

**KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD-32**  
**SAMPLE PAPER 03 (2018-19)**

SUBJECT: MATHEMATICS(041)

**BLUE PRINT : CLASS X**

Unit	Chapter	VSA (1 mark)	SA – I (2 marks)	SA – II (3 marks)	LA (4 marks)	Total	Unit Total
Number system	Real Numbers	1(1)	2(1)*	3(1)	--	6(3)	6(3)
Algebra	Polynomials	--	--	3(1)	--	3(1)	20(8)
	Pair of Linear Equations in two variables	--	2(1)	3(1)	--	5(2)	
	Quadratic Equations	1(1)*	--	--	4(1)*	5(2)	
	Arithmetic progression	1(1)	2(1)*	--	4(1)	7(3)	
Coordinate Geometry	Coordinate Geometry	1(1)	2(1)	3(1)*	--	6(3)	6(3)
Trigonometry	Introduction to Trigonometry	1(1)*	--	3(1)*	4(1)	8(3)	12(4)
	Some Applications of Trigonometry	--	--	--	4(1)*	4(1)	
Geometry	Triangles	1(1)	--	3(1)*	4(1)	8(3)	15(5)
	Circles	--	--	3(1)	--	3(1)	
	Constructions	--	--	--	4(1)	4(1)	
Mensuration	Areas Related to Circles	--	--	3(1)	--	3(1)	10(3)
	Surface Areas and Volumes	--	--	3(1)*	4(1)	7(2)	
Statistics & probability	Statistics	--	--	3(1)	4(1)*	7(2)	11(4)
	Probability	--	4(2)	--	--	4(2)	
	<b>Total</b>	<b>6(6)</b>	<b>12(6)</b>	<b>30(10)</b>	<b>32(8)</b>	<b>80(30)</b>	<b>80(30)</b>

**Note: \* - Internal Choice Questions**

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**CLASS : X**

**MAX. MARKS : 80**  
**DURATION : 3 HRS**

**General Instruction:**

- (i) All questions are compulsory.
- (ii) This question paper contains **30** questions divided into four Sections A, B, C and D.
- (iii) **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.
- (iv) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of Calculators is not permitted

**SECTION – A**

**Questions 1 to 6 carry 1 mark each.**

1. Find the next term of the A.P.  $\sqrt{7}, \sqrt{28}, \sqrt{63}, \dots$
2. Without actually performing the long division, find if  $\frac{987}{10500}$  will have terminating or non-terminating (repeating) decimal expansion. Give reasons for your answer.
3. If 2 is a root of the quadratic equation  $3x^2 + px - 8 = 0$  and the quadratic equation  $4x^2 - 2px + k = 0$  has equal roots, find the value of k.

**OR**

For what value of k, are the roots of the quadratic equation  $3x^2 + 2kx + 27 = 0$  real and equal.

4. Find the perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0).
5. If  $\sin A = \frac{24}{25}$ , then find the value of  $\cos A$ .

**OR**

If  $\tan \theta = \cot (30^\circ + \theta)$ , find the value of  $\theta$ .

6. Sides of 2 similar triangles are in the ratio 4 : 9. What is the ratio areas of these triangles.

**SECTION – B**

**Questions 6 to 12 carry 2 marks each.**

7. Points P, Q, R and S divide the line segment joining the points A(1, 2) and B(6, 7) in 5 equal parts. Find the coordinates of the points P, Q and R.
8. Find the largest number which divides 2053 and 967 and leaves a remainder of 5 and 7 respectively.

**OR**

4 Bells toll together at 9.00 am. They toll after 7, 8, 11 and 12 seconds respectively. How many times will they toll together again in the next 3 hours?

9. A dice is rolled twice. Find the probability that (i) 5 will not come up either time. (ii) 5 will come up exactly one time.

10. A bag contains cards numbered from 1 to 25. A card is drawn at random from the bag. Find the probability that the number on this card is (i) divisible by both 2 and 3 (ii) a two digit number
11. For what value of  $k$ , the following pair of linear equations has infinite number of solutions:  
 $2x + (k - 2)y = k$ ;  $6x + (2k - 1)y = (2k + 5)$ .
12. The sum of the first  $n$  terms of an A.P. is  $5n - n^2$ . Find the  $n$ th term of this A.P.
- OR**
- Which term of the AP 21, 42, 63, 84, ... is 420?

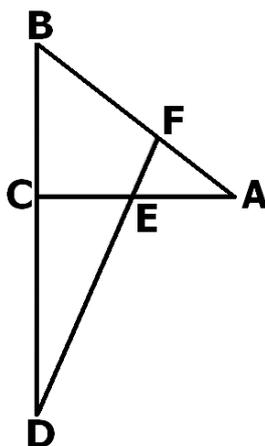
### SECTION – C

Questions 13 to 22 carry 3 marks each.

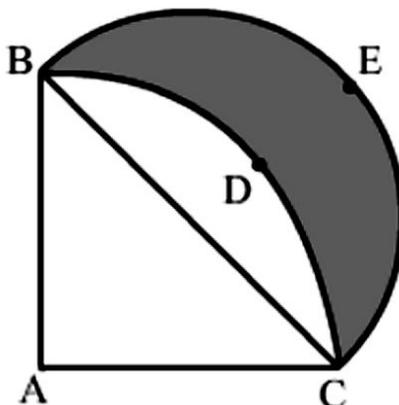
13. Prove that  $7 - 2\sqrt{5}$  is an irrational number.
14. If the polynomial  $6x^4 + 8x^3 + 17x^2 + 21x + 7$  is divided by another polynomial  $3x^2 + 4x + 1$ , the remainder comes out to be  $(ax + b)$ , find  $a$  and  $b$ .
15. If  $AD$  and  $PM$  are medians of triangles  $ABC$  and  $PQR$ , respectively where  $\triangle ABC \sim \triangle PQR$ , prove that  $\frac{AB}{PQ} = \frac{AD}{PM}$

**OR**

In the below figure, line segment  $DF$  intersect the side  $AC$  of a triangle  $ABC$  at the point  $E$  such that  $E$  is the mid-point of  $CA$  and  $\angle AEF = \angle AFE$ . Prove that  $\frac{BD}{CD} = \frac{BF}{CE}$ .



16. In the below figure,  $ABCD$  is a quadrant of a circle of radius 28 cm and a semi circle  $BEC$  is drawn with  $BC$  as diameter. Find the area of the shaded region. [Use  $\pi = \frac{22}{7}$ ]



17. A quadrilateral ABDC is drawn to circumscribe a circle. Prove that  $AB + CD = AD + BC$ .
18. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class.
19. Find the value(s) of  $p$  for which the points  $(p + 1, 2p - 2)$ ,  $(p - 1, p)$  and  $(p - 3, 2p - 6)$  are collinear.

**OR**

The mid-point  $P$  of the line segment joining the points  $A(-10, 4)$  and  $B(-2, 0)$  lies on the line segment joining the points  $C(-9, -4)$  and  $D(-4, y)$ . Find the ratio in which  $P$  divides  $CD$ . Also find the value of  $y$ .

20. A 5 m wide cloth is used to make a conical tent of base diameter 14 m and height 24 m. Find the cost of cloth used at the rate of Rs 25 per metre. [Use  $\pi = \frac{22}{7}$ ]

**OR**

A girl empties a cylindrical bucket, full of sand, of base radius 18 cm and height 32 cm, on the floor to form a conical heap of sand. If the height of this conical heap is 24 cm, then find its slant height correct upto one place of decimal.

21. If  $A + B = 90^\circ$ , prove that  $\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$

**OR**

Prove that:  $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \sec A + \cot A$ .

22. Find the mode of the following frequency distribution:

Marks	Less than 20	Less than 40	Less than 60	Less than 80	Less than 100
Number of students	4	10	28	36	50

### SECTION – D

**Questions 23 to 30 carry 4 marks each.**

23. The angle of elevation of the top of a chimney from the foot of a tower is  $60^\circ$  and the angle of depression of the foot of the chimney from the top of the tower is  $30^\circ$ . If the height of the tower is 40 m, find the height of the chimney. According to pollution control norms, the minimum height of a smoke emitting chimney should be 100 m. State if the height of the above mentioned chimney meets the pollution norms. What value is discussed in this question?

**OR**

A highway leads to the foot of 300 m high tower. An observatory is set at the top of the tower. It sees a car moving towards it at an angle of depression of  $30^\circ$ . After 15 seconds angle of depression becomes  $60^\circ$ .

- (a) Find the distance travelled by the car during this time.  
 (b) How this observatory is helpful to regulate the traffic on the highway?
24. Construct a triangle PQR, in which  $PQ = 6$  cm,  $QR = 7$  cm and  $PR = 8$  cm. Then construct another triangle whose sides are  $\frac{4}{5}$  times the corresponding sides of  $\Delta PQR$ .

25. If  $S_n$  denotes the sum of the first  $n$  terms of an A.P., prove that  $S_{30} = 3(S_{20} - S_{10})$ .

26. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

**OR**

Two water taps together can fill a tank in  $9\frac{3}{8}$  hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

27. A metallic bucket, open at the top, of height 24 cm is in the form of the frustum of a cone, the radii of whose lower and upper circular ends are 7 cm and 14 cm respectively. Find : (i) the volume of water which can completely fill the bucket. (ii) the area of the metal sheet used to make the bucket. [Use  $\pi = \frac{22}{7}$ ]

28. Prove that :  $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \sec \theta + \tan \theta = \frac{1 + \sin \theta}{\cos \theta}$

29. 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".

30. The following table gives production yield per hectare of wheat of 100 farms of a village.

<b>production yield (in kg/ha)</b>	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
<b>Number of farms</b>	2	8	12	24	38	16

Change the distribution to a more than type distribution, and draw its ogive.

**OR**

The median of the following data is 28. Find the values of  $x$  and  $y$ , if the total frequency is 50.

<b>Marks</b>	0-7	7-14	14-21	21-28	28-35	35-42	42-49
<b>No. of Students</b>	3	$x$	7	11	$y$	16	9