INDIAN SCHOOL SOHAR
PERIODIC TEST II (2018-19)
SUBJECT: MATHEMATICS

CLASS: X   MAX. MARKS: 80
DATE: 18.09.2018   TIME: 3HOURS

General Instructions:
➢ *The question paper consists of 30 questions divided into four sections A, B, C and D.*
➢ *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.*
➢ *Use of calculator is not permitted.*

SECTIONA

1. If HCF (26, 91) = 13, then find LCM (26, 91).

2. If the zeros of the quadratic polynomial $x^2 + (a + 1) x + b$ are 2 and -3, then find "a" and "b".

3. If the areas of two similar triangles are in the ratio 81:64, find the ratio of their corresponding sides.

4. The ratio of height of a tower and the length of its shadow on the ground is $\sqrt{3} : 1$, then find the angle of elevation of the sun.

5. If cos A = $\dfrac{\sqrt{3}}{2}$, then find the value of tan A.

6. For what value of "k", do the equations $3x - y = -8$ and $6x - ky = -16$, represent coincident lines.

SECTIONB

7. Write down the decimal expansion of $\dfrac{16}{3125}$ without actual division.

8. D is a point on the side BC of a triangle ABC such that $\angle$ ADC = $\angle$ BAC. Show that CA^2 = CB.CD

9. Prove that the diagonals of a trapezium divide each other proportionally.

10. Find the smallest number which when divided by 161,207 and 184 leaves remainder 21 in each case.

11. Find the zeros of the quadratic polynomial $p(x) = abx^2 + (b^2 - ac) x - bc$.

12. Find the values of k for which roots of the equation $kx(x - 2) + 6 = 0$ are equal.

SECTION C

13. Use Euclid's division lemma to show that the square of any positive integer is either of the form 3m or 3m + 1 for some integer m.

14. Solve for x: $(\dfrac{x}{x+1})^2 - 5(\dfrac{x}{x+1}) + 6 = 0$.

OR

Solve by the method of completing the squares: $3x^2 - 6x + 2 = 0$

15. If one zero of the polynomial $p(x) = (a^2 + 9) x^2 + 45x + 6a$ is reciprocal of the other, find the value of "a".

16. Solve by using cross multiplication method: $2x + y = 5$ and $3x + 2y = 8$.

OR

The sum of the digits of a two digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

16. Prove that area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

18. Solve for x and y: $139x + 56y = 641$ and $56x + 139y = 724$

19. The diagonals of a quadrilateral ABCD intersect each other at O such that $\dfrac{AO}{BO} = \dfrac{CO}{DO}$. Show that ABCD is a trapezium.

OR

If AD and PM are medians of triangles ABC and PQR respectively. If ΔABC ∼ ΔPQR, prove that
$$\dfrac{AB}{PQ} = \dfrac{AD}{PM}$$

20. The shadow of a tower standing on a ground is found to be 40m longer when the sun's altitude is 30^0 than when it was 60^0. Find the height of the tower.

21. Find acute angles A and B, if $\sin(A + 2B) = \dfrac{\sqrt{3}}{2}$ and $\cos(A + 4B) = 0$.

22. In ΔPQR, right angled at Q, if PR + QR = 25cm and PQ = 5cm determine the value of sin P.

OR

Evaluate: $\dfrac{5\cos^2 60^0 + 4\sec^2 30 - \tan^2 45^0}{\sin^2 30^0 + \cos^2 30}$

SECTION D

23. If α, β zeros of a quadratic polynomial $f(x) = ax^2 + bx + c$, then evaluate (i) $\dfrac{1}{\alpha^3} + \dfrac{1}{\beta^3}$

24. Father's age is 3 times the sum of ages of his two children .After 5 years his age will be twice the sum of ages of the two children. Find the age of father.

25. Evaluate: $\sin(50+\theta) - \cos(40-\theta) + \dfrac{1}{4}\cot^2 30 + \dfrac{3\tan 45.\tan 20.\tan 40.\tan 50.\tan 70}{5}$

$+ \dfrac{\sin^2 63 + \sin^2 27}{\cos^2 17 + \cos^2 73}$

26. A straight highway leads to the foot of the tower. A man standing at the top of the tower observes a car at an angle of depression of 30^0, which is approaching to the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60^0. Find the time taken by the car to reach the foot of the tower from this point.

OR

The angle of elevation of a jet plane from a point P on the ground is 60^0. After a flight of 15 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $1500 \sqrt{3}$ m, find the speed of the jet plane.

27. 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.

28. Solve graphically the following system of equations: x + 2y = 5 and 2x − 3y + 4 = 0

29. Prove that $\dfrac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \dfrac{1}{\sec\theta - \tan\theta}$

OR

Prove that, $a^2 + b^2 = x^2 + y^2$ when x = a $\cos\theta$ - b $\sin\theta$ and y = a $\sin\theta$ + b $\cos\theta$

30. A motor boat whose speed is 18km/hr in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

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