Code No. **Series AG-9**   **CLASS X**   **TMG -D/79/89**

- Please check that this question paper contains 3 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.

General Instructions: -

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into three sections A, B ,C and D . Section A contains 10 questions of 1 marks each, Section B is of 5 questions of 2 marks each, Section C is of 10 questions of 3 marks each and Section D is of 5questions of 6 marks each.
3. Write the serial number of the question before attempting it.
4. If you wish to answer any question already answered, cancel the previous answer.
5. In questions where internal choices is provided. You must attempt only one choice.

MATHEMATICS

Time Allowed : 3 hours   **Maximum Marks : 80**

SECTION A

1. Find the value of k, for which the pair of linear equations kx – 2y = 3 and 3x + y = 5 has no solution.
2. Prove that $3 - \sqrt{5}$ is an irrational number.
3. In ABC, DE BC and $\frac{AD}{DB} = \frac{3}{5}$, if AC = 8cm, find AE.
4. Find the sum and product of zeros of $2x^2 + 5x - 6$.
5. The prime factorization of 2310 is 2 x 3 x a x 7 x b. Find a and b.
6. The perimeters of two similar triangles are 36cm and 48cm respectively. If one side of the first triangle is 9cm, what is the corresponding side of the other triangle?
7. Let a and b are two prime numbers, write the LCM(a,b) .
8. If $\cos^4 A - \sin^4 A = 1$, find the value of $\cos^2 A - \sin^2 A$..
9. For what value of p, $x^2 + px + 4 = 0$ will have real roots.
10. An arc of a circle having measure 18^0, has length 22cm. Find the radius of the circle.

SECTION B

11. Solve :139x + 56y = 641 ; 56x + 139y = 724

OR

   2(ax + by) + (a + 4b) = 0 ; 2(bx + ay) + (b – 4a) = 0
12. Evaluate $\frac{\tan 20°}{\cot 70°}$ + $\frac{\csc 20°}{\sec 70°}$ + 2 tan 15° tan 37° tan 53° tan 60° tan 75°.
13. D is any point on side BC of ABC, such that $\angle ADC = \angle BAC$, prove that BC.CD = AC^2.
14. Prove that the parallelogram circumscribing a circle is a rhombus.
15. Find other zeros of the polynomial $2x^4 - 3x^3 - 3x^2 + 6x - 2$, if it is given that two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

SECTION C

16. The cost of fencing a circular field at Rs.11.50 per metre is Rs.2530. The field is to be ploughed at the rate of Rs. 6.50 per sq m. Find the cost of ploughing the field.

OR

The difference between the radii of the smaller circle and the bigger circle is 7 cm and the difference between the areas of the two circles is 1078 sq cm. Find the radius of the smaller circle.

17. Solve for x: $\dfrac{1}{p+q+x} = \dfrac{1}{p} + \dfrac{1}{q} + \dfrac{1}{x}$; $p+q \neq 0$.

18. The line joining the points (2, 1) and (5, - 8) is trisected at the points P and Q.If the point p lies on the line 2x – y + k = 0, find the value of k. .

OR

Find the coordinates of the point which is at a distance of 2 units from (5,4) and 10 units from(11,-2) .

19. The king, queen and jack of clubs are removed from a deck of 52 playing cards then well shuffled. One card is selected from the remaining cards. Find the probability of getting (i) a heart (ii) a king   (iii) a club(iv) the '10, of hearts .
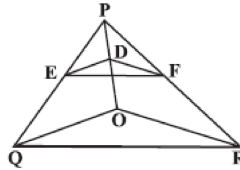
20. Prove $\dfrac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1} = \dfrac{1 + \cos A}{\sin A}$

OR

$\dfrac{1}{\operatorname{cosec} A + \cot A} - \dfrac{1}{\sin A} = \dfrac{1}{\sin A} - \dfrac{1}{\operatorname{cosec} A - \cot A}$.

21. Draw a circle of 3 .4 cm radius. Take a point P out side the circle. Draw two tangents to the circle from the point P without using the center .

22. In Fig., DE || OQ and DF || OR. Show that EF || QR.

23. A spiral is made up of successive semicircles, with centre alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm, . . ….. as shown in fig. What is the total length of such a spiral made up of thirteen consecutive semicircles?(Take $= \dfrac{22}{7}$)
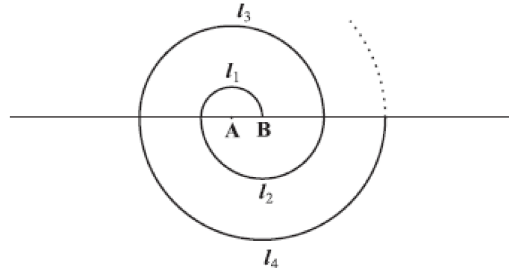
24. The decorative block is made of two solids- a cube and a hemisphere. The base of the block is a cube with edge 5cm, and the hemisphere fixed on the top has diameter of 4.2 cm. Find the total surface area of the block.

25. The angles of a triangle are in AP. The greatest angle is twice the smallest. Find the angles.

SECTION D

26. A pole projected outwards from a window 10m above the ground of a building makes an angle of 30^0 with the wall. The angles of elevations of the bottom and top of the pole from a point on the ground are 30^0 and 60^0 respectively. Find the length of the pole.

OR

An aeroplane when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60^0 and 45^0 respectively. Find the distance between the aeroplanes at that instant.

27. Find the median from the following table:

Marks	No. of Students
Below 10	15
Below 20	35
Below 30	60
Below 40	84
Below 50	94
Below 60	127
Below 70	198
Below 80	249

28. A tent is made in the form of a conic frustum surmounted by a cone. The diameter of the base and the top of the frustum are 14 m and 7 m and its height is 8 m. The height of the tent is 12 m. find the quantity of the canvas required.

OR

The radii of the bases of two right circular solid cones of same height are r_1 and r_2 respectively. The   cones are melted and recast into a solid sphere of radius R. show that the height of each cone is given   by

$$h = \frac{4R^3}{r_1^2 + r_2^2}.$$

29. "In a right triangle, the square of hypotenuse is equal to the sum of squares of other two sides." Prove
    In a   ABC, $AD \perp BC$, prove that $AB^2 + CD^2 = AC^2 + BD^2$.

30. A boat can go 20km downstream and 30 km upstream in 3 hrs. It can go 20km downstream and 10 km upstream in $1\frac{2}{3}$ hrs. Find the speed of boat in still water and speed of stream.

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