



Code No. **Series AG-5**

CLASS X

- 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 5 questions 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.

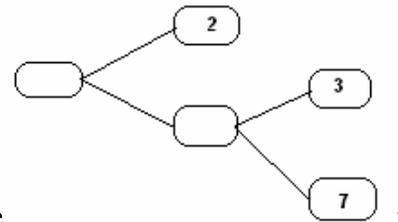
MATHEMATICS

Time Allowed : 3 hours

Maximum Marks : 80

SECTION A

1. Find the number which when divided by 117 gives 41 as quotient and 23 as remainder.
2. Find x , if $a = 40$, $\sum fd = -300$ and $\sum f = 60$.
3. The area of the sector of a circle of radius 17.5 cm is 192.5 sq cm. Find the central angle of the sector.
4. The prime factorization of 2310 is $2 \times 3 \times a \times 7 \times b$. Find a and b .
5. An arc of a circle having measure 18° , has length 22cm. Find the radius of the circle.
6. If $\cos^4 A - \sin^4 A = 1$, find the value of $\cos^2 A - \sin^2 A$.
7. Two friends were born in the year 2000. What is the probability that they have the same birthday?



8. Complete the missing entries in the following factor tree
9. Write the HCF of the smallest composite number and the smallest prime number.
10. 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?

SECTION B

11. Solve using quadratic formula $36x^2 - 12ax + (a^2 - b^2) = 0$.
12. Evaluate: $2\left(\frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 25^\circ + \sin^2 65^\circ}\right) - \tan 45^\circ + \tan 13^\circ \tan 23^\circ \tan 30^\circ \tan 67^\circ \tan 77^\circ$.
13. The line joining the points $(2, 1)$ and $(5, -8)$ is trisected at the points P and Q.

Agyat gupta (TARGET MATHEMATICS)

If the point p lies on the line $2x - y + k = 0$, find the value of k.

- 14. Find the value of x for which the distance between the point P(2,-3) and Q (x,5) is 10 units.
- 15. Cards, marked with numbers 5 to 50 are placed in a box mixed thoroughly. A card is drawn from the box at random. Find the probability that the number on the taken out card is
 - (i) a prime number less than 10.
 - (ii) a number which is perfect square.

OR

In a family, there are three children. Assuming that the chances of a child being a male or female are equal, find the probability that (a) there is one girl in the family (b) there is no male child in the family (c) there is at least one male child in the family.

SECTION C

- 16. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?
- 17. For what value of 'k' will the following part of linear equations have infinitely many solutions. $kx + 3y = k - 3; 2x + ky = k$.

18. Which term of the sequence $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}, \dots$ is first negative terms?

19. Prove that: $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$.

OR

Prove that : $\frac{\sin \theta}{\cot \theta + \operatorname{cosec} \theta} = 2 + \frac{\sin \theta}{\cot \theta - \operatorname{cosec} \theta}$.

20. If A and B are (-2, -2) and (2, -4) respectively, find the coordinates of P such that $AP = \frac{3}{7} AB$ and P lies on the line segment AB.

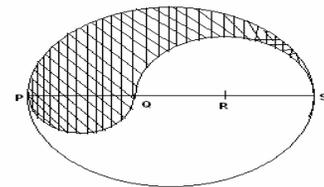
OR

Prove that the distance between two point (x_1, y_1) & (x_2, y_2) is equal to $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

- 21. In a class test, the sum of the marks obtained by P in Mathematics and Science is 28. Had he got 3 more marks in Mathematics and 4 marks less in science, the product of marks obtained in the two subjects would have been 180. Find the marks obtained in the two subjects separately.
- 22. Construct a triangle similar to a given triangle with sides 6cm, 7cm and 8cm and whose sides are $\frac{7}{5}$ th of the corresponding sides of the given triangle.
- 23. The incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. If $AB = AC$, prove that $BD = CD$.
- 24. How many terms of an A.P. -10,-7,-4,-1..... must be added to get the sum 104?
- 25. 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.

OR

PQRS is a diameter of a circle of radius 6 cm. The lengths PQ, QR and RS are equal. Semi-circles are drawn on PQ and QS as diameters. Find the area of shaded region



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SECTION D

26. Form a pair of linear equation in two variables using the following information and solve it graphically. Five year ago, sagar was twice as old as Tiru. Ten years later Sagar's age will be ten years more than Tiru's age. Find their present ages. What was the age of Sagar when Tiru was born ?
27. The angle of elevation of a jet fighter from a point A on the ground is 60° . After a flight of 15seconds, the angle of elevation changes to 30° . If the jet is flying at a speed of 720 km/hour, find the constant height at which the jet is flying.

OR

A tree breaks due to storm and the broken part bends, so that the top of the tree touches the ground making an angle of 30° with the ground. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

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

Using the above result, prove the following :

In a ΔABC , XY is parallel to BC and it divides ΔABC into two parts of equal area. Prove that $\frac{BX}{AB} = \frac{\sqrt{2} - 1}{\sqrt{2}}$.

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

No. of letters	1-4	4-7	7-10	10-13	13-16	16-19
No. of surnames	6	30	40	16	4	4

Determine the median and mean number of letters in the surnames. Also find the modal size of surnames.

30. A gulab jamun, when ready to eating, contains sugar syrup of about 30% of its volume. Find approximately how much syrup would be found in 45 such gulab jamuns, each shaped like a cylinder with two hemispherical ends, if the complete length of each of them is 5 cm and its diameter 2.8 cm.

OR

A tent consists of frustum of a con, surmounted by a cone. If the diameters of the upper and lower circular ends of the frustum be 14 m and 26 m respectively, the height of the frustum be 8 m and the slant height of he surmounted conical portion be 12 m, find the area of canvas required to make the tent. (Assume that the radii of the upper circular end of the frustum and the base of surmounted conical portion are equal.)
