INDIAN SCHOOL SOHAR **No. of printed pages: 5**

PERIODIC TEST II (2023-24)

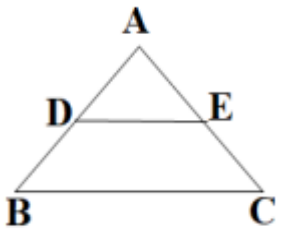
MATHEMATICS (041)

CLASS: X **MAX.MARKS: 80**

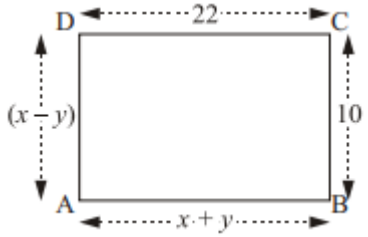
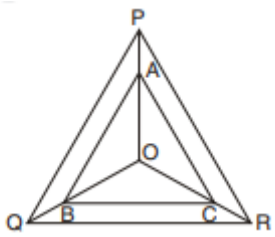
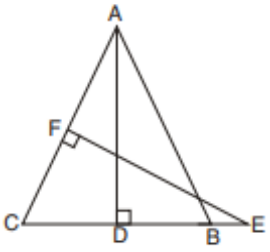
DATE: 24/09/23 **TIME: 3 HOURS**

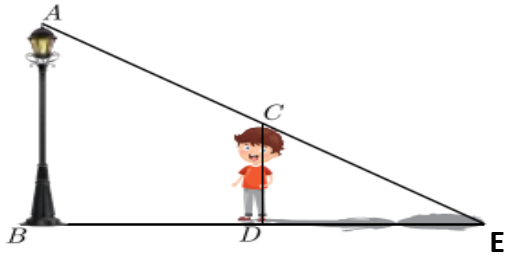
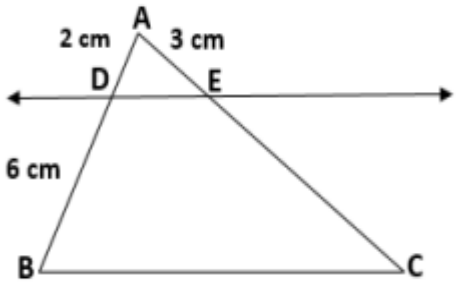
General Instructions:

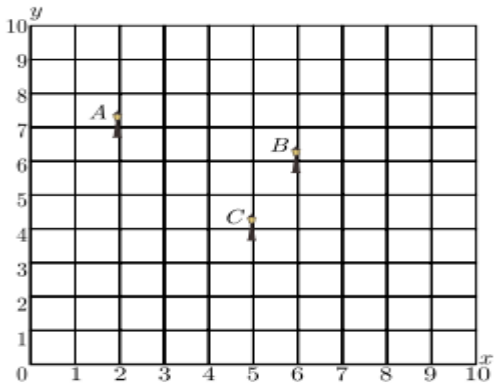
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated 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 = $\frac{22}{7}$ wherever required if not stated.

	Section A **Section A consists of 20 questions of 1 mark each.**	
1.	The product of two numbers is 1600 and their HCF is 5. The LCM of the numbers is (a) 8000 (b) 1600 (c) 320 (d) 1605	1
2.	The ratio of LCM and HCF of the least composite and the least prime numbers is (a) 1:2 (b) 2:1 (c) 1:1 (d) 1:3	1
3.	The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is (a) 4 (b) 0 (c) -4 (d) ± 4	1
4.	The pair of equations $3^{x+y} = 81$, $81^{x-y} = 3$ has (a) no solution (b) unique solution (c) infinitely many solutions (d) x = $2\frac{1}{8}$, y = $2\frac{1}{8}$	1
5.	If LCM(x, 18) =36 and HCF(x, 18) =2, then x is (a) 4 (b) 3 (c) 2 (d) 5	1
6.	In the figure, if DE‖ BC, AD = 3cm, BD = 4cm and BC= 14 cm, then DE equals  (a) 7 cm (b) 3 cm (c) 4 cm (d) 6 cm	1
7.	If α and β are the zeroes of a polynomial $f(x) = kx^2 - 4x + 5k$ and α + β = αβ, then k is (a) $-\frac{2}{5}$ (b) $\frac{4}{5}$ (c) $\frac{1}{3}$ (d) $-\frac{4}{3}$	1
8.	Let a and b be two positive integers such that a = $p^3 q^4$ and b = $p^2 q^3$, where p and q are prime numbers. If HCF(a,b) = $p^m q^n$ and LCM(a,b) = $p^r q^s$, then (m+n)(r+s) is (a) 15 (b) 30 (c) 35 (d) 72	1

9	If P(x) = $2x^2 - 3x + 5$, then P(–1) is equal to : (a) 7 (b) 8 (c) 9 (d) 10	1
10.	The value of c for which the pair of equations cx – y = 2 and 6x – 2y = 4 will have infinitely many solutions is : (a) –3 (b) 3 (c) –12 (d) 12	1
11.	The value of x for which (x − 2), (4x − 1), and (5x + 2) are three consecutive terms of an A.P. is: (a) – 1 (b) 1 (c) 2 (d) -2	1
12.	A(-4, $\frac{m}{3}$) is the mid-point of the line segment joining the points Q(–6, 7) and R(–2, 3), then the value of m is: (a) −12 (b) −4 (c) 15 (d) −6	1
13.	If α and β are the zeroes of the quadratic polynomial f(x) = $x^2 - 5x + m$ such that α − β = 1, then value of 'm' is : (a) 0 (b) 6 (c) 1 (d) –1	1
14.	The distance between the points (m, –n) and (–m, n) is: (a) $\sqrt{m^2 + n^2}$ (b) m + n (c) $2\sqrt{m^2 + n^2}$ (d) $\sqrt{2m^2 + 2n^2}$	1
15.	The graph of the polynomial P(x) cuts the x-axis 5 times and touches it 3 times. The number of zeroes of P(x) is : (a) 8 (b) 3 (c) 5 (d) 2	1
16.	The point which divides the line segment joining the points (7, –6) and (3, 4) in ratio 1 : 2 internally lies in the (a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant	1
17.	The product and sum of the zeroes of a quadratic polynomial are 2 and –15 respectively. The quadratic polynomial is : (a) $x^2 - 2x + 15$ (b) $x^2 - 15x + 2$ (c) $x^2 - 15x - 2$ (d) $x^2 + 15x + 2$	1
18.	Which term of an AP, 21, 42, 63, 84, ... is 210? (a) 9th (b) 10^{th} (c) 11th (d) 12th	1
Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (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 the Assertion (A). (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). (c) Assertion (A) is true, but Reason (R) is false. (d) Assertion (A) is false, but Reason (R) is true.		
19.	Assertion (A): Common difference of the AP -5, -1, 3, 7,… is 4. Reason (R): Common difference of the AP a, a + d, a + 2d ..... is given by d = $a_2 - a_1$.	1
20.	Assertion (A): The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M = 162. Reason (R): If a, b are two positive integers, then H.C.F. × L.C.M. = a × b.	1
Section B Section B consists of 5 questions of 2 marks each.		
21.	Use distance formula to show that the points A(-2, 3), B(1, 2) and C(7, 0) are collinear.	2

22.	If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.	2
23.	In the figure, ABCD is a parallelogram. Find the values of x and y.  	2
24.	If one zero of the polynomial $(a^2 + 9)x^2 + 13x + 6a$ is reciprocal of the other, find the value of 'a'. **OR** Find the zeroes of the polynomial $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$	2
25.	In the figure, A, B and C are points on OP, OQ and OR respectively such that AB || PQ and AC || PR. Show that BC || QR.  **OR** In the given figure, E is a point on side CB produced of an isosceles ΔABC with AB = AC. If AD ⊥ BC and EF ⊥ AC, prove that ΔABD ~ ΔECF.  	2
Section C Section C consists of 6 questions of 3 marks each.		
26.	If α, β are zeroes of quadratic polynomial $P(x) = 3x^2 - 5x - 2$, find the value of (i) $\alpha^2 + \beta^2$ (ii) $\frac{1}{\alpha} + \frac{1}{\beta}$	3
27.	Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis. **OR** Father's age is 3 times the sum of ages of his two children. After 5 years his age will be twice the sum of ages of the two children. Find the age of father.	3
28.	Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points A(2, -2) and B(3, 7).	3
29.	Solve the equation: $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$, $x \neq -4, 7$.	3

30.	Given that √3 is irrational, prove that 5 + 2√3 is irrational.	3
31.	Through the mid-point M of the side CD of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD(produced) in E. Prove that EL = 2BL **OR** A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds.  	3
	Section D Section D consists of 4 questions of 5 marks each.	
32.	The monthly incomes of A and B are in the ratio 8 : 7 and their expenditures are in the ratio 19 : 16. If each saves Rs 5000 per month, find the monthly income of each.	5
33.	Sum of the areas of two squares is 468 m^2. If the difference of their perimeters is 24 m, find the sides of the two squares. **OR** In a flight of 600km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hr from its usual speed and the time of the flight increased by 30 minutes. Find the scheduled duration of the flight.	5
34.	If mth term of an A.P. is $\frac{1}{n}$ and nth term is $\frac{1}{m}$, then find the sum of its first ' mn' term. **OR** Solve for x: 1 + 6 + 11 + ... + x = 148.	5
35.	Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. In the figure, find EC, if $\frac{AD}{DB} = \frac{AE}{EC}$ using the above theorem.  	5
	Section E Section E has 3 case based integrated units of assessment with sub- parts of the values of 1, 1 and 2 marks each respectively.	
36	**Case Study – 1** February 14 is celebrated as international book giving day and many countries in the world celebrate this day some people in India also started celebrating this day and donated the following numbers of book to a public library. History = 96, Science = 240, and Biography = 336. These books have to be stacked in such a way that all books are stored topic wise and each step contains equal numbers of book.	

	Based on the above information answer the following questions: (i) Find the maximum number of book in each stack. (ii) Prime factorization of 336. (iii) Determine the total number of stacks that will be used for arranging all the books. **OR** Find LCM of 96, 240 and 336	 1 1 2
37	**Case Study – 2** Resident Welfare Association (RWA) of a Gulmohar Society in Delhi has installed three electric poles A, B and C in a society's common park. Despite these three poles, some parts of the park are still in dark. So, RWA decides to have one more electric pole D in the park. The park can be modeled as a coordinate system given below.  Based on the above, answer the following questions: (i) What is the position of the pole C? (ii) What is the distance of the pole B from the corner O of the park? (iii) Find the position of the fourth pole D so that four points A, B C and D form a parallelogram. **OR** What is the distance between poles A and C?	 1 1 2
38.	**Case Study – 3** In the month of April to June 2022, the exports of passenger cars from India increased by 26% in the corresponding quarter of 2021–22, as per a report. A car manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increases uniformly by a fixed number every year. Based on the above information answer the following questions. (i) Find the production in the 1st year. (ii) Find the production in the 12th year. (iii) Find the total production in first 10 years. **OR** In how many years will the total production reach 31200 cars?	 1 1 2

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