CLASS IX – MATHEMATICS

Chapter Test: Quadrilaterals

(Ganita Manjari, Grade 9, Part II – Chapter 12)

Time: 1½ Hours **M. M.: 40**

General Instructions:

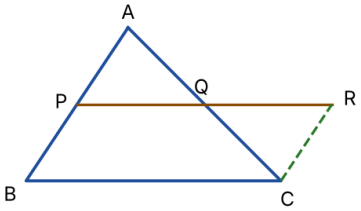
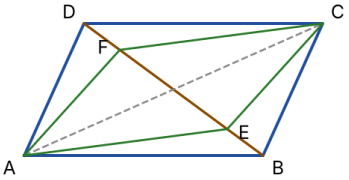
1. This paper contains 21 questions. All questions are compulsory.
2. This paper is divided into 5 sections: **A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1** to **10** are MCQs and questions no. **11** and **12** are Assertion-Reason based questions of 1 mark each.
4. In **Section B**, Questions no. **13** to **16** are Very Short Answer type questions carrying 2 marks each.
5. In **Section C**, Questions no. **17** and **18** are Short Answer type questions carrying 3 marks each.
6. In **Section D**, Questions no. **19** and **20** are Long Answer type questions carrying 5 marks each.
7. In **Section E**, Question no. **21** is a case based question carrying 4 marks. Internal choice is provided in the 2 marks part of the case study.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 1 part of Section E.
9. Figures are not drawn to scale. Give reasons for your steps wherever required.
10. Use of calculator is **not** allowed.

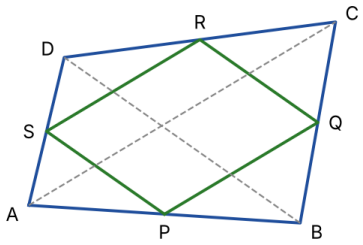
Q. No.	Section – A	Marks
1.	In a parallelogram ABCD, $\angle A = 72°$. Then $\angle B$ is equal to (A) 72° (B) 108° (C) 18° (D) 118°	**[1]**
2.	The adjacent sides of a parallelogram are 8 cm and 5 cm. Its perimeter is (A) 13 cm (B) 40 cm (C) 26 cm (D) 18 cm	**[1]**
3.	The diagonals AC and BD of a parallelogram ABCD intersect at O. If AC = 12 cm and BD = 18 cm, then OD is (A) 6 cm (B) 12 cm (C) 18 cm (D) 9 cm	**[1]**
4.	Which of the following is **not** always true for a parallelogram? (A) Its opposite sides are equal (B) Its opposite angles are equal (C) Its diagonals bisect each other (D) Its diagonals are equal	**[1]**
5.	In ΔABC, D and E are the midpoints of AB and AC respectively. If BC = 18 cm, then DE is (A) 9 cm (B) 18 cm (C) 36 cm (D) 4.5 cm	**[1]**
6.	Three angles of a quadrilateral are 85°, 110° and 70°. The fourth angle is (A) 85° (B) 95° (C) 105° (D) 75°	**[1]**
7.	A parallelogram whose diagonals are equal is a (A) rhombus (B) kite (C) rectangle (D) trapezium	**[1]**
8.	Two adjacent angles of a parallelogram are $(2x + 10)°$ and $(3x - 20)°$. The value of x is (A) 30 (B) 38 (C) 36 (D) 40	**[1]**
9.	The sides of a triangle are 10 cm, 14 cm and 18 cm. The perimeter of the triangle formed by joining the midpoints of its sides is (A) 42 cm (B) 14 cm (C) 21 cm (D) 28 cm	**[1]**
10.	The quadrilateral formed by joining the midpoints of the sides of any quadrilateral (in order) is always a (A) parallelogram (B) rectangle (C) rhombus (D) square	**[1]**

Q. No.	Section – A	Marks
	Questions number 11 and 12 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer from the options (A), (B), (C) and (D) as given below. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true but Reason (R) is false. (D) Assertion (A) is false but Reason (R) is true.	
11.	**Assertion (A):** The diagonals of every parallelogram are equal in length. **Reason (R):** The diagonals of a parallelogram bisect each other.	**[1]**
12.	**Assertion (A):** In ΔABC, D and E are the midpoints of AB and AC. If DE = 5 cm, then BC = 10 cm. **Reason (R):** The segment joining the midpoints of two sides of a triangle is parallel to the third side and half of it.	**[1]**

Q. No.	Section – B	Marks
13.	In a parallelogram ABCD, $\angle A = (4x + 5)°$ and $\angle C = (6x - 25)°$. Find the value of x and the measures of all four angles of the parallelogram.	**[2]**
14.	(A) The diagonals PR and QS of a parallelogram PQRS meet at O. If PO = $(2x + 3)$ cm and OR = $(4x - 7)$ cm, find x and the length of PR. **OR** (B) In a quadrilateral ABCD, AB = CD = 6.4 cm and BC = DA = 4.1 cm. Is ABCD a parallelogram? Name the property you use.	**[2]**
15.	In ΔABC, AB = 16 cm, BC = 22 cm and CA = 14 cm. D, E and F are the midpoints of BC, CA and AB respectively. Find the perimeter of ΔDEF.	**[2]**
16.	(A) Two adjacent angles of a parallelogram are in the ratio 2 : 3. Find all the angles of the parallelogram. **OR** (B) State true or false, with a reason: (i) A parallelogram with a right angle is a rectangle. (ii) A rhombus with perpendicular diagonals is a square.	**[2]**

Q. No.	Section – C	Marks
17.	(A) The diagonal AC of a parallelogram ABCD bisects ∠A. Show that ABCD is a rhombus. **OR** (B) Show that if one pair of opposite sides of a quadrilateral is equal and parallel, then the quadrilateral is a parallelogram.	**[3]**
18.	(A) The medians AD and BE of ΔABC meet at G. If AG = 14 cm and BE = 21 cm, find GD, BG and GE. **OR** (B) P, Q, R and S are the midpoints of the sides AB, BC, CD and DA of a quadrilateral ABCD. If AC = 10 cm and BD = 14 cm, name the type of quadrilateral PQRS and find its perimeter.	**[3]**

Q. No.	Section – D	Marks
19.	(A) Prove that the segment joining the midpoints of two sides of a triangle is parallel to the third side and is half of it. (In the figure, P and Q are the midpoints of AB and AC; the line through C parallel to BA meets PQ produced at R.)  **OR** (B) Prove that the quadrilateral formed by joining the midpoints of the sides of a quadrilateral ABCD, taken in order, is a parallelogram. [4] If AC = BD, what special parallelogram is it? Give a reason. [1]	**[5]**
20.	(A) ABCD is a parallelogram. E and F are points on the diagonal BD such that BE = DF.  (i) Prove that AECF is a parallelogram. [3] (ii) If BD = 20 cm and BE = 4 cm, find EF. [1] (iii) If AC = 12 cm also, what special parallelogram is AECF? Give a reason. [1] **OR** (B) ABCD is a trapezium with AB ∥ DC. E is the midpoint of AD, and the line through E parallel to AB meets BC at F. Prove that F is the midpoint of BC. [3] Show that EF = ½(AB + CD). [1] If AB = 18 cm and CD = 12 cm, find EF. [1]	**[5]**

Q. No.	Section – E	Marks
21.	**Case Study:** A farmer owns a four-sided field ABCD. The diagonals are AC = 80 m and BD = 60 m. He fixes a post at the midpoint of each side: P on AB, Q on BC, R on CD and S on DA, and runs a wire PQ, QR, RS, SP joining the posts in order.  (i) What type of quadrilateral is PQRS? **[1]** (ii) Find the length of wire needed to go once around PQRS. **[1]** (iii) (A) The farmer wants PQRS to be a rectangle. What must be true about the diagonals AC and BD of the field? Give a reason. **[2]** **OR** (iii) (B) A second wire is laid along the diagonals PR and QS of PQRS. If PR = 52 m and QS = 46 m, and they meet at T, find PT and TS. Give a reason. **[2]**	**[4]**