

Class : X
Subject : MATHEMATICS

Max Marks:80
Time Allotted: 3 hrs

Instructions:

1. All questions are compulsory.
 2. The question paper consists of 30 questions. Section – A comprises of 6 questions of 1 mark each, Section – B comprises of 6 questions of 2 marks each, Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 8 questions of 4 marks each.
 3. Use of calculator is not permitted.
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SECTION –A

1. State EUCLID'S division lemma.
2. Find the cubic polynomial whose zeroes are 2,-3 and 5.
3. Find 37th term of AP \sqrt{x} , $3\sqrt{x}$, $5\sqrt{x}$, $7\sqrt{x}$
4. Prove that the tangent drawn at the ends of a diameter of a circle are parallel.
5. If the median and mode of a data are 52 and 52.4 respectively then find its mean using the empirical relationship between mean, mode and median.
6. If the probability of winning a game is 0.7, what is the probability of losing it?

SECTION –B

7. Write the decimal expansion of (i) $\frac{16584}{625}$ (ii) $\frac{3647}{2^2 \times 5^4}$
8. Find the zeroes of the polynomial $f(x) = \sqrt{3}x^2 + 10x + 7\sqrt{3}$ and verify the relationship between the zeroes and the coefficient.
9. For what value of k will the equations $3x+4y+2=0$ and $9x+12y+k=0$ represent coincident lines?
10. In what ratio is the line segment joining the points (3,-6)and (-6,8) divided by the y-axis?
11. Find the value of $\cos 15^\circ$ using the formula $\cos(A-B) = \cos A \cos B + \sin A \sin B$
12. If $\sum f_i x_i = 132 + 5p$, $\sum f_i = 20$ and mean of the distribution is 8.1, then calculate the value of p.

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. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.
15. A person saves Re. 1 on the first day and increases his savings daily by Re. 1 What will be his savings in 365 days?
16. D and E are points on the sides CA and CB respectively of a ΔABC right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$.

17. A park is in the form a rectangle of dimensions 120m x 100m. At the centre of the park there is a circular lawn. The area of the park excluding the circular lawn is 8700 sq m. Find the radius of the circular lawn.
18. Prove : $\frac{\sec A + \tan A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$
19. The angle of elevation of a kite, as observed from a point 10 m above the lake is found to be 30° . and the angle of depression of its reflection in the lake is found to be 60° . Determine the height of the kite from the lake.
20. In a single throw of 3 dice, find the probability of getting a total of 17 or 18.
21. A chord PQ of a circle of radius 10 cm makes a right angle at the centre of the circle. Find the area of the major and the minor segments. (Take $\pi = 3.14$)
22. Water in a canal 6m wide and 1.5 m deep is flowing with the speed of 10km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?

SECTION –D

23. Determine graphically the vertices of the triangle, the equations of whose sides are $5y - x = 7$, $3y - 5x = -9$ and $y + 2x = -3$.
24. Solve for x: $\frac{x}{4} + \frac{x}{9} + \frac{x}{4} + 7\sqrt{x} + 56 = x$.
25. Name the type of the triangle formed by the points A(3,2), B (-2,-3) and C(2,3). Justify your answer.
26. State and prove the Area theorem.
27. Construct tangents to a circle of radius 3 cm from a point on the concentric circle of radius 5 cm and measure their lengths. Write steps of construction.
28. A pole 5m high is fixed on the top of the tower. The angle of elevation of the top of the pole observed from point A on the ground is 60° and the angle of depression of the point A from the top of the tower is 45° . Find the height of the tower. ($\sqrt{3} = 1.732$)
29. From the following frequency distribution table, draw a 'more than type ogive' and Find the Median using graph.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	8	12	21	30	22	7

30. A cylindrical reservoir is 14 m in diameter. Water is poured into it at the rate of 350 liters per minute. Find the rate in cm per hour at which water level rises in the reservoir.