

BHARATIYA VIDYA BHAVAN'S V.M.PUBLIC SCHOOL, VADODARA
SESSION 2017-18
SAMPLE PAPER – 6

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.

Section – A

1. What is the exponent of 3 in the prime factorization of 864?
2. Find a quadratic polynomial whose sum and product of its zeroes are 0 and $\sqrt{5}$ respectively.
3. Determine k so that $3k - 2$, $4k - 6$ and $k + 2$ are three consecutive terms of an AP.
4. If from an external point P of a circle with centre O, two tangents PQ and PR are drawn such that $\angle QPR = 120^\circ$, prove that $2PQ = PO$.
5. If the median of 20 observation is 50 and mode is also 50, find the mean.
6. From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a spade card.

Section – B

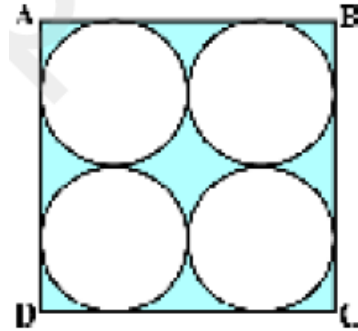
7. Given that the HCF(96, 404) = 4, find LCM(96, 404).
8. Divide $6x^3 + 13x^2 + x - 2$ by $2x + 1$, and find quotient and remainder.
9. Solve for x and y: $47x + 31y = 63$; $31x + 47y = 15$
10. Find a point on y-axis which is equidistant from the points (- 5, 2) and (9, - 2).
11. If $7 \sin^2\theta + 3 \cos^2\theta = 4$, show that $\tan \theta = \frac{1}{\sqrt{3}}$
12. Find the missing frequency f if the mode of the following data is 154.

Class	120 - 130	130 – 140	140 – 150	150 – 160	160 – 170	170 – 180
Frequency	2	8	12	f	8	7

Section – C

13. Find the HCF of 825, 675 and 450 by using Euclid's division algorithm.
14. Find the positive value of k for which $x^2 + kx + 64 = 0$ and $x^2 - 8x + k$ will have real roots.
15. The sum of the 5th and 9th terms of an AP is 30. If its 25th term is three times its 8th term, find the AP.
16. In a right angled triangle ΔABC right angled at C, AD is the median. Prove that $AB^2 = 4AD^2 - 3AC^2$
17. Prove that the rectangle which circumscribes a circle is a square.
18. Prove that: $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$.
19. The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 0 seconds the angle of elevation becomes 30° . If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane.

20. A bag contains numbers which are numbered from 2 to 90. A card is drawn at random from the bag. Find the probability that it bears:
- a two digit number
 - a number which is a perfect square.
 - a number divisible by 10.
21. A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter of the sphere.
22. Find the area of the shaded region in the figure, where ABCD is a square of side 14 cm.



Section – D

23. A motorboat can travel 30 km upstream and 28 km downstream in 7 hours. It can travel 21 km upstream and return in 5 hours. Find the speed of the boat in still water and the speed of the stream.
24. Solve the equation: $2^{2x+3} = 65(2^x - 1) + 57$
25. If the vertices of a triangle are (1, - 3), (4, p) and (- 9, 7) and its area is 15 sq. units, find the value(s) of p.
26. State and prove the Basic Proportionality Theorem.
27. Construct a ΔABC in which $BC = 6.5$ cm, $AB = 5.5$ cm and $\angle ABC = 60^\circ$. Also construct a triangle similar to ΔABC , whose each side is $\frac{3}{2}$ times the corresponding side of ΔABC . Justify your construction.
28. The angle of elevation of a cloud from a point 60 m above the lake is 30° and the angle of depression of its reflection in the lake is 60° , find the height of the cloud.
29. Draw less than and more than ogives for the following distribution and hence obtain the median.

Marks	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
No. of students	14	6	10	20	30	8	12

30. A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A sphere is lowered into the water such that when it touches the sides it is just immersed. What fraction of water overflows?