UNIQUE STUDY POINT

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Class: VI	**Subject:** Mathematics	**Session:** 2025-26
Chapter: 08 - Playing with Constructions	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

Q.1. What shape is formed by joining all points at a fixed distance from a central point?

(a) Square

(b) Rectangle

(c) Circle

(d) Triangle

Q.2. Which property is common to both a square and a rectangle?

(a) All sides are equal

(b) All angles are 90°

(c) Diagonals are unequal

(d) Only two sides are equal

Q.3. A line segment that passes through the center of a circle and has its endpoints on the circle is called:

(a) Radius

(b) Chord

(c) Diameter

(d) Arc

Q.4. In a square ABCD, which of the following is NOT a valid name?

(a) BCDA

(b) CDAB

(c) ACBD

(d) DCBA

Q.5. The corners of a rectangle are also called:

(a) Edges

(b) Vertices

(c) Centers

(d) Points

Q.6. Which of the following figures has all sides equal and all angles 90°?

(a) Rectangle only

(b) Square only

(c) Both rectangle and square

(d) Circle

Q.7. If a rectangle is rotated, it remains a:

(a) Square

(b) Circle

(c) Rectangle

(d) Triangle

Q.8. The length of the radius is:

(a) Double the diameter

(b) Half the diameter

(c) Equal to the diameter

(d) Four times the diameter

Q.9. How many pairs of opposite sides does a rectangle have?

(a) 1

(b) 2

(c) 3

(d) 4

Q.10. A perpendicular line makes an angle of:

(a) 45°

(b) 60°

(c) 90°

(d) 180°

SECTION B - Short Answer Questions (2 marks each)

Q.11. What is a compass? Write its main use in geometry.

Q.12. Name the four corners and four sides of a square PQRS.

Q.13. Can a square be called a rectangle? Justify your answer.

Q.14. If the diagonal of a rectangle divides an angle into 30° and 60°, what can you say about the rectangle?

SECTION C - Short Answer Questions (3 marks each)

Q.15. Draw a square of side 4 cm. Draw both its diagonals. What do you observe about the point where the diagonals intersect?

Q.16. Explain how you can find a point that is equidistant from two given points A and B using a compass.

Q.17. A rectangle has sides 3 cm and 9 cm. Can it be divided into three identical squares? If yes, explain how. If no, explain why not.

SECTION D - Long Answer Question (5 marks)

Q.18. Construct a rectangle in which one of the diagonals divides the opposite angles into 60° and 30°. Write all steps of construction clearly. Also, verify that your figure satisfies the properties of a rectangle.

SECTION E - Case Study Based Questions (4 marks each)

Q.19. Case Study 1: School Playground

A school has a rectangular playground measuring 50 m by 30 m. The school management decides to mark a circular running track in the center with radius 10 m. Four square sandpits, each of side 5 m, are to be placed in the four corners of the playground.

Based on this information, answer the following:

(a) What is the perimeter of the playground? (1 mark)

(b) What is the distance across the circular track passing through its center? (1 mark)

(c) What is the total area occupied by the four square sandpits? (2 marks)

Q.20. Case Study 2: Geometry Project

In a geometry project, students are asked to create designs using squares and circles. Amit draws a square ABCD with side 8 cm. He then marks a point P that is 8 cm away from both corners A and B.

Answer the following based on Amit's work:

(a) What is the perimeter of the square ABCD? (1 mark)

(b) How can Amit locate point P using a compass? (1 mark)

(c) If Amit draws circles with radius 8 cm from points A and B, at how many points will these circles intersect? Explain. (2 marks)

DETAILED ANSWER KEY - PAPER 04

SECTION A - Answers to MCQs

1. (c) Circle

A circle is formed by joining all points at a fixed distance from a central point.

2. (b) All angles are 90°

Both squares and rectangles have all angles equal to 90°.

3. (c) Diameter

A diameter is a line segment that passes through the center and has endpoints on the circle.

4. (c) ACBD

ACBD is not a valid name as it does not follow the order of travel around the square.

5. (b) Vertices

The corners of a rectangle are called vertices (singular: vertex).

6. (b) Square only

Only a square has both all sides equal and all angles 90°.

7. (c) Rectangle

When a rectangle is rotated, it remains a rectangle as its properties don't change.

8. (b) Half the diameter

The radius is half the length of the diameter.

9. (b) 2

A rectangle has 2 pairs of opposite sides.

10. (c) 90°

A perpendicular line makes an angle of 90° with another line.

SECTION B - Answers to Short Answer Questions

11.

A compass is a geometric instrument with two legs: one with a pointed end and another with a pencil.

Main use: A compass is primarily used to draw circles and arcs of specific radii.

12.

Four corners: P, Q, R, and S
Four sides: PQ, QR, RS, and SP

13.

Yes, a square can be called a rectangle.

Justification: A square satisfies both properties of a rectangle:
- Opposite sides are equal (in fact, all sides are equal)

- All angles are 90°
Therefore, every square is a special type of rectangle.

14.

If the diagonal divides an angle into 30° and 60°, then 30° + 60° = 90°.
This confirms that the angle is a right angle, which satisfies the rectangle property that all angles are 90°.

SECTION C - Answers to Short Answer Questions

15.

[Student should draw a square of side 4 cm and draw both diagonals]

Construction: Square ABCD with side 4 cm is drawn.
Diagonals AC and BD are drawn.

Observation: The two diagonals intersect at their midpoint, dividing each diagonal into two equal parts. The point of intersection is equidistant from all four corners of the square.

16.

Method to find a point equidistant from A and B:
Step 1: Open the compass to a radius greater than half the distance between A and B.
Step 2: With A as center, draw an arc above and below the line AB.
Step 3: With the same radius and B as center, draw arcs to intersect the previous arcs.
Step 4: Mark the points where the arcs intersect. These points are equidistant from both A and B.

17.

Yes, the rectangle can be divided into three identical squares.

Explanation: The rectangle has sides 3 cm and 9 cm.
Since 9 = 3 × 3, the length is exactly three times the breadth.
Therefore, we can divide the rectangle into three squares, each of side 3 cm.
Each square will have all sides equal to 3 cm.

SECTION D - Answer to Long Answer Question

18.

Steps of Construction:

Step 1: Draw a line segment AB of any convenient length (say 6 cm).
Step 2: At point A, use a protractor to mark an angle of 60° with AB.
Step 3: Draw a line along this 60° angle.
Step 4: At point B, construct a perpendicular to AB using a protractor or set square.
Step 5: Mark point C where the perpendicular from B meets the line from A.
Step 6: From point C, construct a perpendicular to BC.
Step 7: From point A, construct a perpendicular to AB.
Step 8: Mark point D where these two perpendiculars meet.
Step 9: Join all four points to complete rectangle ABCD.

Verification:
- Measure angles at A, B, C, D (all should be 90°) ✓
- Measure AB and CD (should be equal) ✓
- Measure BC and AD (should be equal) ✓
- Check that diagonal AC divides angle A into 60° and 30° ✓
Therefore, ABCD is a rectangle.

SECTION E - Answers to Case Study Based Questions

19. Case Study 1: School Playground

(a) Perimeter of playground = 2(length + breadth)
= 2(50 + 30) = 2 × 80 = 160 m

(b) Distance across the circular track passing through center = Diameter
= 2 × radius = 2 × 10 = 20 m

(c) Area of one square sandpit = side × side = 5 × 5 = 25 m^2
Total area of 4 sandpits = 4 × 25 = 100 m^2

20. Case Study 2: Geometry Project

(a) Perimeter of square ABCD = 4 × side = 4 × 8 = 32 cm

(b) Amit can locate point P by:
- Drawing an arc of radius 8 cm with center at A
- Drawing another arc of radius 8 cm with center at B
- The point where these two arcs intersect is point P

(c) The two circles will intersect at 2 points.
Explanation: When two circles have the same radius and their centers are at a distance equal to one radius apart (AB = 8 cm, which equals the radius), the circles will intersect at exactly two points - one above the line AB and one below the line AB.
