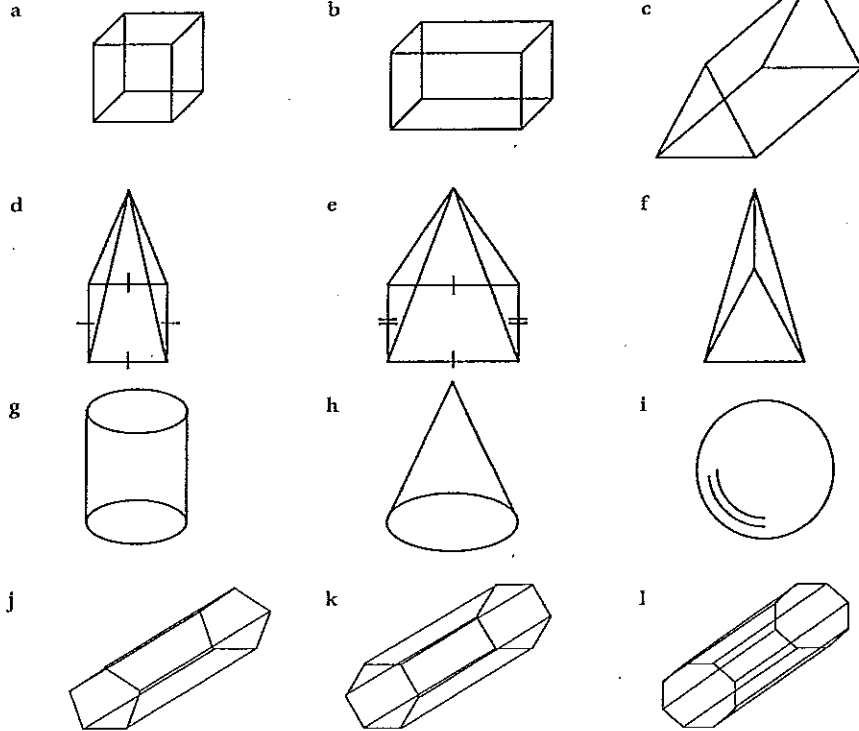
QUESTION 2 Complete the following table.

| | $\angle A$ | $\angle B$ | $\angle C$ | Type of triangle |
|---|-------------|------------|-------------|------------------|
| | 30° | 50° | 100° | obtuse |
| a | 60° | 80° | 40° | |
| b | 50° | | 90° | right |
| c | 60° | 60° | 60° | |
| d | 70° | 40° | 70° | |
| e | 55° | | 65° | |
| f | | 48° | 112° | |
| g | 45° | | 45° | |
| h | 30° | 60° | | |
| i | 130° | 20° | | |

Shapes, plane and solid

Topic 6: Solids

QUESTION 1 Name the solids shown below.



QUESTION 2 Which of the above solids are prisms?

a _____ b _____ c _____

d _____ e _____ f _____

QUESTION 3 Which solids are pyramids?

a _____ b _____ c _____

QUESTION 4 Which solids are neither prisms nor pyramids?

a _____ b _____ c _____

Shapes, plane and solid

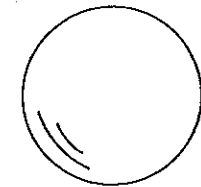
Topic 7: Euler's rule

QUESTION 1 From the solids drawn on page 6, complete the following table.

| | Solids | Number of | | | Euler's Rule $E = F + V - 2$ |
|---|----------------------------------|-----------|--------------|-----------|---------------------------------|
| | | Faces (F) | Vertices (V) | Edges (E) | |
| a | Cube | | | | |
| b | Rectangular prism | | | | |
| c | Triangular prism | | | | |
| d | Square pyramid | | | | |
| e | Rectangular prism | | | | |
| f | Triangular pyramid (tetrahedron) | | | | |
| g | Pentagonal prism | | | | |
| h | Hexagonal prism | | | | |
| i | Octagonal prism | | | | |

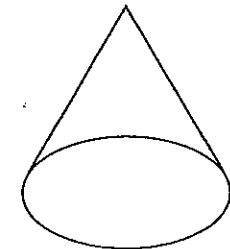
QUESTION 2

- a Name this solid. _____
- b How many surfaces has it? _____
- c Is its surface flat or curved? _____
- d How many vertices has it? _____
- e How many edges has it? _____



QUESTION 3

- a Name this solid. _____
- b How many surfaces has it? _____
- c How many vertices has it? _____
- d How many edges has it? _____
- e Describe the surfaces of this solid. _____



Shapes, plane and solid

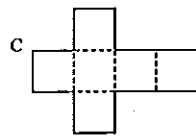
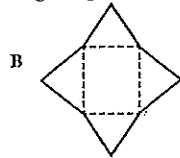
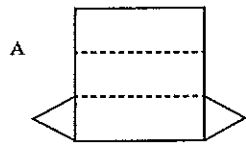
Topic 8: Nets

QUESTION 1 Match the net to the correct name of the solid

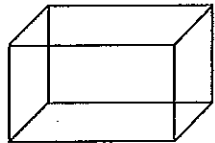
a Cube

b Triangular prism

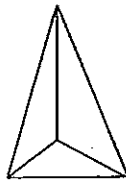
c Rectangular pyramid



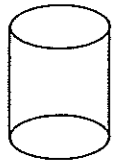
QUESTION 2 Draw the nets of the following solids.



a Rectangular prism



b Triangular pyramid (tetrahedron)

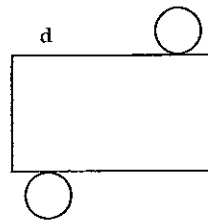
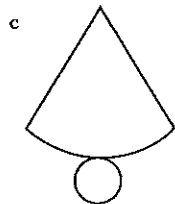
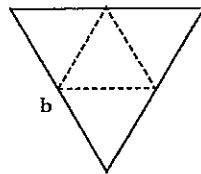
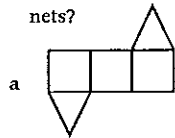


c Cylinder



d Cone

QUESTION 3 Which solids will be formed from the following nets?



Shapes, plane and solid

Topic 9: Problem solving and shapes

1 State the size of each angle of a square.

2 State the size of each angle of an equilateral triangle.

3 In a right-angled triangle, if one of the other two angles is 60° , find the size of the third angle.

4 The angle sum of a quadrilateral is 360° . A rectangle is a quadrilateral and all its angles are equal. What is the size of each angle?

5 In an obtuse-angled triangle, the size of the obtuse angle is 120° and the other two angles are equal. Find the size of each of these equal angles.

6 In a triangle, the angle sum is 180° , if two of its angles add up to 150° , find the size of the third angle of the triangle.

7 Are all rectangles squares?

8 Are all squares rectangles?

9 Are all isosceles triangles equilateral triangles?

10 Are all equilateral triangles isosceles triangles?

11 How many faces does a rectangular prism have?

12 How many edges does a cube have?

13 How many vertices does a square pyramid have?

14 Write the name of a solid if it has two triangular faces and three rectangular faces.

15 Write the name of a solid that does not have any flat faces.

Shapes, plane and solid - Assessment

Unit 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 The angle sum of a triangle is <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 360° <input type="radio"/> (D) 270° | 1 |
| 2 The angle sum of a quadrilateral is <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 360° <input type="radio"/> (D) 270° | 1 |
| 3 An isosceles triangle has <input type="radio"/> (A) 3 sides equal <input type="radio"/> (B) 2 sides equal <input type="radio"/> (C) 4 sides equal <input type="radio"/> (D) all sides equal | 1 |
| 4 An acute angle measures <input type="radio"/> (A) less than 90° <input type="radio"/> (B) 90° <input type="radio"/> (C) between 90° and 180° <input type="radio"/> (D) 360° | 1 |
| 5 An obtuse angle measures <input type="radio"/> (A) less than 90° <input type="radio"/> (B) 90° <input type="radio"/> (C) between 90° and 180° <input type="radio"/> (D) 360° | 1 |
| 6 When two parallel lines are cut by a transversal, the alternate angles <input type="radio"/> (A) are equal <input type="radio"/> (B) add up to 90° <input type="radio"/> (C) add up to 180° <input type="radio"/> (D) add up to 360° | 1 |
| 7 When two parallel lines are cut by a transversal, the corresponding angles <input type="radio"/> (A) are equal <input type="radio"/> (B) add up to 90° <input type="radio"/> (C) add up to 180° <input type="radio"/> (D) add up to 360° | 1 |
| 8 When two parallel lines are cut by a transversal, the co-interior angles <input type="radio"/> (A) are equal <input type="radio"/> (B) add up to 90° <input type="radio"/> (C) add up to 180° <input type="radio"/> (D) add up to 360° | 1 |
| 9 A straight angle measures <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 270° <input type="radio"/> (D) 360° | 1 |
| 10 A right angle measures <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 270° <input type="radio"/> (D) 360° | 1 |
| 11 A revolution measures <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 270° <input type="radio"/> (D) 360° | 1 |
| 12 A reflex angle measures <input type="radio"/> (A) between 0° and 90° <input type="radio"/> (B) between 90° and 270° <input type="radio"/> (C) between 180° and 270° <input type="radio"/> (D) between 180° and 360° | 1 |

Total marks achieved for PART A

12

Shapes, plane and solid - Assessment

Unit 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 cube have? | _____ | 1 |
| 2 How many edges does a rectangular prism have? | _____ | 1 |
| 3 Name the type of angle marked with the cross. | _____ | 1 |
| 4 What is the size of $\angle ACB$? | _____ | 1 |
| 5 Name two supplementary angles. | _____ | 1 |
| 6 What is the size of $\angle ACD$? | _____ | 1 |
| 7 What is the angle sum of a quadrilateral? | _____ | 1 |
| 8 What is the angle sum of the sizes of the acute angles of a right angled triangle? | _____ | 1 |
| 9 The size of the vertex angle of an isosceles triangle is 80°. What is the size of each base angle? | _____ | 1 |
| 10 How many axes of symmetry does a square have? | _____ | 1 |
| 11 Write the type of angle that measures 330°. | _____ | 1 |
| 12 Write the name of the plane shape with five sides. | _____ | 1 |
| 13 How many axes of symmetry does a rhombus have? | _____ | 1 |
| 14 Are all rhombuses squares? | _____ | 1 |
| 15 Are all squares rhombuses? | _____ | 1 |

Total marks achieved for PART B

15

Shapes, plane and solid

Topic Test

PART A

Instructions This part consists of 12 multiple-choice questions
 Each question is worth 2 marks
 Fill in only ONE CIRCLE for each question
 Calculators are NOT allowed

Time allowed: 15 minutes

Total marks = 12

| | Marks |
|--|-------|
| 1 The angle sum of a triangle is <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 360° <input type="radio"/> (D) 270° | 1 |
| 2 The angle sum of a quadrilateral is <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 360° <input type="radio"/> (D) 270° | 1 |
| 3 An isosceles triangle has <input type="radio"/> (A) 3 sides equal <input type="radio"/> (B) 2 sides equal <input type="radio"/> (C) 4 sides equal <input type="radio"/> (D) all sides equal | 1 |
| 4 An acute angle measures <input type="radio"/> (A) less than 90° <input type="radio"/> (B) 90° <input type="radio"/> (C) between 90° and 180° <input type="radio"/> (D) 360° | 1 |
| 5 An obtuse angle measures <input type="radio"/> (A) less than 90° <input type="radio"/> (B) 90° <input type="radio"/> (C) between 90° and 180° <input type="radio"/> (D) 360° | 1 |
| 6 When two parallel lines are cut by a transversal, the alternate angles <input type="radio"/> (A) are equal <input type="radio"/> (B) add up to 90° <input type="radio"/> (C) add up to 180° <input type="radio"/> (D) add up to 360° | 1 |
| 7 When two parallel lines are cut by a transversal, the corresponding angles <input type="radio"/> (A) are equal <input type="radio"/> (B) add up to 90° <input type="radio"/> (C) add up to 180° <input type="radio"/> (D) add up to 360° | 1 |
| 8 When two parallel lines are cut by a transversal, the co-interior angles <input type="radio"/> (A) are equal <input type="radio"/> (B) add up to 90° <input type="radio"/> (C) add up to 180° <input type="radio"/> (D) add up to 360° | 1 |
| 9 A straight angle measures <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 270° <input type="radio"/> (D) 360° | 1 |
| 10 A right angle measures <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 270° <input type="radio"/> (D) 360° | 1 |
| 11 A revolution measures <input type="radio"/> (A) 90° <input type="radio"/> (B) 180° <input type="radio"/> (C) 270° <input type="radio"/> (D) 360° | 1 |
| 12 A reflex angle measures <input type="radio"/> (A) between 0° and 90° <input type="radio"/> (B) between 90° and 270° <input type="radio"/> (C) between 180° and 270° <input type="radio"/> (D) between 180° and 360° | 1 |

Total marks achieved for PART A

12

Shapes, plane and solid

Topic Test

PART B

Instructions This part consists of 15 questions
 Each question is worth 2 marks
 Write answers in the answers-only column

Time allowed: 20 minutes

Total marks = 30

| Questions | Answers only | Marks |
|---|--------------|-------|
| 1 How many faces does a cube have? | _____ | 2 |
| 2 How many edges does a rectangular prism have? | _____ | 2 |
| 3 Name the type of angle marked with the cross. | _____ | 2 |
| 4 What is the size of $\angle ACB$? | _____ | 2 |
| 5 Name two supplementary angles. | _____ | 2 |
| 6 What is the size of $\angle ACD$? | _____ | 2 |
| 7 What is the angle sum of a quadrilateral? | _____ | 2 |
| 8 What is the angle sum of the sizes of the acute angles of a right angled triangle? | _____ | 2 |
| 9 The size of the vertex angle of an isosceles triangle is 80° . What is the size of each base angle? | _____ | 2 |
| 10 How many axes of symmetry does a square have? | _____ | 2 |
| 11 Write the type of angle that measures 330° . | _____ | 2 |
| 12 Write the name of the plane shape with five sides. | _____ | 2 |
| 13 How many axes of symmetry does a rhombus have? | _____ | 2 |
| 14 Are all rhombuses squares? | _____ | 2 |
| 15 Are all squares rhombuses? | _____ | 2 |

Total marks achieved for PART B




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Answers - Shapes, Plane and Solid

PAGE 1 a point b horizontal line c ray d interval e curved line f sloping line g horizontal line h vertical line
i parallel lines j perpendicular lines k intersecting lines l closed curve m acute angle n right angle o obtuse angle
p straight angle q reflex angle r revolution

PAGE 2 a scalene triangle b isosceles triangle c equilateral triangle d acute angled triangle e right angled triangle
f obtuse angled triangle g square h rectangle i parallelogram j rhombus k trapezium l kite m pentagon n hexagon
o heptagon p octagon q circle r ellipse (oval)

PAGE 3 1 a B b C c G d B e I f F g D h A i H 2 a equal b equal c 180° 3 a corresponding, 60° b co-interior, 100°
c alternate, 70°

PAGE 4 1 a 4 b 2 c 3 d 1 e 1 f 6 g infinite h 1 1 2 2 a  b  c  3 a, c, d, e



PAGE 5 1 a right angled b equilateral c right angled d obtuse angled e isosceles f scalene g acute angled
h isosceles i equilateral 2 a acute angled b 40° c equilateral d isosceles e 60° , acute angled f 20° , obtuse angled
g 90° , right angled isosceles h 90° , right angled i 30° , obtuse angled

PAGE 6 1 a cube b rectangular prism c triangular prism d square pyramid e rectangular pyramid f triangular pyramid g
cylinder h cone i sphere j pentagonal prism k hexagonal prism l octagonal prism 2 a a b b c c
d j e k f l 3 a d b e c f 4 a g b h c i

PAGE 7 1 a 6, 8, 12: $12 = 6 + 8 - 2$ b 6, 8, 12: $12 = 6 + 8 - 2$ c 5, 6, 9: $9 = 5 + 6 - 2$ d 5, 5, 8: $8 = 5 + 5 - 2$

e 5, 5, 8: $8 = 5 + 5 - 2$ f 4, 4, 6: $6 = 4 + 4 - 2$ g 7, 10, 15: $15 = 7 + 10 - 2$ h 8, 12, 18: $18 = 8 + 12 - 2$

i 10, 16, 24: $24 = 10 + 16 - 2$ 2 a sphere b 1 c curved d 0 e 0 3 a cone b 2 c 1 d 1 e curved, flat

PAGE 8 1 a C b A c B 2 a  b  c  d  3 a triangular prism b triangular pyramid c cone d cylinder

PAGE 9 1 90° 2 60° 3 30° 4 90° 5 30° 6 30° 7 no 8 yes 9 no 10 yes 11 6 12 12 13 5 14 triangular prism
15 sphere

PAGE 10 1 B 2 C 3 B 4 A 5 C 6 A 7 A 8 C 9 B 10 A 11 D 12 D

PAGE 11 1 6 2 12 3 acute angle 4 90° 5 $\angle ACD$, $\angle BCD$ 6 140° 7 360° 8 90° 9 50° 10 4 11 reflex 12 pentagon
13 2 14 no 15 yes