KENDRIYA VIDYALAYA SANGATHAN, BENGALURU REGION

IST PRE-BOARD EXAMINATION (2017-18)

**CLASS: X**   **SUBJECT: MATHEMATICS**   **TIME: 3hours**   **MARKS: 80**

General instructions:

1. All questions are compulsory. This question paper contains 6 pages
2. The questions paper consists of 30 questions divided into four Sections A, B, C and D.
3. Section A contains 6 questions of 1 mark each, Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 8 questions of 4 marks each.
4. There is no overall choice. However, internal choices are provided in three questions of 3 marks each and two questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not allowed.

SECTION A

1. Write whether the rational number $\frac{51}{1500}$ will have a terminating decimal expansionor a non-terminating repeating decimal expansion.   (1)

2. Write the number of zeroes of the polynomial whose graph is given   (1)
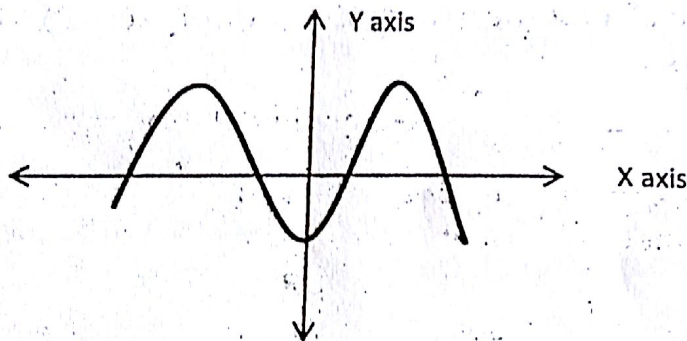
3. Which term of the AP : 72, 63, 54, ... is 0?   (1)

4. Let $\triangle ABC \sim \triangle DEF$ and their areas be respectively, 64cm^2 and 121cm^2. If EF= 15.4cm, find BC.   (1)

5. Find the distance between the pairs of points (a, b), (-a, -b).   (1)

6. If $\angle A$ and $\angle B$ are acute angles such that $\cos A = \cos B$, then show that $\angle A = \angle B$. (1)

SECTION B

7. Given that HCF (306, 657) =9, Find LCM (306,657)   TB (2)

8. For what value of 'a', the point (3, a) lies on the line represented by 2x -3y =5? (2)

9. Find the roots of the quadratic equation3 $x^2 -2\sqrt{6} x +2 =0$ by factorization method.   TB (2)

10. Find the coordinates of the point A, Where AB is the diameter of a circle whose centre is (2, -3) and B is (1, 4).   TB (2)

11. S and T are points on sides PR and QR of $\triangle PQR$ such that $\angle P = \angle RTS$. Show that $\triangle RPQ \sim \triangle RTS$.   TB (2)

12. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.   (2)
TB

SECTION C

13. Prove that $\sqrt{5}$ is irrational.   TB (3

14. Find two numbers whose sum is 27 and product is 182.   X (3

15. Find the value of k for the quadratic equation $kx(x-2) + 6 = 0$ so that it has two equal roots.   X (3

16. If the numbers x-2, 4x-1 and 5x+2 are in A.P. Find the value of x.   X (3

17. If A (-2, 4), B (0, 0) and C (4, 2) are the vertices of $\triangle$ ABC, then find the length of the median through the vertex A   TB (3

OR

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

18. Prove that the lengths of tangents drawn from an external point to a circ are equal.   TB

2

19 Evaluate: $\dfrac{\cos^2 20^0 + \cos^2 70^0}{\sec^2 50^0 - \cot^2 40^0}$ + $2\csc^2 58^0 - 2\cot 58^0 \tan 32^0 + \sin 30^0 \csc 30^0$.
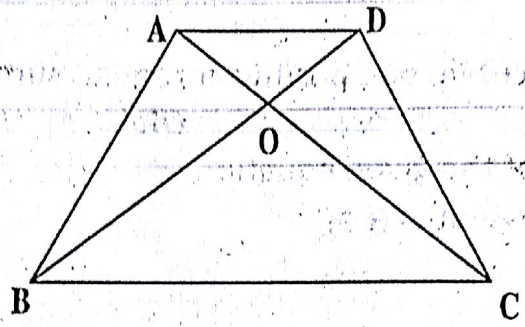
OR

If $\sin\theta + \cos\theta = \sqrt{2}$, then evaluate: $\tan\theta + \cot\theta$ (3)

20 ABC is a right angled at A and D is the midpoint of AB. Prove that
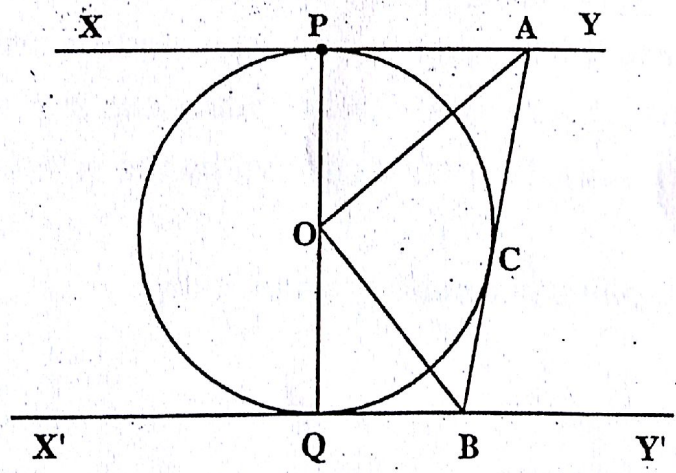$BC^2 = CD^2 + 3BD^2$ (3)

OR

$\triangle ABD$ and $\triangle CBD$ are two triangles on the same base BD. If AC intersects BD at O,

show that $\dfrac{area(ABD)}{area(CBD)} = \dfrac{AO}{CO}$
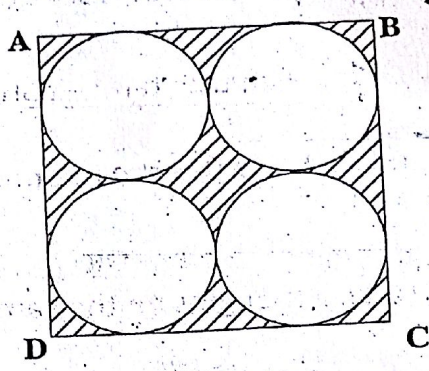
$T\mathcal{B}$

21 In given figure XY and X' Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X' Y' at B . Prove that $\angle AOB = 90^0$ NCRT   (3)

3

22. Find the area of a shaded region where ABCD is a square of 14cm.

SECTION D

23. Find two consecutive odd positive integers, sum of whose squares is 290

OR

(4)

Find the roots of the given equation

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30} \quad (x \neq -4 \text{ and } 7).$$

24. In a school, students thought of planting saplings in and around the school to reduce air pollution It was decided that the number of saplings, that each section of each Class will plant, will be the same as the class, in which they are studying, e.g., a section of Class I will plant 1 sapling, a section of Class II will plant 2 saplings and so on till Class XII. There are three sections of each class. How many saplings will be planted by the students? Write any two values shown by the school children? (4)

25. Represent the pair of equations graphically. (4)

   (i) $x + 3y = 6$

   (ii) $2x - 3y = 12$

   Calculate the area of a triangle formed by the lines so drawn and y-axis.

4

26 Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides (4)

OR

Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides

27 Draw a pair of tangents to a circle of radius 5cm which are inclined to each other at an angle of 60^0. (4)

28 Prove that
$(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A.$ (4)

29 The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storied building are 30° and 45°, respectively. Find the height of the multi-storied building and the distance between the two buildings. (4)

30 Find the area of the shaded region in a given figure, where a circular arc of radius 6cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre. (4)

******