Code No. **Series AG-TS4**    **CLASS X**    **TMG -D/79/89**

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

- 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.

## SECTION A

1. Without actually performing long division, write down the decimal expansion of $\dfrac{23}{200}$ .

2. Form a quadratic polynomial whose zeroes are $2+\sqrt{3}$ and $2-\sqrt{3}$ .

3. Find out whether the line representing the following pair of linear equations intersect at a point, are parallel or coincident. $\dfrac{4}{3}x+2y=8; 2x+3y=12$ .

4. In the following AP, find the missing term in the box. 2, ( ),26

5. If $\theta$ is an acute angle and $\sin\theta=\cos\theta$ find the value of $2\tan^2\theta+\sin^2\theta-1$.

6. A steel wire , when bent in the form of a square , encloses an area of 121 square cm . The same wire is bent in the form of a circle . Find the area of the circle .

7. Find the sum of first n natural number .

8. A letter is chosen at random from the letters of the word 'UNIVERSAL'. Find the probability the letter chosen is not a vowel.

9. A bicycle wheel makes 5000 revolution in moving 11 km. Find the diameter of the wheel.

10. The wicket taken by a bowler in 10 cricket matches are as follows : 2,6,4,5,0,2,1,3,2,3. Find the mode of the data.

## SECTION B

11. 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).

12. Without Using trigonometric tables, evaluate $\dfrac{\sec^2 36^0-\cot^2 54^0}{\cos ec^2 57^0-\tan^2 33^0}+2\sin^2 22^0\cos^2 45^0\sec^2 68^0$

OR

If $Sin(A+B)=SinACosB+CosASinB$ then, find the value of $\sin 75^0$.

**13.** If A and B are (-2,-2) and (2,-4) respectively, find the coordinates of p such that $AP = \dfrac{3}{7} AB$ and p lies on the line segment AB.
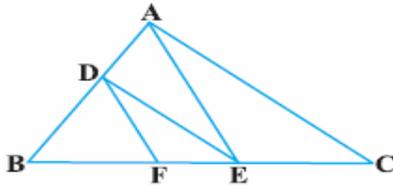
**14.** In Fig. [figure: triangle ABC with D on AB, points F and E on BC, cevians drawn], DE || AC and DF || AE. Prove that $\dfrac{BF}{EF} = \dfrac{BE}{EC}$ .

**15.** Three unbiased coins are tossed together, find the probability of getting (i) at least two heads (ii) at most two heads .

## SECTION C

**16.** Prove that $3 + 2\sqrt{5}$ is irrational.

OR

Show that any positive odd integer is of the form $6q + 1 \; or \; 6q + 3 \; or \; 6q + 5$, where q is some integer.

**17.** Find the roots of the equation $a^2 x^2 - 3abx + 2b^2 = 0$ by the method of completing the square.

**18.** Check graphically whether the pair of equations and $\begin{matrix} x + 3y = 6 \\ 2x - 3y = 12 \end{matrix}$ is consistent. If so, solve them graphically.

**19.** The first term of an AP is 5, the last term is 45 and the sum is 400.Find the number of terms and the common difference.

OR

A spiral is made up of successive semi-circles, with centres alternately at A and B , starting with centre
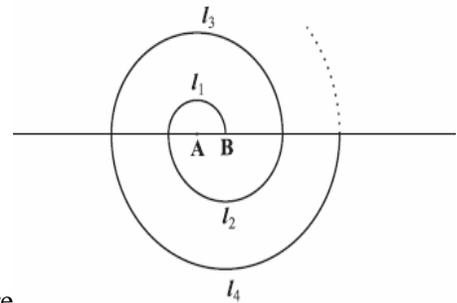
at A, of radii 0.5cm, 1.0cm, 1.5cm, 2.0 cm,….as shown in Figure .
What is the total length of such a spiral made up of thirteen consecutive semi-circles ?

**20.** Find the value of $\sin 45^0$ geometrically.

**21.** Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : $(-1, -2)(1, 0), (-1, 2), (-3, 0)$ .

**22.** A median of a triangle divides it into two triangles of equal areas. Verify this result for $\Delta ABC$ whose vertices are A(4,-6),B (3,-2) and C (5,2)

**23.** Draw a circle of radius 6 cm from a point 10cm away from its centre. .Construct the pair of tangents to the circle and measure their lengths.

**24.** In an equilateral triangle ABC, D is a point on side BC such that BD = $\dfrac{1}{3} BC$ .Prove that $9AD^2 = 7AB^2$ .

OR

A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D into length 8cm and 6cm respectively .Find the sides AB and AC.
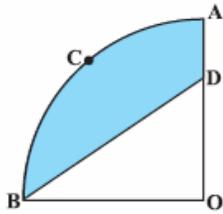
**25.** In Fig.  , OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the (i) quadrant OACB, (ii) shaded region.

## SECTION D

**26.** Formulate the following problem as a pair of equations, and find its solution :

Ritu Can row downstream 20 km in 2 hours, and upstream 4km in 2 hours. Find her speed of rowing in still water and the speed of the current.

OR

Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more.. Find the number of students in the class.

**27.** The angle of elevation and depression of the top and bottom of a lighthouse from the top of a building,60 m high are $30^0$ $and 60^0$ respectively. Find.

(i) the difference between the height of the lighthouse and the building.

(ii) distance between the light house and the building.

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

Using the above result do the following :

Diagonals of a trapezium ABCD with *ABIIDC* intersect each other at the point O. If AB = 2 CD, find the ratio of the areas of triangles AOB and COD.

**29.** From a solid cylinder whose height is 2.4cm and diameter 1.4cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area

of the remaining solid to the nearest $cm^2$.

OR

A 20cm high metallic right circular cone whose vertical angle is $60^0$ 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

$\frac{1}{16}cm,$ find the length of the wire.

**30.** During the medical check-up of 35 students of a class, their weights were recorded as follows :

| Weight (in kg) | Number of students | Weight (in kg) | Number of students |
|---|---|---|---|
| Less than 38 | 0 | Less than 46 | 14 |
| Less than 40 | 3 | Less than 48 | 28 |
| Less than 42 | 5 | Less than 50 | 32 |
| Less than 44 | 9 | Less than 52 | 35 |

Draw a less than type ogive for the given data. .Find out the median weight from the graph and verify the result by using the formula.

✱✱✱✱✱✱✱✱✱✱✱✱✱✱✱