Year of Quality education 18th

Code No. **Series AG-C** **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. In the following A.P's, find the missing terms : - 4 * * * * 6 .

2. For what value of k , the following linear equation have no solution:(3k+1) x +3y-2=0 and (k^2 +1) x+ (k-2) y -5 =0 .

3. Write the nature of the roots of the quadratic equations $2x^2+5x+5=0$.

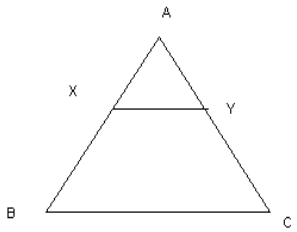
4. If $\sqrt{2}\tan\theta = 1$, evaluate $\dfrac{\cos ec^2\theta - \sec^2\theta}{\cos ec^2\theta + \cot^2\theta}$.

5. Write first three terms of the sequence whose nth term is $\dfrac{n(n-2)}{2}$.

6.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 area of two circle.

7. In the trapezium ABCD, AB II CD and AB = 2 CD. If the area of $\Delta AOB = 84cm^2$, find the area of ΔCOD .

8. In the given figure XY *ll* BC. Find the length of XY. Given AX= 2 cm ,BX= 6 cm , BC = 12 cm .



9. From a well shuffled pack of 52 playing cards, three kings and two black jacks are removed. From the remaining cards, a card is drawn at random. Find the probability that the drawn card is neither an ace nor a king.

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10. The graph of y = $ax^2 + bx + c$ cuts the x-axis at (a,0) and (-b,0).Find all the zeros of the polynomials $ax^2 + bx + c$.

SECTION B

11. In a class test, the sum of Shefali's marks in Mathematics and English is 30.Had she got 2 marks more in Mathematics and 3 marks less in English , the product would have been 210.Find her marks in the two subjects.

12. Solve the following system of equations : $3(x+3y) = 11xy, 3(2x+y) = 7xy$.

13. If $(0,b), \left(\frac{-a}{2}, \frac{b}{2}\right) \& \left(\frac{a}{2}, \frac{-b}{2}\right)$ are the mid-points of the sides of a triangle, find the coordinates of its centroid.

OR

Find the area of ΔABC , the coordinates of the mid-points of whose sides are D(-1,-2), E (6,1) and F (3,5) respectively.

14. If the sum of 7 terms of an A.P is 49 and that of 17 terms is 289, find the sum of n terms.

15. Find the value of cos 15 using formula cos(A – B) = cosA cosB + sinA sin B .

SECTION C

16. Apply the division algorithm to find the quotient and remainder on dividing p(x) by g(x), where p(x) = $x^4 - 5x + 6$ and g(x) = $2 - x^2$ .Also, verify the division algorithm.

17. Determine graphically the coordinates of vertices of a triangle, the equations of whose sides are y = x, 3y = x, x + y = 8 .

18. The sum of three numbers in A.P. is 27 and their product is 405. Find the numbers.

19. 200 logs are stacked in the following manner : 20 logs in the bottom row , 19 in the next row , 18 in the row next to it and so on . In how many row , the 200 logs are placed and how many logs are in the top row ?

20. Prove that : $(\sin^8\theta - \cos^8\theta) = (\sin^2\theta - \cos^2\theta)(1 - 2\sin^2\theta\cos^2\theta)$.

OR

Prove that : $(\sin\theta + \sec\theta)^2 + (\cos\theta + \cos ec\theta)^2 = (1 + \sec\theta.\cos ec\theta)^2$.

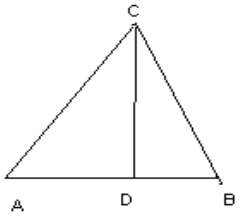
21. Show that the points (2a,4a), (2a,6a) and $(2a + \sqrt{3}a, 5a)$ are vertices of an equilateral triangle.

22. 17 cards numbered 1,2,3,….. 16,17 are put in a box and mixed thoroughly. One person draws a card from the box. Find the probability that the number on the card is (i) a prime (ii) divisible by 3 (iii) divisible by 2 and 3 both.

OR

A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random, from the jar, the probability that it is green is $\frac{2}{3}$,find the number of blue marbles in the jar.

23. In this figures, $\angle ACB = 90^0$ and CD $\perp$ AB.Prove that $\frac{CB^2}{CA^2} = \frac{BD}{AD}$



24. Draw a right triangle in which the sides (other than the hypotenuse) are of length 4cm and 3 cm. Then construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

25. Find the area of the shaded region in the following fig. area of triangle ACB is 35 cm ^{2} and CD = 5 cm.

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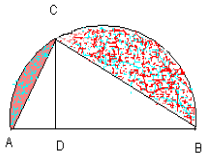

OR

A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. find the height of the platform.

SECTION D

26. Tap A fills a tank whereas Tap B empties it . Tap B take 4 hours more to empty the tank then Tap A takes to fill the tank . If both the taps are opened simultaneously and the tank is filled in 24 hours . Find the time taken by Tap A to fill the tank .

27. A parachutist is descending vertically and makes angles $45^0 \, and \, 60^0$ at two observation points 100 m a parts from each other on the left side of him self .find ,the meters, the approximate height from which he falls and also find , in meters the approximate distance of the point where he falls on the ground from the first observation point.

OR

A statue 1.6 m tall, stands on the top of a pedestal .From a point on the ground , the angle of elevation of the top of the statue is 60^0 and from the same point the angle of elevation of the top of the pedestal is 45^0. Find the height of the pedestal.

28. Prove that is a line divides any two sides of a triangle in the same ratio, and then the line is parallel to third sides. Using the above theorem prove that ABCD is a trapezium with $AB \| DC$. E and F are points on nonparallel sides AD and BC respectively, such that $EF \| AB$. Show that $\frac{AE}{ED} = \frac{BF}{FC}$.

29. 100 surnames were randomly picked from a local telephone directory and frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows:

Numbers of letters	Number of surnames
1-4	6
4-7	30
7-10	40
10-13	16
13-16	5
16-19	3

Determine the mean number of letter in the surname. Find the median number of letters in the surnames? Also find the modal size of the surnames.

30. A farmer connects a pipe of internal dimeter 20 cm from a canal into a cylinder tank in her field , which is 10 m in diameter and 2 m deep . if water flows through the pipe at the rate of 3 km/ hr , in how much time will the tank be filled.

OR

A gulabjamun contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 gulabjamuns shaped like a cylinder with two hemispherical ends with length 5cm and diameter 2.8cm.

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