

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. Find the number nearest to 110000 but greater than 100000 which is exactly divisible by each of 8, 15 and 21.
2. Find the quadratic polynomial whose zeroes are $-\sqrt{2}$ and $\sqrt{3}$.
3. How many terms of two digits are divisible by 3?
4. Two concentric circles are of radii 5cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.
5. If $u_i = \frac{x_i - 25}{10}$, $\sum f_i u_i = 20$ and $\sum f_i = 100$, then find the value of \bar{x} .
6. A die is thrown twice. What is the probability that 5 will come up at least once?

SECTION –B

7. Prove that $5 - 2\sqrt{3}$ is an irrational number.
8. If $-\sqrt{2}$ and $\sqrt{2}$ are two zeroes of the polynomial $2x^4 + 7x^3 - 19x^2 - 14x + 30$, find its remaining zeroes.
9. Solve for x and y: $55x + 67y = 311$, $67x + 55y = 299$.
10. Find the area of triangle, whose vertices are A (2,3), B(-2,1) and C(3,-2).
11. Evaluate: $\frac{\cos 35^\circ}{\sin 55^\circ} + \frac{\sin 11^\circ}{\cos 79^\circ} - \cos 28^\circ \operatorname{cosec} 62^\circ$
12. The mean of the following frequency distribution is 53. Find the value of p.

Class interval	0-20	20-40	40-60	60-80	80-100
Frequency	12	15	32	p	13

SECTION –C

13. Use Euclid's division algorithm to find the HCF of 21658 and 8624.
14. Find the value of k for which the roots of quadratic equation $x^2 - 2(k+1)x + k^2 = 0$ are real and equal.
15. Find the value of X, if $(-4) + (-1) + 2 + \dots + X = 437$
16. Prove that sum of the squares of the diagonals of a parallelogram is equal to sum of the squares of its sides.
17. Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angle at the centre.

18. Prove that $\frac{\sin \theta}{1-\cos \theta} + \frac{\tan \theta}{1+\cos \theta} = \sec \theta \operatorname{cosec} \theta + \cot \theta$

19. The angle of elevation of a jet plane from the point A on the ground is 60° . After 10 second of the flight the angle of elevation changes to 30° . If the speed of the plane is 900 km/hr, find the constant height at which the jet is flying. ($\sqrt{3} = 1.732$)

20. Cards numbered 3,4,5...,17 are put in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the card drawn bears (i) an even number (ii) a number divisible by 3 or 5 (iii) a prime number.

21. Two circles touch internally. The sum of their areas is 116π sq. cm. and the distance between their centers is 6 cm. Find the radii of the two given circles.

22. How many spherical leads shots each 4.2 cm in diameter can be obtained from a rectangular solid of lead with dimensions 66 cm, 42cm and 21cm?

SECTION –D

23. A person can row 4 km upstream and 16 km downstream in 1 hour 50 minutes. He can row 20 km upstream and 20 km downstream in 4 hours 10 minutes. Find the speed of the boat in still water and the speed of the stream.

24. Solve for x: $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$, $x \neq 2, 4$

25. Find the ratio in which the join of points (3,-1) and (8,9) is divided by the line $y-x+2=0$.

26. State and prove the Basic Proportionality theorem.

27. Construct a triangle ABC in which $AB = 5.5$ cm, $BC = 8.5$ cm and $AC = 7$ cm. Draw a triangle similar to ΔABC with its sides equal to $\frac{2}{3}$ of the corresponding sides of ΔABC . Write steps of construction.

28. Two points A and B are on opposite sides of a tower. The top of the tower makes the angle of 30° and 45° at A and B respectively. If the height of the tower is 40 m, find the distance AB.

($\sqrt{3} = 1.732$)

29. Find the median weekly wages of the workers from the following frequency distribution table.

Class interval	Below 1000	Below 900	Below 800	Below 700	Below 600	Below 500
Frequency	50	45	32	18	10	2

30. A solid metallic sphere of diameter 21 cm is melted and recast into a number of smaller cones, each of diameter 7 cm and height 3 cm. Find the number of cones so formed.