

**KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION**  
**SAMPLE PAPER 05 (2017-18)**

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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**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 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 value of  $y$  if the first three terms of an AP respectively are  $3y - 1$ ,  $3y + 5$  and  $5y + 1$ .
2. If  $\text{LCM}(480, 672) = 3360$ , find  $\text{HCF}(480, 672)$ .
3. Find the values of  $k$  for which the quadratic equation  $(k + 4)x^2 + (k + 1)x + 1 = 0$  has equal roots.
4. If the points  $A(x, 2)$ ,  $B(-3, -4)$  and  $C(7, -5)$  are collinear, then find the value of  $x$ .
5. If  $\sin 5\theta = \cos 4\theta$ , where  $5\theta$  and  $4\theta$  are acute angles, find the value of  $\theta$ .
6. If  $\triangle ABC \sim \triangle PQR$ ,  $BC = 8$  cm and  $QR = 6$  cm, the ratio of the areas of  $\triangle ABC$  and  $\triangle PQR$

**SECTION – B**

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

7. Prove that the points  $(7, 10)$ ,  $(-2, 5)$  and  $(3, -4)$  are the vertices of an isosceles right triangle.
8. Find the HCF of 81 and 237 and express it as a linear combination of 81 and 237.
9. If two different dice are rolled together, find the probability of getting (i) an even number on first dice (ii) an even number on both dice.
10. A bag contains cards numbered from 1 to 49. A card is drawn from the bag at random, after mixing the cards thoroughly. Find the probability that the number on the drawn card is: (i) a multiple of 5 (ii) a perfect square
11. Find the value of  $k$ , so that the following system of equations has no solution:  
 $(3k + 1)x + 3y - 2 = 0$ ;  $(k^2 + 1)x + (k - 2)y - 5 = 0$ .
12. If the seventh term of an AP is  $\frac{1}{9}$  and its ninth term is  $\frac{1}{7}$ , find its 63rd term.

## SECTION – C

**Questions 13 to 22 carry 3 marks each.**

13. Use Euclid's division lemma to show that the cube of any positive integer is of the form  $9m$ ,  $9m + 1$  or  $9m + 8$ .

14. ABCD is a trapezium in which  $AB \parallel DC$  and its diagonals intersect each other at the point O.

Show that  $\frac{AO}{BO} = \frac{CO}{DO}$

**OR**

Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of  $\triangle PQR$ . Show that  $\triangle ABC \sim \triangle PQR$ .

15. Find the ratio in which the point P(x, 2) divides the line segment joining the points A(12, 5) and B(4, -3). Also find the value of x.

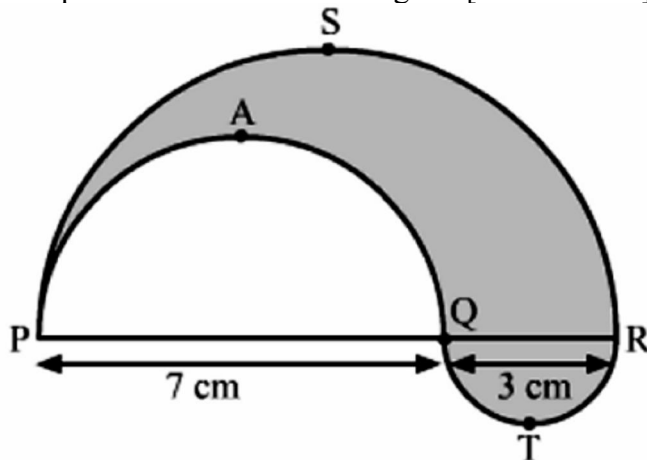
**OR**

If the points A(-2, 1), B(a, b) and C(4, -1) are collinear and  $a - b = 1$ , find the values of a and b.

16. 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  $2PQ = PO$ .

17. 8 men and 12 boys can finish a piece of work in 10 days while 6 men and 8 boys finish it in 14 days. Find the time taken by one man alone and by one boy alone to finish the work.

18. In the below figure, PSR, RTQ and PAQ are three semicircles of diameters 10 cm, 3 cm and 7 cm respectively. Find the perimeter of the shaded region. [Use  $\pi = 3.14$ ]



19. If the polynomial  $6x^4 + 8x^3 - 5x^2 + ax + b$  is exactly divisible by the polynomial  $2x^2 - 5$ , then find the values of a and b.

20. A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank which is 10 m in diameter and 2 m deep. If the water flows through the pipe at the rate of 4 km per hour, in how much time will the tank be filled completely?

**OR**

A solid metallic right circular cone 20 cm high and whose vertical angle is  $60^\circ$ , 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  $\frac{1}{12}$  cm, find the length of the wire.

21. Evaluate:  $\frac{\sin 18^\circ}{\cos 72^\circ} + \sqrt{3} \{ \tan 10^\circ \tan 30^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ \}$

OR

If  $\tan (A - B) = \frac{1}{\sqrt{3}}$  and  $\tan (A + B) = \sqrt{3}$ , then find the value of A and B.

22. Find the mode age of the patients from the following distribution :

Age(in years)	6-15	16-25	26-35	36-45	46-55	56-65
No. of patients	6	11	21	23	14	5

### SECTION – D

Questions 23 to 30 carry 4 marks each.

23. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of the tower from the foot of the building is  $60^\circ$ . If the tower is 60 m high, find the height of the building.
24. Draw a right triangle ABC in which  $AB = 6$  cm,  $BC = 8$  cm and  $\angle B = 90^\circ$ . Draw BD perpendicular from B on AC and draw a circle passing through the points B, C and D. Construct tangents from A to this circle.
25. In an AP of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the A.P.
26. In a flight for 6000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 400 km/hr and consequently time of flight increased by 30 minutes. Find the original duration of flight.

OR

- Out of a number of saras birds, one-fourth of the number are moving about in lots,  $\frac{1}{9}$ th coupled with  $\frac{1}{4}$ th as well as 7 times the square root of the number move on a hill, 56 birds remain in vakula trees. What is the total number of trees?
27. Sushant has a vessel, of the form of an inverted cone, open at the top, of height 11 cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of diameter 0.5 cm are put in the vessel due to which th of the water in the vessel flows out. Find how many balls were put in the vessel. Sushant made the arrangement so that the water that flows out irrigates the flower beds. What value has been shown by Sushant?
28. If  $a \cos^3 \theta + 3a \sin^2 \theta \cos \theta = m$  and  $a \sin^3 \theta + 3a \sin \theta \cos^2 \theta = n$ , prove that  $(m+n)^{2/3} + (m-n)^{2/3} = 2a^{2/3}$
29. Prove that “In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

OR

Prove that “The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.”

30. The mean of the following frequency distribution is 57.6 and the sum of the observations is 50. Find  $f_1$  and  $f_2$ .

<b>Class</b>	0-20	20-40	40-60	60-80	80-100	100-120
<b>Frequency</b>	7	$f_1$	12	$f_2$	8	5

**OR**

The following is the distribution of weights (in kg) of 40 persons:

<b>Weight(in kg)</b>	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80
<b>No. of persons</b>	4	4	13	5	6	5	2	1

Construct a cumulative frequency distribution (of less than type) table for the data above and determine the median from the graph.

