

BHARATIYA VIDYA BHAVAN'S V.M.PUBLIC SCHOOL, VADODARA
SESSION 2017-18
SAMPLE PAPER – 8

Class : X
Subject : MATHEMATICS

Max Marks:80
Time Allotted: 3 hrs

Instructions:

1. All questions are compulsory.
 2. The question paper consists of 30 questions. Section – A comprises of 6 questions of 1 mark each, Section – B comprises of 6 questions of 2 marks each, Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 8 questions of 4 marks each.
 3. Use of calculator is not permitted.
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Section A

1. The HCF and LCM OF 2 numbers are 9 and 360 respectively. If one number is 45, write the other number.
2. Find k if the following equations have no solution $3x - y - 5 = 0$; $6x - 2y - k = 0$.
3. Write the next two terms of $\sqrt{2}, \sqrt{8}, \sqrt{18}, \dots$
4. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Find the length of PQ.
5. If $\sin(A+B)=1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, $0 < A+B \leq 90^\circ$, find A .
6. Two coins are tossed simultaneously. What is the probability of getting at least one head?

Section B

7. Show that $5 - \sqrt{3}$ is an irrational number.
8. Form a quadratic equation in y, in which the sum and product of the zeroes are 1 and $\frac{1}{4}$.
9. Show that $x^2 - 3$ is a factor of $2x^4 + 3x^3 - 2x^2 - 9x - 12$.
10. The coordinates of midpoint of a line segment PQ are (1, -2). The coordinates of P are (-3, 2). Find the coordinates of Q .
11. If $\sin A = \frac{1}{3}$, find the value of $(2 \cot^2 A + 2)$.
12. The following table gives the daily income of 50 workers of a factory :

Daily income (in Rupees)	100 - 120	120 - 140	140 - 160	160 - 180	180 - 200
Number of workers	12	14	8	6	10

Section C

13. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is a positive integer.
14. Find the middlemost term(s) of the A.P. – 11 , - 7 , - 3 , ... , 49.
15. A two digit number is such the product of its digits is 18. When 27 is added to the number , then the digits interchange their places. Find the number.
16. Prove that the area of an equilateral triangle described on the side of a square is half the area of the equilateral triangle described on its diagonal.
17. If all the sides of a parallelogram touches a circle , show that the parallelogram is a rhombus.

18. Prove that $\frac{\sec \theta - \tan \theta}{\sec \theta + \tan \theta} = 1 - 2 \tan \theta (\sec \theta - \tan \theta)$.
19. The length of shadow of a tower standing on a level plane is found to be $2y$ metres longer when the sun's altitude is 30° than when it was 45° . Prove that the height of the tower is $y(\sqrt{3} + 1)$ metres.
20. A jar contains 24 marbles, some green and others blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.
21. Find the area of the sector of a circle with radius 4 cm and sector angle 30° . Also find the area of the corresponding major sector.
22. A hemispherical tank, full of water, is emptied by a pipe at the rate of $\frac{20}{7}$ litres per second. How much time will it take to empty half the tank, if the diameter of the base of the tank is 3 m?

Section D

23. Solve the following pair of equations :

$$\frac{1}{2(x+2y)} + \frac{5}{3(3x-2y)} = \frac{-3}{2}$$

$$\frac{5}{4(x+2y)} + \frac{3}{5(3x-2y)} = \frac{61}{60}$$

24. The sum of a number and its positive square root is $\frac{6}{25}$. Find the number.
25. The opposite vertices of a square are $(-1, 2)$ and $(3, 2)$. Find the coordinates of the other two vertices.
26. Through the midpoint 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 $EL = 2BL$.
27. Construct a triangle similar to the given triangle ABC in which $AB = 6$ cm, $BC = 5$ cm and $\angle B = 60^\circ$ with its sides equal to $\frac{4}{5}$ th of corresponding sides of $\triangle ABC$.
28. The angles of depression of the top of a tower from two points at distances a and b , from the base and on the same straight line with it are complementary. Prove that the height of the tower is \sqrt{ab} .
29. Find the median :

Class interval	118-126	127-135	136-144	145-153	154-162	163-171	172-180
frequency	3	5	9	12	5	4	3

30. A metallic right circular cone, 20 cm high and vertical angle 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.