INDIAN SCHOOL AL WADI AL KABIR

Annual Examination 2022-23

SUB: Mathematics (041) Set 1

Date:02/03/2023 Time Allowed :3 hours

Class: IX Maximum Marks: 80

General Instructions:

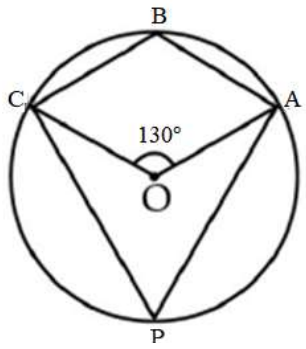
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 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 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$, wherever required if not stated.

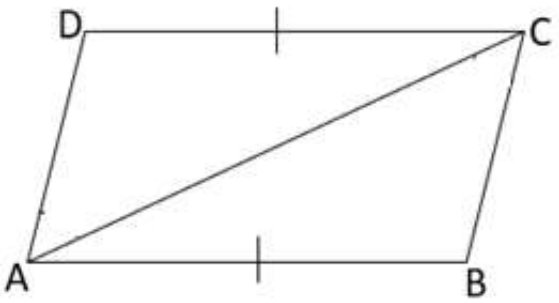
SECTION A

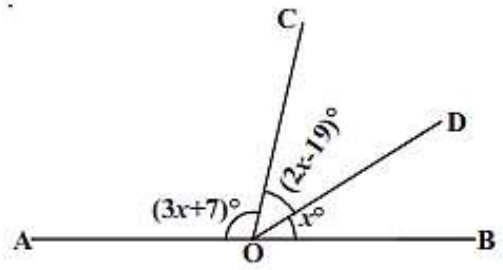
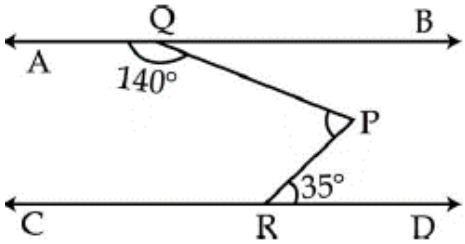
Section A consists of 20 questions of 1 mark each.

1	The zero of the polynomial p(x) = 3x – 2 is:						
	(A)	0	**(B)**	$\frac{2}{3}$	**(C)**	$\frac{3}{2}$	**(D)** $\frac{-2}{3}$
2	Euclid stated that all right angles are equal to each other in the form of:						
	(A)	an axiom	**(B)**	a definition			
	(C)	a postulate	**(D)**	a proof			
3	Volume of right circular cone of radius 6cm and height 7cm is:						
	(A)	1892 cm^3	**(B)**	66 cm^3	**(C)**	264 cm^3	**(D)** 132 cm^3

4	$\sqrt{12} \times \sqrt{8}$ is equal to:							
	(A)	$4\sqrt{6}$	**(B)**	$3\sqrt{6}$	**(C)**	$2\sqrt{6}$	**(D)**	$6\sqrt{6}$
5	The angles of a quadrilateral are in the ratio 2 : 3 : 6 : 7. The largest angle of the quadrilateral is:							
	(A)	120°	**(B)**	220°	**(C)**	180°	**(D)**	140°
6	The perimeter of an isosceles triangle is 32 cm. The ratio of equal side to the base is 3 : 2.The equal sides are of length:							
	(A)	20 cm	**(B)**	16 cm	**(C)**	8 cm	**(D)**	12 cm
7	The equation of a line parallel to y – axis is:							
	(A)	y = a; a is any real number			**(B)**	x = a; a is any real number		
	(C)	y = x			**(D)**	x + y = 0		
8	The total surface area of a hemisphere of radius r is:							
	(A)	$4\pi r^2$	**(B)**	πr^2	**(C)**	$2\pi r^2$	**(D)**	$3\pi r^2$
9	Which of the following is irrational?							
	(A)	$\frac{\sqrt{4}}{\sqrt{9}}$	**(B)**	$\frac{\sqrt{24}}{5\sqrt{6}}$	**(C)**	$\sqrt{7}$	**(D)**	$\sqrt{81}$
10	In ΔABC, AB = AC and ∠B = 50°. Then ∠A is equal to:							
	(A)	80°	**(B)**	50°	**(C)**	40°	**(D)**	130°
11	HELP is a parallelogram. Diagonals HL and EP intersect at O. If OE = 4 cm and HL is 5cm more than EP find OH.							
	(A)	8 cm	**(B)**	6.5 cm	**(C)**	13 cm	**(D)**	4.5 cm
12	The point whose ordinate is -5 and which lies on *y*-axis is:							
	(A)	(-5, 0)	**(B)**	(0, -5)	**(C)**	(5, -5)	**(D)**	(-5, 5)

13	In triangles ABC and PRQ, AB = PR and ∠ A = ∠P = 90°. The two triangles are congruent by RHS congruence if: **(A)** AC = PQ **(B)** AC = QR **(C)** BC = RQ **(D)** BC = PR							
14	In the figure, the magnitude of angle ABC if angle ∠AOC=130° will be:  **(A)** 160° **(B)** 65° **(C)** 50° **(D)** 115°							
15	The area of an equilateral triangle with side 60 cm is: **(A)** $90\sqrt{3}cm^2$ **(B)** $900cm^2$ **(C)** $900\sqrt{3}cm^2$ **(D)** $300\sqrt{3}cm^2$							
16	The value of $249^2 - 248^2$ is equal to: **(A)** 1^2 **(B)** 477 **(C)** 487 **(D)** 497							
17	The value of $(125)^{\frac{2}{3}}$ is: **(A)** 5 **(B)** 25 **(C)** 35 **(D)** 45							
18	AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm, the distance of AB from the centre of the circle is: **(A)** 8 cm **(B)** 15 cm **(C)** 4 cm **(D)** 17 cm							
	DIRECTION: In the question numbers 19 and 20, a statement of **assertion (A)** is followed by statement of **Reason (R)**. Choose the correct option.							

19	**Assertion(A)**: If (x + 1) is a factor of $f(x) = x^2 + ax + 2$, then a = -3. **Reason(R)**: If (x - a) is a factor of p(x), then p(a) = 0. (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.
20	**Assertion(A)**: If two complementary angles are in the ratio 3:6, the angles are 30° and 60°. **Reason(R)**: Two angles are said to be complementary if the sum of the angles is 90°. (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.
	SECTION B
	Section B consists of 5 questions of 2 marks each.
21	Express $0.\overline{23}$ in $\frac{p}{q}$ form where p and q are integers and q≠0.
22	In the given figure AB = CD, ∠DCA = ∠BAC. Prove that AD = CB. 

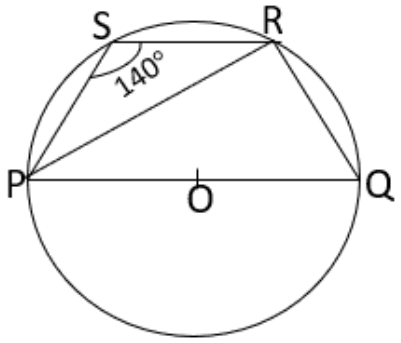
23	Express 8x + 2 = -5y in the form ax + by + c = 0 where a, b and c are real numbers and find the values of a, b and c. **OR** Find the value of 'm' so that x = 1 and y = 1 is a solution of the equation 5mx + 30my = 70.
24	In the adjacent figure, AB is a straight line. Find the value of *x* and also find ∠AOC. 
25	Find the cost of white-washing the outer curved surface of a hemispherical dome with radius 14 m at the rate of ₹ 50 per m^2. **OR** Find the diameter of a sphere whose surface area is 616 cm^2.
	SECTION C
	Section C consists of 6 questions of 3 marks each.
26	Factorise: $x^3 - 3x^2 - 10x + 24$
27	In the given figure, AB ∥ CD, ∠AQP=140° and ∠PRD=35°. Find ∠ QPR and reflex ∠ QPR. 
28	Represent $\sqrt{8.2}$ geometrically on the number line. **OR** Simplify: $\frac{1}{3+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{3}} + \frac{1}{\sqrt{3}+1}$

29 Write any 3 Euclid's Axioms.

30 Prove that equal chords of a circle subtend equal angles at the centre.

OR

In figure, O is the centre of the circle and POQ is the diameter of the circle. If ∠PSR = 140°, find ∠RPQ.



31 A survey of 200 people was conducted about their preference of visiting various pavilions.

Pavilion	Good living	Delhi Pavilion	Toy Pavilion	Defence
No. of people	95	45	40	20

Find the probability that the selected person visited:

(i) Only Defence pavilion

(ii) Only Toy pavilion

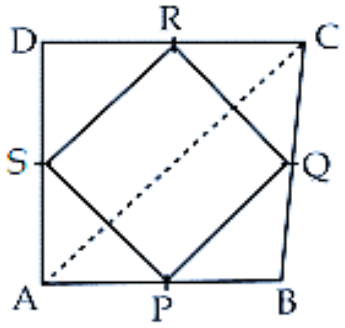
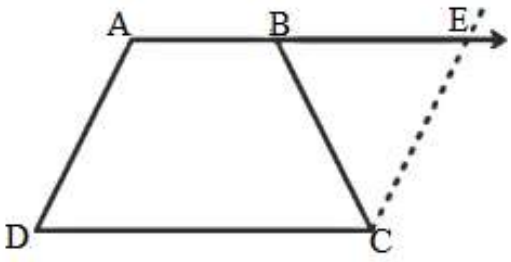
(iii) Both Good living and Delhi pavilion

SECTION D

Section D consists of 4 questions of 5 marks each.

32 Draw a histogram and frequency polygon on the same graph for the following data.

Classes	150-200	200-250	250-300	300-350	350-400	400-450	450-500
Frequency	5	3	5	6	8	7	1

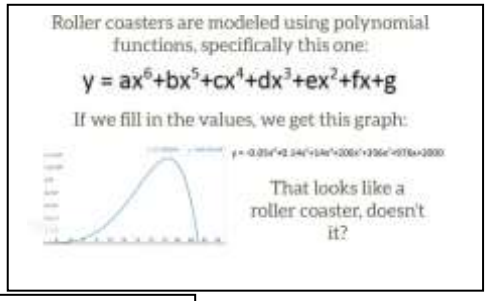
33	The triangular side walls of a flyover have been used for advertisements. Sides of a triangular side walls are in the ratio of 12 : 17 : 25 and its perimeter is 540 m. Find the area of one triangular side wall. The advertisement yields an earning of ₹ 5000 per m^2 per year. A company hired one of its side walls for 1 year. How much rent did the company pay for an year for the side wall? **OR** A triangular park ABC has sides 120m, 80m and 50m. A gardener *Dhania* has to put a fence all around it and also plant grass inside. How much area does she need to plant? Find the cost of fencing it with barbed wire at the rate of ₹ 20 per metre leaving a space 3m wide for a gate on one side.
34	Draw the graph of the linear equation x + 2y = 8 and answer the following questions. (i)Find the coordinates of the point which intersect the graph at X axis. (ii)Is x = -2, y = 5 a solution of x + 2y = 8.
35	ABCD is a quadrilateral in which P, Q, R and S are mid points of sides AB, BC, CD and DA (see fig). AC is a diagonal. Prove that (i) PQ ‖ SR (ii) PQRS is a parallelogram. (iii) PS = QR  **OR** ABCD is a trapezium in which AB ‖ CD. CE ‖ AD and AD = BC (see Fig.). Show that (i) ∠ A = ∠ B (ii) ∠ C = ∠ D (iii) Δ ABC ≅ Δ BAD 

SECTION E

Case Study Based Questions are compulsory.

36 **Case Study -1**

In mathematics, a polynomial is an expression consisting of variables and coefficients, that involves only the operations of addition, subtraction, multiplication, and positive-integer powers of variables. Polynomials appear in many areas of mathematics and science. For example, they are used to form polynomial equations, which encode a wide range of problems, from elementary word problems to complicated scientific problems.



Aditi a student of class IX had doubts in Polynomials and approached her Mathematics teacher. After clearing her doubts, to check whether she understood the concept or not, the teacher gave her questions to solve.

Based on the above information, answer the following questions:

I	Identify the polynomials among the following expressions: x^2, $x^{\frac{2}{3}} + 3$, $2x^2 - \frac{3}{x} + 5$, $2xy + 5$	1m
II	Find the value of q(z) at z = 2. $q(z) = 5z^3 - 4z + \sqrt{2}$	1m
III	Without actual calculating the cubes, find the value of: $(28)^3 + (-15)^3 + (-13)^3$ **OR** Expand using suitable identity: $\left(x - \frac{2}{3}y\right)^3$	2m

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Case Study – 2

John planned a birthday party for his younger brother with his friends. They decided to make some birthday caps by themselves and to buy a cake from a bakery shop. For these two items, they decided the following dimensions:

Cake: Spherical cake with diameter 28 cm.

Cap: Conical shape with base circumference 44 cm and height 24 cm.

I	What is the radius of the conical cap?	1m
II	What is the slant height of the conical cap?	1m
III	How many square cm paper would be used to make 4 such caps? **OR** What is the volume of the spherical birthday cake?	2m

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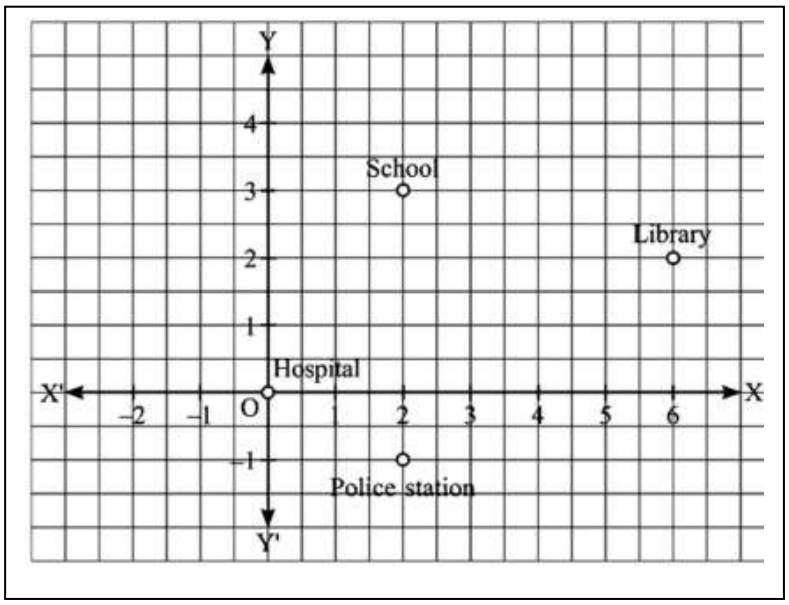
Case Study -3



Aditya, a student of Class IX went to a city Hospital along with his grandfather for general checkup. From there he visited three places - School, Library and Police Station. After returning to his village, he plotted a graph by taking Hospital as origin and marked three places on the graph as per his direction of movement and distance.

Based on the above information answer the following questions:

I	Find the coordinates of school and library.	1m
II	Find the distance between school and police station.	1m
III	Identify the quadrant or axis on which the following points lie. (i) (0, 2) (ii) (-2, -1) (iii) (4, 3) (iv) (5, -1) **OR** Find the coordinates of the hospital and police station. Also, find the difference of abscissa of library and ordinate of the police station.	2m

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