KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 02 FOR PERIODIC TEST III EXAM (2017-18)

SUBJECT: MATHEMATICS(041)

<u>BLUE PRINT : CLASS X</u>

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	--	2(1)	3(1)	--	5(2)	26(10)
	Pair of Linear Equations in two variables	--	2(1)	3(1)	4(1)*	9(3)	
	Quadratic Equations	1(1)	--	--	4(1)*	5(2)	
	Arithmetic progression	1(1)	2(1)	--	4(1)	7(3)	
Coordinate Geometry	Coordinate Geometry	1(1)	--	3(1)*	4(1)	8(3)	8(3)
Trigonometry	Introduction to Trigonometry	1(1)	--	3(1) 3(1)*	4(1)	11(4)	15(5)
	Some Applications of Trigonometry	--	--	--	4(1)	4(1)	
Geometry	Triangles	1(1)	--	3(1)*	4(1)*	8(3)	17(6)
	Circles	--	2(1)	3(1)	--	5(2)	
	Constructions	--	--	--	4(1)	4(1)	
Mensuration	Areas Related to Circles	--	2(1)	3(1) 3(1)*	--	8(3)	8(3)
	Total	**6(6)**	**12(6)**	**30(10)**	**32(8)**	**80(30)**	**80(30)**

Note: * - Internal Choice Questions

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SUBJECT: MATHEMATICS   **MAX. MARKS : 80**
CLASS : X   **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. In ∆ABC, D and E are points on sides AB and AC respectively such that DE ∥ BC and AD : DB = 3 : 1. If AE = 6.6 cm then find EC.

2. If the mid-point of the line segment joining the points P(6, b – 2) and Q(– 2, 4) is (2, – 3), find the value of b.

3. If $\tan \theta = \cot (30° + \theta)$, find the value of θ.

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

5. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.

6. For what value of p, are 2p + 1, 13, 5p – 3 three consecutive terms of an AP?

SECTION – B
Questions 6 to 12 carry 2 marks each.

7. Use Euclid's division algorithm to find the HCF of 504 and 980.

8. Find a quadratic polynomial, whose zeroes are – 3 and 2.

9. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.

10. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.

11. For what values of k will the following pair of linear equations have infinitely many solutions?
    kx + 3y – (k – 3) = 0
    12x + ky – k = 0

12. If the sum of the first 14 terms of an AP is 1050 and its first term is 10, find the 20th term.

SECTION – C
Questions 13 to 22 carry 3 marks each.

13. Prove that $\sqrt{5}$ is an irrational number.

14. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

15. Find the area of the quadrilateral whose vertices, taken in order, are $(-4, -2)$, $(-3, -5)$, $(3, -2)$ and $(2, 3)$.
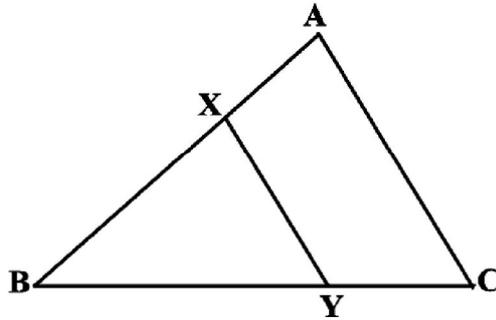
OR

If $(1, 2)$, $(4, y)$, $(x, 6)$ and $(3, 5)$ are the vertices of a parallelogram taken in order, find x and y.

16. D and E are points on the sides CA and CB respectively of a triangle ABC right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$.

OR

In the below figure, the line segment XY is parallel to side AC of Δ ABC and it divides the triangle into two parts of equal areas. Find the ratio $\dfrac{AX}{AB}$.
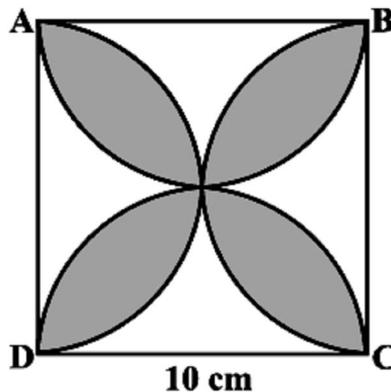

17. If A, B and C are interior angles of a triangle ABC, then show that $\tan\left(\dfrac{A+B}{2}\right) = \dfrac{C}{2}$
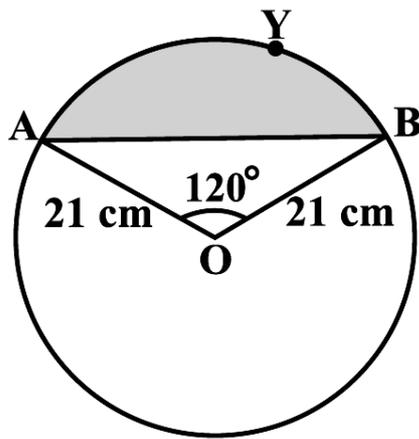
OR

If $\sin (A - B) = \dfrac{1}{2}$, $\cos (A + B) = \dfrac{1}{2}$, $0° < A + B \le 90°$, $A > B$, find A and B.

18. Find the area of the shaded design in below figure, where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$)
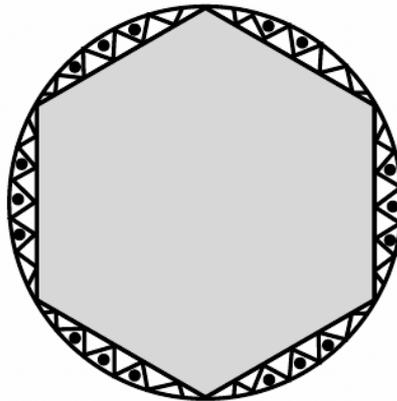

19. Find the area of the segment AYB shown in the below figure, if radius of the circle is 21 cm and $\angle$ AOB = 120°.

OR

A round table cover has six equal designs as shown in the below figure. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of Rs 0.35 per cm². (Use $\sqrt{3}$ = 1.7)

20. If sin 3A = cos (A – 26°), where 3A is an acute angle, find the value of A.

21. On dividing $x^3 – 3x^2 + x + 2$ by a polynomial g(x), the quotient and remainder were x – 2 and –2x + 4, respectively. Find g(x).

22. Draw the graphs of the equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

SECTION – D
Questions 23 to 30 carry 4 marks each.

23. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

24. 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.

OR

A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find its length and breadth.

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

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

26. A train covered a certain distance at a uniform speed. If the train would have been 10 km/h faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 10 km/h; it would have taken 3 hours more than the scheduled time. Find the distance covered by the train.

OR

A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km down-stream. Determine the speed of the stream and that of the boat in still water.

27. The vertices of a Δ ABC are A(4, 6), B(1, 5) and C(7, 2). A line is drawn to intersect sides AB and AC at D and E respectively, such that $\dfrac{AD}{AB} = \dfrac{AE}{AC} = \dfrac{1}{4}$. Calculate the area of the Δ ADE and compare it with the area of Δ ABC.

28. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of first sixteen terms of the AP.

29. Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle$ ABC = 60°. Then construct a triangle whose sides are 3/4 of the corresponding sides of the triangle ABC.

30. Prove that $\dfrac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \sec\theta + \tan\theta$