INDIAN SCHOOL SOHAR No. of printed pages: 5

PERIODIC TEST II (2022-23)

MATHEMATICS (BASIC)

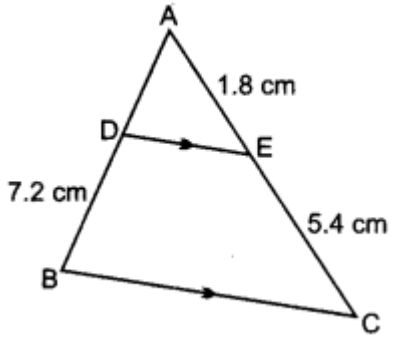
CLASS: X **MAX.MARKS: 80**

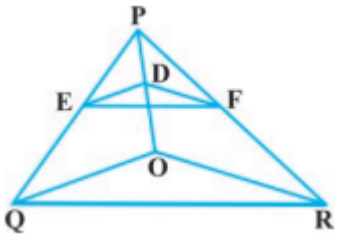
DATE: 29/09/22 **TIME: 3 HOURS**

General Instructions:

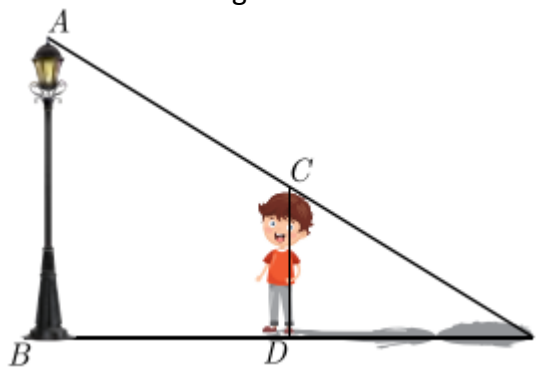
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section 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.	If two positive integers a and b are written as a = x^3y^3 and b = xy^2 where x , y are prime numbers, then HCF(a, b) is (a) xy (b) xy^2 (c) x^3y^3 (d) x^2y^2	1
2.	The sum of the zeroes of the polynomial 2 $x^2 - 8x + 6$ is (a) - 3 (b) 3 (c) - 4 (d) 4	1
3.	The distance of the point P(-3, -4) from the x-axis is (a) -3 (b) 3 (c) 4 (d) 5	1
4.	How many different prime factors are there in the prime factorization of 5005? (a) 4 (b) 2 (c) 6 (d) 7	1
5.	If 2x + 3y = 0 and 4x – 3y = 0 then x + y =? (a) 2 (b) 1 (c) -1 (d) 0	1
6.	HCF of 168 and 126 is (a) 21 (b) 42 (c) 14 (d) 18	1
7.	The zeroes of the quadratic polynomial $x^2 - 15x + 50$ are (a) both positive (b) both negative (c) both equal (d) one positive and one negative	1
8.	For what value of k do the equations 3x – y + 8 = 0 and 6x + ky = -16 represent coincident lines? (a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -2	1
9.	The distance between (-1, -3) and (5, -2) is (a) $\sqrt{61}$ units (b) $\sqrt{37}$ units (c) 5 units (d) $\sqrt{17}$ units	1
10.	If ΔABC ~ Δ DEF such that 2AB = DE and BC = 8 cm then find EF. (a) 21 (b) 4 (c) 14 (d) 16	1

11.	The zeroes of the quadratic polynomial $x^2 + 7x + 10$ are (a) -2, -5 (b) 2, 5 (c) -3, -8 (d) 3, 8	1
12.	The value of($\sin^2 60° + 2 \tan 45° - \cos^2 30°$) is (a) -2 (b) $\frac{1}{4}$ (c) 2 (d) $\frac{1}{2}$	1
13.	If $\sin\theta - \cos\theta = 0$, then the value of θ is (a) 30° (b) 60° (c) 90° (d) 45°	1
14.	In figure, the graph of a polynomial P(x) is shown. The number of zeroes of P(x) is  (a) 2 (b) 4 (c) 1 (d) 3	1
15.	In ΔABC and Δ DEF, $\angle F = \angle C$, $\angle B = \angle E$ and $AB = \frac{1}{2} DE$. Then, the two triangles are (a) Congruent, but not similar. (b) Similar, but not congruent. (c) Neither congruent nor similar. (d) Congruent as well as similar.	1
16.	In ΔABC, DE || BC. Find the length of side AD, given that AE = 1.8 cm, BD = 7.2 cm and CE = 5.4 cm.  (a) 2.1 cm (b) 4 cm (c) 2.4 cm (d) 1.6 cm	1
17.	In a right angled triangle ABC, $\angle B = 90°$. If $\angle A = 45°$, then the value of $\tan A - \cos^2 C$ is (a) - 2 (b) $\frac{1}{2}$ (c) 2 (d) $-\frac{1}{2}$	1
18.	The perimeter of the triangle with vertices (0, 4), (0, 0) and (3, 0) is (a) 5 units (b) 4 units (c) 7 units (d) 12 units	1
19.	If one zero of the quadratic polynomial $2x^2 - 8x - m$ is $\frac{5}{2}$, then the value of m is (a) $\frac{-15}{2}$ (b) $-\frac{1}{2}$ (c) -2 (d) 8	1
20.	If the prime factorization of a natural number N is $2^4 \times 3^4 \times 5^3 \times 7$, then number of consecutive zeroes in N is (a) 2 (b) 4 (c) 3 (d) 1	1

	Section B **Section B consists of 5 questions of 2 marks each.**	
21.	If α and $\frac{1}{\alpha}$ are the zeroes of the polynomial $4x^2 - 2x + (k - 4)$, find the value of k.	2
22.	A line intersects the y-axis and x axis at the points P and Q respectively. If (2, -5) is the mid-point of PQ, and then find the coordinates of P and Q. **OR** Find a relation between x and y such that the point P(x, y) is equidistant from the points A (7, 1) and B (3, 5).	2
23.	If $5\tan\theta = 3$, then what is the value of $\left(\frac{5\sin\theta - \cos\theta}{5\sin\theta + \cos\theta}\right)$?	2
24.	In the figure, DE||OQ and DF|| OR. Show that EF|| QR.  **OR** Prove that the diagonals of a trapezium divide each other proportionally.	2
25.	If α and β are the zeroes of the polynomial $P(x) = 3x^2 - 5x - 2$, then evaluate $\alpha^2 + \beta^2$.	2
	Section C **Section C consists of 6 questions of 3 marks each.**	
26.	Prove that $(cosec\theta - cot\theta)^2 = \frac{1 - \cos\theta}{1 + \cos\theta}$	3
27.	Solve: 47x + 31y = 63, 31x + 47y = 15. **OR** 5 pencils and 7 pens together cost Rs. 250 whereas 7 pencils and 5 pens together cost Rs. 302. Find the cost of one pencil and that of a pen.	3
28.	Prove that $2 + \sqrt{5}$ is an irrational number. **OR** On a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?	3
29.	Find the zeroes of the quadratic polynomial $x^2 + 12 + 7x$ and verify the relationship between the zeroes and its coefficients.	3
30.	If $\cos(A + B) = \frac{1}{2}$ and $\sin(A - B) = \frac{1}{2}$, $0° < (A + B) < 90°$, $A > B$, then find the values of A and B.	3
31.	Find the HCF and LCM of 306 and 54. Verify that HCF × LCM = product of two numbers.	3
	Section D **Section D consists of 4 questions of 5 marks each.**	
32.	State and prove Basic Proportionality theorem.	5
33.	Show that the points P (0, -2), Q (3, 1), R (0, 4) and S (-3, 1) are the vertices of a square PQRS.	5

34.	Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test? **OR** Draw the graphs of the equations 2x + y = 4 and 2 x − y = 4. Write the co-ordinates of the vertices of the triangle formed by these lines and the y-axis. Also, shade the region between two lines and y-axis.	5
35.	Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + tan^2 A + cot^2 A$. **OR** Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$.	5
	Section E **Case study based questions are compulsory.**	
36	**Case Study – 1** A seminar is being conducted by an Educational Organization, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively.  (i) Express 108 as a product of primes. (ii) Find the LCM of 60, 84 and 108 (iii) In each room the same number of participants are to be seated and all of them being in the same subject, hence find the maximum number of participants that can accommodated in each room. **OR** What is the minimum number of rooms required during the event?	1 1 2
37	**Case Study – 2** Birla Science Museum is the first Science and Technology Museum of the country, established in 1954. It houses exhibits and displays on science and technology where visitors can interact with the exhibits to make the understanding of science and technology easy and entertaining.  Birla Science Museum has set aside a children's room having planets and stars painted on the ceiling. Suppose an imaginary coordinate system is placed on the ceiling in the	

	room with the centre of the ceiling at (0, 0,).Three particular stars are located at S (-10, 5), T (3, -8) and R (-7, -4) where the coordinates represent the distance in feet from the center of the room. (i) Find the distance between the point (-10, 5) and (3, -8). (ii) Find the distance between the point (3, -8) and (-7, -4). (iii) Which star is farthest from the center of the room? **OR** What are the coordinates of the mid-point of the line segment joining the points S (-10, 5) and R (-7, -4)?	1 1 2
38	**Case Study – 3** Rohan is very intelligent in maths. He always tries to relate the concept of maths in daily life. One day he is walking away from the base of a lamp post at a speed of 1 m/s. Lamp is 4.5 m above the ground.  (i) Which similarity criterion is used in solving the above problem? (ii) What is the distance of Rohan from pole at this point? (iii) If after 2 seconds, length of shadow is 1 meter, what is the height of Rohan? **OR** What is the minimum time after which his shadow will become larger than his original height?	1 1 2

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