



TIME: 3 Hrs.

(MM 80)

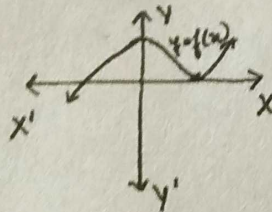
General Instructions:

- ▶ All the questions are compulsory.
- ▶ The paper consists of 30 questions divided into four sections A, B, C and D
- ▶ i) Section A contains 6 questions of 1 mark each.
- ▶ ii) Section B contains 6 questions of 2 mark each.
- ▶ iii) Section C contains 10 questions of 3 mark each.
- ▶ iv) Section D contains 8 questions of 4 mark each.
- ▶ Use of calculator is not permitted.

Section A

Question Nos. 1 to 6 are 1 mark each.

1. If the mean of first "n" natural numbers is $\frac{5n}{9}$, then what is the value of n?
2. Find the probability that a leap year selected at random will contain 53 sundays.
3. What is the value of $\sin^2\theta + \frac{1}{1+\tan^2\theta}$
4. What is the total number of factors of a prime number?
5. The equations $2x + 3y = 9$ and $4x + 6y = 18$ can have how many solutions?
6. The graph of a polynomial $y = f(x)$ is shown below. Find the number of real zeroes of $f(x)$.



Section B

Question Nos. 7 to 12 are 2 mark each.

7. If $(x+2)$, $2x$, $(2x+3)$ are three consecutive terms of an AP, find the value of x .
8. When the length of shadow of vertical pole is equal to $\sqrt{3}$ times of its height, find the angle of elevation of the sun's altitude.
9. If $(2, p)$ is the mid point of the line segment joining $A(6, -5)$ and $B(-2, 11)$, find the value of p .
10. Evaluate : $\sin^2 30^\circ \cos^2 45^\circ + 4 \tan^2 30^\circ + \frac{1 - \sin^2 90^\circ}{2} + \frac{1 - \cot^2 60^\circ}{8}$
11. One card is drawn from a well-shuffled deck of 52 playing cards. Find the probability of getting:
 - i) a non-face card.
 - ii) a black king or a red queen.
12. Draw a line segment of length 7.6cm and divide it in the ratio 5:8. Measure the two parts.

Section C

Question Nos. 13 to 22 are 3 mark each.

13. The area of an equilateral triangle is $49\sqrt{3} \text{ cm}^2$ taking each angular point as centre, circles are drawn with radius equal to half the length of the side of the triangle. Find the area of the triangle not included in the circle. [take $\sqrt{3} = 1.73$]
14. Evaluate : $\sqrt{20} + \sqrt{20} + \sqrt{20} + \dots + \infty$

15. Prove that $(3+5\sqrt{2})$ is irrational.

16. For the following frequency distribution, draw a cumulative frequency curve of more than type and hence obtain the median value.

| Class Interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|----------------|------|-------|-------|-------|-------|-------|-------|
| Frequency | 5 | 15 | 20 | 23 | 17 | 11 | 9 |

17. Draw a circle of radius 6cm. From a point 10cm away from its centre, construct the pair of tangents to the circle and measure their lengths.
18. If a circle touches all the four sides of a quadrilateral ABCD, prove that $AB + CD = BC + DA$.
19. The difference to two numbers is 5 and the difference of their reciprocals is $1/10$. find the numbers.
20. The probability of guessing the correct answer to a certain question is $x/12$. If the probability of not guessing the correct answer to this question is $3/4$. Find x .
21. Spherical marbles of diameter 1.4 cm each are dropped into a cylindrical beaker of radius 3.5 cm containing some water. Find the number of marbles that should be dropped into the beaker so that the water level in the beaker rises by 5.6cm.
22. The angles of elevation of the top of a tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6m.

Section D

Question Nos. 23 to 30 are 4 mark each.

23. State and prove Thale's Theorem.
24. Construct a triangle with sides 5cm, 6cm and 7cm and then another triangle whose sides are $7/5$ of the corresponding sides of the first triangle.
25. Solve the following system of equations graphically:

$$3x + 2y - 11 = 0 \text{ and } 2x - 3y + 10 = 0$$
 Shade the region bounded by these lines and the x-axis.
26. Find the mean, median and mode for the following data-

| class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | total |
|-----------|------|-------|-------|-------|-------|-------|
| frequency | 8 | 16 | 36 | 34 | 6 | 10 |
27. If the sum of n terms of an AO is the same as the sum of its n terms, then find the sum of its $(m+n)$ terms.
28. If $x = a \sin\theta + b \cos\theta$ and $y = a \cos\theta - b \sin\theta$, prove that $x^2 + y^2 = a^2 + b^2$
29. Prove that the length of tangents drawn from an external point to a circle are equal.
30. From the top of a building 60m high, the angles of depression to be 30° and 60° . Find the height of the tower.

