INDIAN SCHOOL AL WADI AL KABIR

Pre-Mid-Term Examination (2024-25)

Class: IX | Sub: MATHEMATICS | Max Marks: 30

Date:02-06-24 | SET I | Time:1 hour

General Instructions:

1. This question paper has 4 sections- A - D.
2. Section A- PART-1 (MCQ) comprises of 6 questions of 1 mark each.
3. Section A- PART-2 (Assertion and Reason) comprises of 1 question of 1 mark each.
4. Section B comprises of 3 questions of 2marks each.
5. Section C comprises of 3 questions of 3 marks each.
6. Section D comprises of 2 Case based integrated units of assessment (4 marks each) with sub-parts of the values 1, 1 and 2 marks each respectively.
7. All questions are compulsory. An internal choice has been provided.

Section A

PART-1(MCQ-1 mark each)

Q.1.	If the side of an equilateral triangle is $3\sqrt{3}$ cm, then perimeter of this triangle is:							
			B	$9\sqrt{3}$ cm				
Q.2.	An irrational number in between $\frac{2}{5}$ and $\frac{3}{5}$:							
					C	0.4104100…	D	
Q.3.	Area of a right triangle if perimeter is 24m hypotenuse is 10 and one of the side is 6m:							
					C	$24\ m^2$		
Q.4.	Find the value of $\left(7^{\frac{5}{3}} \div 7^{\frac{4}{3}}\right) \times 7^{\frac{-1}{3}}$ is:							
					C	1		
Q.5.	A paper cut out which is in the shape of a triangle whose two sides are equal in measure and the third side is 18cm. If the perimeter is 42cm, then the length of each equal side is:							
					C	12cm		
Q.6.	The simplest rationalising factor of $\frac{5}{\sqrt{63}}$ is:							
			B	$\sqrt{7}$				

Section A

PART-2 ASSERTION AND REASON TYPE QUESTIONS (1 mark each)

	DIRECTION: A statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option. (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. **ANSWER** (d) Assertion (A) is false but Reason (R) is true.
Q.7.	Assertion(A): the rationalising factor of $5-2\sqrt{6}$ is $5+2\sqrt{6}$. Reason(R): the product of non-zero rational number with irrational number is rational.
	Section B (2 marks each)
Q.8.	Express 23.5777… in the form of $\frac{p}{q}$, where p, q are integers and q≠0. $x = 23.57777$ .... $10x = 235.7777$ ….. (½) 100 x =2357.7777…. (½) 90x =2122 (½) $x = \frac{2122}{90} = \frac{1061}{45}$ (½)
Q.9.	Simplify and find the value of: $5 \times \sqrt[3]{27} + 7\sqrt[5]{32} - \sqrt[3]{216}$ $5 \times 3 + (7 \times 2) - 6$ (½ + ½ + ½) $= 15 + 14 - 6 = 23$ (½) (OR) Find the value of $\left(\frac{1}{4}\right)^{-2} - 3 \times 8^{\frac{2}{3}} \times 4^0 + \left(\frac{9}{16}\right)^{\frac{-1}{2}}$ $=4^2 - 3 \times 2^{3\times\frac{2}{3}} \times 1 + \left(\frac{16}{9}\right)^{\frac{1}{2}}$ (½ + ½) $= 16 - 12 + \frac{4}{3} = 4 + \frac{4}{3} = \frac{16}{3}$ (½ + ½)
Q.10.	The perimeter of a triangular field is 120m and its sides are in the ratio 3: 4: 5 Find the length of its sides and find the area of the triangle. $3x, 4x \text{ and } 5x$ are sides. $3x + 4x + 5x = 120$ $12x = 120$

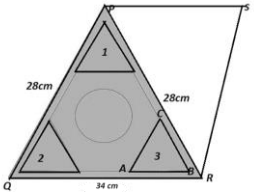
	$x = \frac{120}{12}$ =10 30cm, 40cm and 50cm. (½ + ½) Area of triangle = $\frac{1}{2} \times bh = \frac{1}{2} \times 30 \times 40 = 600$ cm^2 (½ + ½)
	Section C (3 marks each)
Q.11.	Represent $\sqrt{3}$ on a number line. No. line with proper marking (1) Two perpendiculars (½ + ½) Marking $\sqrt{3}$ (½ + ½)
Q.12.	Find the cost of laying grass in a triangular field of sides 50m, 65m and 65m at the rate of ₹ 10 per m^2 S = $\frac{50+65+65}{2}$ =90cm (½) Area = $\sqrt{s(s-a)(s-b)(s-c)} = \sqrt{90(90-50)(90-65)(90-65)}$ (½ + ½) =$\sqrt{90 \times 40 \times 25 \times 25}$ = $25 \times 10 \times 2 \times 3 = 1500$ (½ + ½) Cost = 1500 ×10 = ₹ 15000 (½)
Q.13.	Rationalise the denominator and find the values of a and b, if $\frac{\sqrt{5}+2}{\sqrt{5}-2}$ = a + $\sqrt{5}$ b $\frac{\sqrt{5}+2}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2} = \frac{(\sqrt{5}+2)^2}{\sqrt{5}^2-2^2}$ (½ + ½ + ½) $= 5 + 4 + 4\sqrt{5} = 9 + 4\sqrt{5}$ (½ + ½) $a = 9,\ b = 4$ (½) (OR) If $x = \frac{2}{\sqrt{10}-\sqrt{8}}$ and $y = \frac{2}{\sqrt{10}+\sqrt{8}}$, then find the value of $(x-y)^2$. $x = \frac{2}{\sqrt{10}-\sqrt{8}} \times \frac{\sqrt{10}+\sqrt{8}}{\sqrt{10}+\sqrt{8}} = \frac{2(\sqrt{10}+\sqrt{8})}{2} = \sqrt{10}+\sqrt{8}$ (½ + ½) $y = \frac{2}{\sqrt{10}+\sqrt{8}} \times \frac{\sqrt{10}-\sqrt{8}}{\sqrt{10}-\sqrt{8}} = \frac{2(\sqrt{10}-\sqrt{8})}{2} = \sqrt{10}-\sqrt{8}$ (½ + ½) $(x-y)^2 = = (\sqrt{10}+\sqrt{8}-\sqrt{10}+\sqrt{8})^2$ $= (2\sqrt{8})^2 = 32$ (½ + ½)
	Section D

	(CASE STUDY BASED QUESTIONS – 4 MARKS EACH)	
Q.14.	CASE STUDY BASED-I Ravish and Aarush decide to visit the world book fair which is organized every year. During their visit Ravish was fascinated by the cover page of a book with π, e and other irrational numbers. They were discussing more about irrational numbers and their operations, rationalising the denominator of an irrational number and rationalising factors. Some of their discussions are given below. Based on the knowledge of irrational numbers, answer the following questions.	
(i)	Find any two rational numbers between $\frac{3}{4}$ and $\frac{4}{5}$. Any two rational no. (½ + ½)	1m
(ii)	Simplify: $3\sqrt{162} + \sqrt{98} - 5\sqrt{45}$ $3\times 9\sqrt{2} + 7\sqrt{2} - 5\times 3\sqrt{5} = 34\sqrt{2} - 15\sqrt{5}$ (½ + ½)	1m
(iii)	a) Simplify: $(4\sqrt{3} + 5)(\sqrt{3} + 7)$ $= (4\sqrt{3}\times\sqrt{3}) + (4\sqrt{3}\times 7) + 5\sqrt{3} + 35$ (½ + ½) $= 12 + 35 + 33\sqrt{3} = 47 + 33\sqrt{3}$ (½ + ½) OR b) If $a = \frac{1}{3-2\sqrt{2}}$ and $b = \frac{1}{a}$, then find the value of $a + b$ $a = \frac{1}{3-2\sqrt{2}}\times\frac{3+2\sqrt{2}}{3+2\sqrt{2}} = \frac{3+2\sqrt{2}}{9-8} = 3 + 2\sqrt{2}$ (½ + ½) $b = \frac{1}{a} = 3 - 2\sqrt{2}$ (½) $a+b = 3 + 2\sqrt{2} + 3 - 2\sqrt{2} = 6$ (½)	2m

Q.15. CASE STUDY BASED-II

Triangular shapes offer versatility and aesthetic appeal in both interior design and floral arrangements.

Mr. Sharma's choice of triangular tiles for the interior work of his house reflects a contemporary and innovative approach to design. By opting for triangular tiles, he introduces a dynamic geometric element that enhances the visual interest of his living space. These tiles can be arranged in various patterns, from classic grids to more intricate tessellations, allowing for endless possibilities in terms of layout and creativity. The triangular shape lends a modern and sophisticated feel to the rooms, creating a unique ambiance that stands out from traditional square or rectangular tiles. Mr. Sharma's decision to use triangular tiles with the following types and dimensions.



(i)	Find the semi-perimeter of the triangular design PQR. S = $\frac{28+28+34}{2} = \frac{90}{2}$ =45cm (½ + ½)	1m
(ii)	Mr. Sharma has a plan to extend one part of the design as it is in the shape of a triangle PSR, its two sides, PS and SR, are at the ratio 5: 6 and its perimeter is 61cm. Then find the two sides of the extended portion. $5x + 6x + 28 = 61$ (½) $11x = 61 - 28 = 33$ $x = \frac{33}{11} = 3$ (½) $two\ sides\ are:\ 5 \times 3 = 15, 6 \times 3 = 18cm$ (½ + ½)	1m
(iii)	a) Find the area of triangular portion PQR. S = $\frac{28+28+34}{2} = \frac{90}{2}$ =45 (½) Area = $\sqrt{s(s-a)(s-b)(s-c)}$ (½) =$\sqrt{45(45-28)(45-28)(45-34)}$ =$\sqrt{45 \times 17 \times 17 \times 11}$ (½) = $51\sqrt{5 \times 11} = 51\sqrt{55}$ (½) OR Area of one triangle = $\frac{\sqrt{3}a^2}{4} = \frac{\sqrt{3} \times 12 \times 12}{4} = 36\sqrt{3}$ cm^2 (½ + ½) Area of 3 triangles = $3 \times 36\sqrt{3}$ cm^2 =$108\sqrt{3}cm^2$ (½) the length of the tape required to put the border of three triangles =$3 \times 3 \times 12 = 108cm$ (½)	2m

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