

SUBJECT: MATHEMATICS

CLASS 10TH

TIME: 3 HOURS

MAX MARKS: 80

General Instructions:

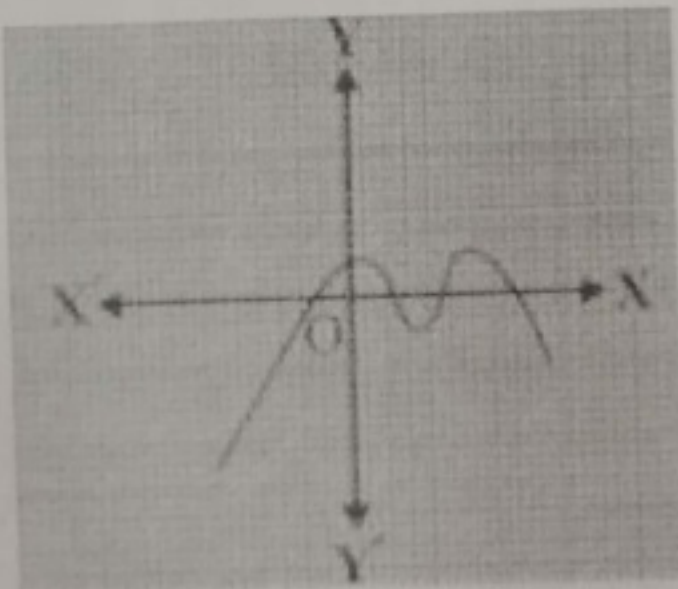
- i. This question paper comprises of four sections A, B, C & D and carries 40 questions of 80 marks. All questions are compulsory.
- ii. Section-A-Q No.1 to Q 20 comprises of 20 questions of one mark each.
- iii. Section-B-Q No.21 to Q 26 comprises of 6 questions of two marks each.
- iv. Section-C-Q No.27 to Q 34 comprises of 8 questions of three marks each.
- v. Section-D-Q No.35 to Q 40 comprises of 6 questions of four marks each.
- vi. There is no overall choice in the question paper. However, choice has been provided in 2 questions of one mark, 2 questions of two marks, 2 questions of three marks and 4 questions of four marks. Student has to attempt only one of the choice in such questions.

SECTION-A

1. The number $1 - \sqrt{3}$ is:

- (A) an even number (B) an irrational number (C) odd number (D) a rational number

2. Graph of a polynomial is given below:



Number of zeros of polynomial are:

- (A) 1 (B) 2 (C) 3 (D) 4

3. The pair of linear equations $2x - y + 9 = 0$ and $6x - 3y + 10 = 0$ are:

- (A) parallel (B) intersecting (C) coincident (D) none

4. 30th term of the AP: 10, 7, 4, . . . is

- (A) 97 (B) 77 (C) -77 (D) -87

5. $\sin^2(25^\circ) + \cos^2(25^\circ)$ is equal to

- (A) $\sin(30^\circ)$ (B) $\sin(90^\circ)$ (C) $\cos(90^\circ)$ (D) $\sin(0^\circ)$

6. The abscissa of any point on y-axis is

- (A) 0 (B) 1 (C) -1 (D) none

7. HCF (0, 2) is

- (A) 0 (B) 2 (C) not possible to find (D) none

8. Getting a natural number greater than zero is an example of

- (A) impossible event (B) sure event (C) simple event (D) none

9. Three times volume of right circular cone of given height (h) and radius r is equal to:

- (A) twice volume of cylinder of height h and radius r (B) volume of cylinder of height h and radius r
(C) half of volume of cylinder of height h and radius r (D) none

10. Which of the following is quadratic equation

- (A) $1+x^2+\sqrt{x}=0$ (B) $(x-1)^2=(x-2)^2$ (C) $(x-1)(x-2)=x^2+2$ (D) $x^2+2=5$

11. Prime factorization of 1001 is 7.11.13 (True/False)

12. The sum of first n natural numbers is _____

13. If $P(A) = \frac{1}{2}$ then $P(\text{not } A) = \frac{1}{2}$ (True/False)

14. All _____ triangles are similar.

15. A circle can have _____ parallel tangents at the most.

16. Write formula for sum to n terms of an AP.

17. $\sqrt{2}x + \sqrt{3}y = 4$ is an example of linear equation in two variables. (True/False)

(True/False)

18. $\sin(30^\circ) + \cos(60^\circ)$ is equal to $\tan(45^\circ)$.

OR

If $\sin A = \cos A$, where A is acute angle, then angle A is _____

19. Calculate mean of first 10 natural numbers.

20. Write the formula for Mean of Grouped data.

OR

Mode of observations 4, 2, 9, 2, 1, 3, 2, 5, 2 is _____

SECTION-B

21. Solve by substitution method

$$\sqrt{2}x + \sqrt{3}y = 0 \text{ and } \sqrt{3}x - \sqrt{8}y = 0$$

22. Find discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$ and hence nature of roots.

23. Given $15\cot A = 8$, find $\sec A$.

24. Find volume of hemisphere of radius 2 cm.

OR

Calculate volume of cylinder of radius 1 cm and height 1 cm.

25. Find the point on the x-axis which is equidistant from (2, -5) and (-2, 9).

OR

Determine if the points (1, 5), (2, 3) and (-2, -11) are collinear.

26. The sum and product of zeros of quadratic polynomial $x^2 - 15$ are?

SECTION-C

27. 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.

28. Find the area of the sector of a circle with radius 4 cm and angle 30° . Also find the area of the corresponding major sector.

29. Prove that the tangent drawn at the ends of a diameter of a circle are parallel.

OR

Prove that the lengths of tangents drawn from an external point to a circle are equal.

30. Prove that if a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

31. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \cdot CD$

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

33. The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

OR

Find the sum of first 22 terms of an AP in which $d=7$ and 22th term is 149.

34. A die is thrown once. Find the probability of getting

(a) a prime number (b) a number lying between 2 and 6

SECTION D

35. Is it possible to design a rectangular mango grove whose length is twice its breadth, and area is 800m^2 ? if so, find its length and breadth.

OR

Find two consecutive positive integers, the sum of whose squares is 365.

36. A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.

OR

A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume in terms of π .

37. From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower.

38. If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = \frac{1}{\sqrt{3}}$; $0^\circ < A+B \leq 90^\circ$; $A > B$, find A and B.

OR

Prove the identity $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

39. State and prove Basic Proportionality theorem.

OR

The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{OA}{BO} = \frac{CO}{DO}$. show that ABCD is a trapezium.

40. The distribution below gives the weights of 3 students of a class. Find the median weight of the students

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
No. of students	2	3	8	6	6	3	2