Delhi Public School, Howrah

PERIODIC ASSESSMENT – 2 (2024 - 2025)

Class - IX

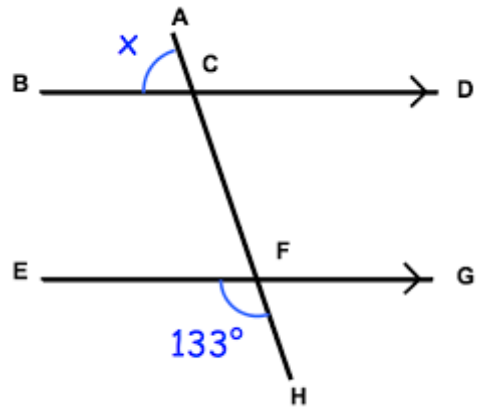
Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

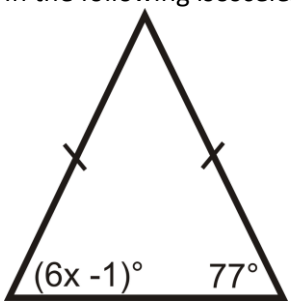
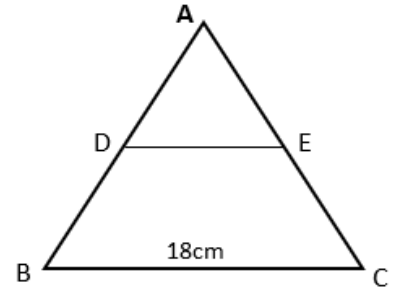
Subject: Mathematics (Code No-041)

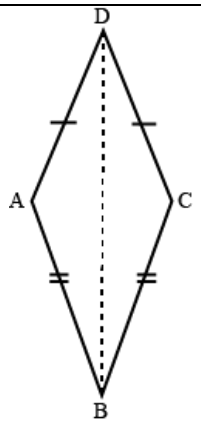
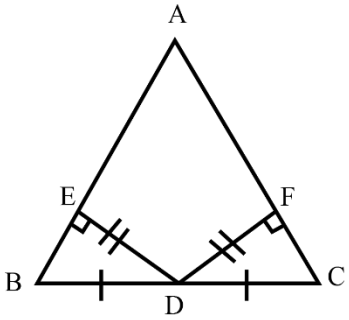
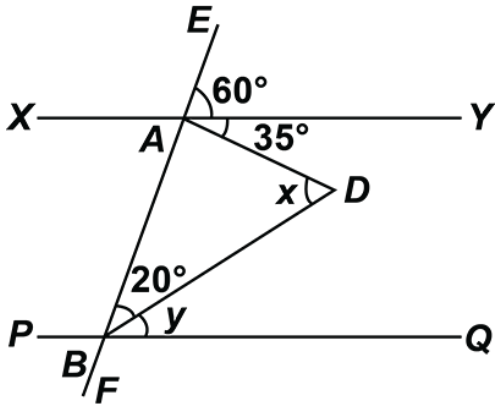
Time: 3 Hours **F.M. 80**

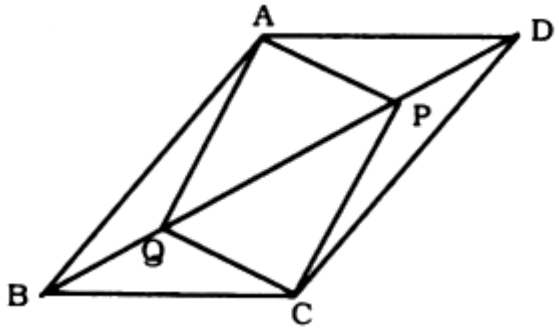
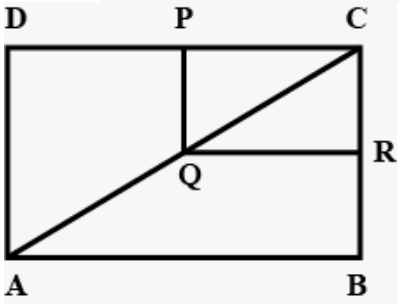
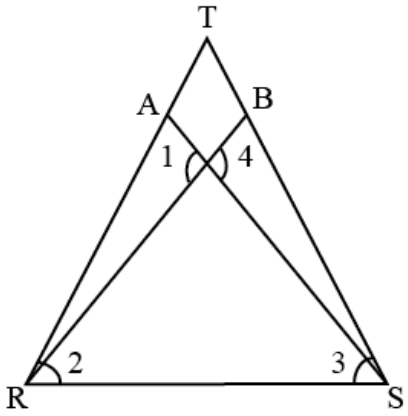
General Instructions:

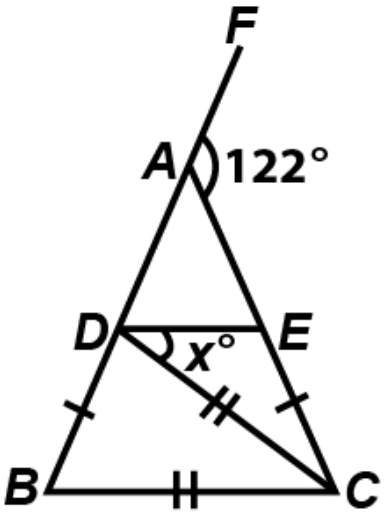
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

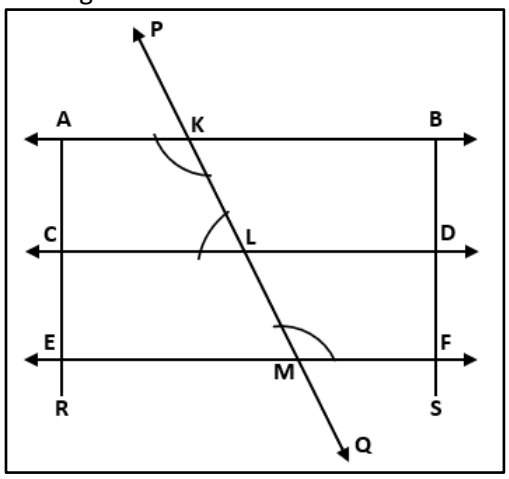
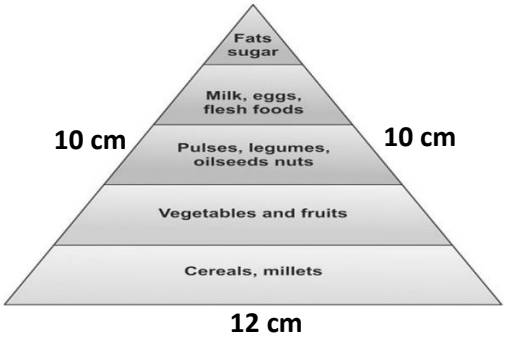
	SECTION A	
	Section A consists of 20 questions of 1 mark each.	
1.	The rationalisation factor of $3-\sqrt{7}$ is (a) $\sqrt{7}-3$ (b) $3+\sqrt{7}$ (c) $\sqrt{3}-7$ (d) $\sqrt{3}+7$	1
2.	If $(x-2)$ is a factor of x^3-2x^2+p, then the value of p is (a) -1 (b) 1 (c) -2 (d) 0	1
3.	The ordinate of a point is negative in: (a) II and III quadrants (b) III quadrant only (c) III and IV quadrants (d) IV quadrant only	1
4.	An exterior angle of a triangle is 105° and its two interior opposite angles are equal. Each of these equal angles is (a) $37\frac{1}{2}^\circ$ (b) $52\frac{1}{2}^\circ$ (c) $72\frac{1}{2}^\circ$ (d) 75°	1
5.	Which of the following statements is FALSE? (a) Only one line can pass through a single point. (b) Only one line can pass through two distinct points. (c) A terminated line can be produced indefinitely on both the sides. (d) If two circles are equal, then their radii are equal.	1
6.	In the following figure, the value of x is:  (a) $133°$ (b) $45°$ (c) $100°$ (d) $47°$	1
7.	If $'m'$ is a positive integer which is not a perfect square, then the value of $\sqrt{m}$ is: (a) A natural number (b) An irrational number (c) An integer (d) A rational number	1
8.	The consecutive angles of a parallelogram are: (a) Complementary (b) Supplementary (c) Equal (d) None of these	1

9.	If $(x+3,5)=(6,y-3)$, then the coordinates (x,y) are: (a) $(-3,2)$ (b) $(-3,8)$ (c) $(-3,-8)$ (d) $(3,8)$	1
10.	The area of an equilateral triangle with side 2 cm is: (a) $\sqrt{6}\ cm^2$ (b) $\sqrt{3}\ cm^2$ (c) $\sqrt{8}\ cm^2$ (d) $4\ cm^2$	1
11.	If $3x-2y+z=0$, then the value of $27x^3-8y^3+z^3$ is: (a) $-6xyz$ (b) $-18xyz$ (c) $18xyz$ (d) $6xyz$	1
12.	In the following isosceles triangle, the value of x is:  (a) $11°$ (b) $12°$ (c) $13°$ (d) $14°$	1
13.	Which option shows the equation $5y-8x=7(x+y)-9$ expressed in the form of $ax+by+c=0$? (a) $-x+6y-9=0$ (b) $-x+12y-9=0$ (c) $15x+2y-9=0$ (d) $8x+5y+0=0$	1
14.	If two complementary angles are in the ratio 7 : 3, then the angles are: (a) $45°, 45°$ (b) $63°, 27°$ (c) $60°, 30°$ (d) $50°, 40°$	1
15.	The simplified form of $\left(-\frac{1}{27}\right)^{-2/3}$ is: (a) $\frac{1}{9}$ (b) – 9 (c) 9 (d) $-\frac{1}{9}$	1
16.	If the point P lies in between M and N and C is the mid-point of MP, then (a) $MC+PN=MN$ (b) $MP+CP=MN$ (c) $MC+CN=MN$ (d) $CP+CN=MN$	1
17.	What is the length of DE if DE || BC and D and E are midpoints of AB and AC?  (a) 18 cm (b) 15 cm (c) 9 cm (d) 20 cm	1
18.	The equation of the Y-axis is: (a) x = 0 (b) x = y (c) y = 0 (d) x + y = 0	1
19.	In the questions 19 and 20, a statement of Assertion is followed by a statement of Reason. Mark the correct choice as: (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion. (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion. (c) Assertion is true but Reason is false. (d) Assertion is false but Reason is true. **Assertion:** If the ordinate of a point is equal to its abscissa, then the point lies either in the Quadrant-I or in the Quadrant-III. **Reason:** A point whose both coordinates are negative, will lie in Quadrant-II.	1
20.	**Assertion:** If the opposite angles of a parallelogram are $(2x-2)°$ and $(52-x)°$, then the measure of one angle is $34°$. **Reason:** Opposite angles of a parallelogram are equal.	1
	SECTION B	
	Section B consists of 5 questions of 2 marks each.	
21(a).	Show that 2.35353535…=$2.\overline{35}$ can be expressed in the form of $\frac{p}{q}$, where p and q are integers and q≠0.	2

	OR	
21(b).	Find two different irrational numbers between the rational numbers $\frac{2}{11}$ and $\frac{1}{4}$.	2
22.	Write the co-ordinates of any two points whose abscissa is 2 less than the ordinate.	2
23(a).	In the given figure, AD = CD and AB = CB. Prove that (i) $\triangle ABD \cong \triangle CBD$ (ii) BD bisects $\angle ABC$ 	2
	OR	
23(b).	In the given figure, ED = DF, BD = DC, DE ⊥ AB and DF ⊥ AC. Prove that AB = AC. 	2
24.	In a parallelogram, show that the angle bisectors of two adjacent angles intersect at right angles.	2
25.	In which quadrant, will the points lie, if (i) The ordinate is 2 and the abscissa is – 3. (ii) The abscissa is – 4 and the ordinate is – 2. (iii) The ordinate is – 3 and the abscissa is 4. (iv) The ordinate is 3 and the abscissa is – 2.	2
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
26(a).	If $x = 0$ and $x = -1$ are the zeroes of the polynomial $f(x) = 2x^3 - 3x^2 + ax + b$, find the value of a and b.	3
	OR	
26(b).	If $z^2 + \frac{1}{z^2} = 34$, find the value of $z^3 + \frac{1}{z^3}$.	3
27.	Represent $\sqrt{4.9}$ on the number line.	3
28.	If the bisector of an angle of a triangle also bisects the opposite side, prove that the triangle is isosceles.	3
29.	In the adjoining figure, XY || PQ and EF is the transversal. Find the values of x and y. 	3

30(a).	In parallelogram ABCD, two points P and Q are taken on diagonal BD such that DP = BQ. Show that  (i) △APD ≅ △CQB (ii) AP = CQ	3
	OR	
30(b).	In the given figure, ABCD and PQRC are rectangles and Q is the mid-point of AC. Prove that: (i) DP = PC (ii) PR = $\frac{1}{2}$ AC  	3
31.	Factorize: $2x^3 - x^2 - 13x - 6$	3
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	
32.	If $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$, then find the value of $x + y + xy$.	5
33(a).	If $a + b + c = 0$, then prove that $\frac{(b+c)^2}{3bc} + \frac{(c+a)^2}{3ac} + \frac{(a+b)^2}{3ab} = 1$	5
	OR	
33(b).	If both $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, then show that $p = r$	5
34(a).	In the given figure, it is given that RT = TS, ∠1 = 2∠2 and ∠4 = 2∠3. Prove that △RBT ≅ △SAT.  	5
	OR	
34(b).	In the given figure, AB = AC, CD = CB and DE || BC. If ∠CAF = 122°, then find the value of x.	5

		
35.	P, Q, R and S are respectively the mid-points of the sides AB, BC, CD and DA of a quadrilateral ABCD in which AC = BD. Prove that PQRS is a rhombus.	5
	SECTION E	
	Section E consists of 3 questions of 4 marks each.	
36.	**Case Study-1** Vehicle parking is the major problem in any metropolitan city. In Delhi at Chandni Chowk, the parking charge of a two-wheeler is ₹ 20 for the first hour and ₹ 5 for next subsequent hours.  On the basis of the above information, solve the following questions:	
	(a) Write a linear equation based on the given statement.	1
	(b) Find the parking charge of a two-wheeler for 5 hours.	1
	(c) Find the 4 solutions of the linear equation obtained in question (a).	2
	OR	
	(d) For how many hours the parking charge of a two-wheeler will be ₹ 60.	2

37.	**Case Study-2** A vertical hanging garden is built opposite to the entrance gate of a hotel. To make it environmental friendly it was made up of bamboo poles. On the two vertical poles AR and BS which were dug inside the ground, three horizontal poles AB, CD and EF of equal sizes were tied parallel to the ground. To give the structure some stability and beauty, another pole PQ was tied to the poles AB, CD and EF as shown in the given figure. Ornamental and flowering plants are to be hanged on these three parallel poles. The poles AR and BS are perpendicular to the ground and PQ intersects the three parallel poles at K, L and M. Also, the angles ∠CLK and ∠LMF are in the ratio 3 : 7.   Based on the above information and the given figure, answer the following questions:	
	(a) If ∠AKL=$(2x-10)°$ and ∠LMF=$(x+5)°$, find the value of x.	1
	(b) **Statement-1**: ∠KLC = ∠DLM ; **Statement-2**: ∠KLC = ∠DLK Which of the above statements is true? Justify your answer	1
	(c) What is the sum of ∠KLC and ∠LMF?	2
	OR	
	(d) What is the value of ∠AKL?	2
38.	**Case Study-3** A food pyramid is a representation of the optional number of servings to be eaten each day from each of basic food groups. It is designed to make healthy eating easier. There are many health-care NGOs in India, who are working for underprivileged children. In rural areas health statistics are continued too poor. In this direction Health Care India has made the children under the age of 13 aware of "food pyramid" by telling the importance of different food groups such as carbohydrates, fats, vitamins, proteins, minerals etc. The models of food pyramid which they have used is a triangle with sides 10 cm, 10 cm and 12 cm.  	
	(a) Find the semi-perimeter of the triangle.	1
	(b) If the length of the base is 10 cm instead of 12 cm, then find the area of the triangle.	1
	(c) Find the area of the food pyramid which is in shape of a triangle of sides 10 cm, 10 cm and 12 cm respectively.	2
	OR	
	(d) Find the height of the triangle with respect to the base 12 cm.	2

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