WAZID SIR

Sector 15, Noida

CLASS 10 - MATHEMATICS
10th standard paper 1

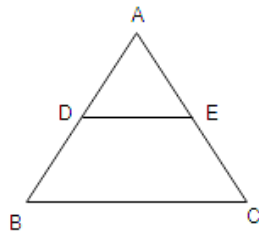**Time Allowed: 3 hours**   **Maximum Marks: 80**

General Instructions:

1. All the questions are compulsory.

2. The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

3. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.

4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

5. Use of calculators is not permitted.

Section A

1. The decimal expansion of number $\frac{441}{2^2 \times 5^3 \times 7}$ has   **[1]**

   a) None of these   b) non-terminating and non-repeating decimal

   c) terminating decimal   d) non-terminating repeating decimal

2. If $9^{x+2} = 240 + 9^x$, then the value of 'x' is   **[1]**

   a) 0.5   b) 0.1

   c) 0.3   d) 0.2

3. The marks obtained by 9 students in Mathematics are 59, 46, 30, 23, 27, 44, 52, 40 and 29. The median of the data is   **[1]**

   a) 35   b) 29

   c) 30   d) 40

4. If p = – 7 and q = 12 and $x^2 + px + q = 0$, then the value of 'x' is   **[1]**

   a) 3 and 4   b) 3 and – 4

   c) – 3 and – 4   d) – 3 and 4

5. If $(\alpha + \beta) = 90°$, then the value of $\sqrt{\cos\alpha \cos ec\beta - \cos\alpha \sin\beta}$ is   **[1]**

   a) cos α b) cos β

   c) $sin\,\alpha$ d) $sin\,\beta$

6. If ΔPQR is right angled at Q, then the value of sin (P + R) is   **[1]**

a) $\frac{1}{2}$ b) 1

c) $\sqrt{2}$ d) 0

7.   In a right triangle ABC, $\angle B = 90°$ and 2 AB = $\sqrt{3}$AC, then $\angle C$ is   **[1]**

a) $90°$ b) $60°$

c) $75°$ d) $30°$

8.   If the mid – point of the line segment joining the points (a, b – 2) and (– 2, 4) is (2, – 3), then the   **[1]**
values of 'a' and 'b' are

a) 6, 8   b) 6, – 8

c) 4, – 5   d) – 6, 8

9.   The point of intersection of the x – axis and y – axis is called   **[1]**

a) ordinate   b) abscissa

c) quardant   d) origin

10.   Raju bought a fish from a shop for his aquarium. The shop keeper takes out one fish from a   **[1]**
tank containing 15 male fish and 18 female fish. The probability that the fish taken out is a
male fish is

a) $\frac{5}{11}$ b) $\frac{6}{11}$

c) $\frac{5}{12}$ d) $\frac{7}{11}$

11.   Fill in the blanks: **[1]**

The perpendicular distance between the two parallel circular bases is called the _____ of the
frustum of the cone.

12.   Fill in the blanks: **[1]**

If -1 is a zero of the polynomial f(x) = x^2 - 7x - 8, then the other zero of this polynomial is

_____.

OR

Fill in the blanks:

Factors of $3x^3$ - x^2 - 3x + 1 are _____.

13.   Fill in the blanks: **[1]**

In $\triangle$ABC and $\triangle$DEF, if $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = \frac{5}{9}$, then the ratio of ar($\triangle$ABC): ar($\triangle$DEF) is

_____.

14.   Fill in the blanks: **[1]**

If S_n and S_{n-1} is the sum of first n and (n - 1) term of an AP, then its nth term, a_n is given by

_____.

15.   Fill in the blanks: **[1]**

The Abscissa is _____ to the right of y-axis and is _____ to the left of y-axis.

16.   Find the H.C.F. of 95 and 190.   **[1]**

17.   In $\triangle ABC$ shown below, DE || BC   **[1]**
If BC = 8 cm , DE = 6 cm and area of $\triangle ADE = 45 cm^2$, What is the area of $\triangle ABC$?

18. Find the sum of n terms of the following series: $\left(4 - \frac{1}{n}\right) + \left(4 - \frac{2}{n}\right) + \left(4 - \frac{3}{n}\right) + \ldots$ **[1]**

OR

For the AP $\frac{3}{2}, \frac{1}{2}, \frac{-1}{2}, \frac{-3}{2}, \ldots$ write the first term and the common difference.

19. In fig., PA and PB are two tangents drawn from an external point P to a circle with centre C **[1]**
and radius 4 cm. If PA $\perp$ PB, then find the length of each tangent.
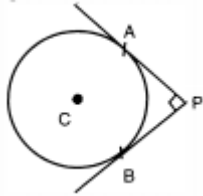
20. Show that the equation $3x^2 + 7x + 8 = 0$ is not true for any real value of x. **[1]**

Section B

21. A game consists of tossing a one-rupee coin 3 times and noting its outcome each time. Hanif **[2]**
wins if all the tosses give the same result i.e., three heads or three tails and loses otherwise.
Calculate the probability that Hanif will lose the game.

22. Find the nature of the roots of the following quadratic equation. If the real roots exist, find **[2]**
them: $3x^2 - 4\sqrt{3}x + 4 = 0$

23. In the figure given below, AD $\perp$ BC. Prove that $AB^2 + CD^2 = BD^2 + AC^2$: **[2]**
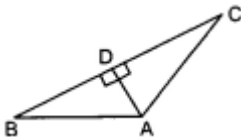
OR

In $\triangle$PQR, point M is on side PQ and point S is on the side PR such that QRSM is a trapezium. If
MS:QR = 3:5, then find area ($\triangle$PMS):area (QRSM).

24. An airplane is approaching point A along a straight line and at a constant altitude h. At 10:00 **[2]**
am, the angle of elevation of the airplane is 20° and at 10:01 am, it is 60°.
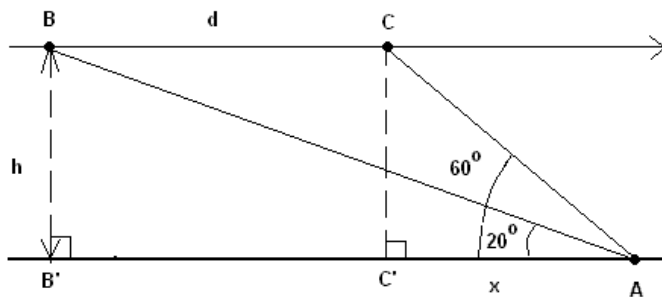
   i. What is the distance 'd' is covered by airplane from 10:00 am to 10:01 am if the speed of the
      airplane is constant and equal to 600 miles/hour?
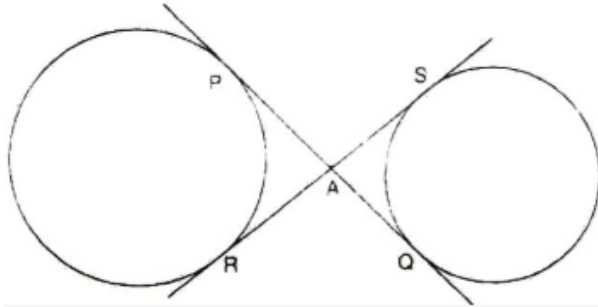   ii. What is the altitude 'h' of the airplane? (round answer to 2 decimal places).

25. Prove that the lengths of tangents drawn from an external point to a circle are equal. Using **[2]**
the above prove the following: A quadrilateral ABCD is drawn to circumscribe a circle. Prove

that AB + CD = AD + BC.
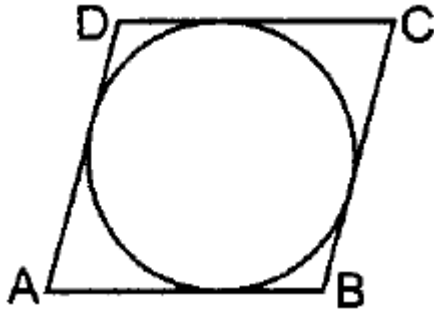
OR

In fig common tangents PQ and RS to two circles intersect at A. Prove that PQ = RS.

26. Isha is 10 years old girl. On the result day, Isha and her father Suresh were very happy as she **[2]** got first position in the class. While coming back to their home, Isha asked for a treat from her father as a reward for her success. They went to a juice shop and asked for two glasses of juice.

Aisha, a juise seller, was serving juice to her customers in two types of glasses. Both the glasses had inner radius 3cm. The height of both the glasses was 10cm.

First type: A Glass with hemispherical raised bottom.

Second type: A glass with conical raised bottom of height 1.5cm.

Isha insisted to have the juice in first type of glass and her father decided to have the juice in second type of glass. Out of the two, Isha or her father Suresh, who got more quantity of juice to drink and by how much?

Section C

27. Prove that $\sqrt{5} + \sqrt{3}$ is irrational number. **[3]**

OR

Find the HCF and LCM of the following pairs of positive integers by applying the prime factorization method: 72, 90

28. The sum of three terms of an A.P. is 21 and the product of the first and the third terms exceeds **[3]** the second term by 6, find three terms.

29. A boat goes 16 km upstream and 24 km downstream in 6 hours. Also, if covers 12 km **[3]** upstream and 36 km downstream in the same time. Find the speed of the boat in still water and that of the stream.

Solve the following system of equations by substitution method. x + y = 7; 2x – 3y = 11.

30. Obtain all the zeroes of $x^4 - 7x^3 + 17x^2 - 17x + 6$, if two of its zeroes are 3 and 1. **[3]**

31. In $\triangle$ABC, the coordinates of vertex A are (0, -1) and D (1,0) and E (0,1) respectively the mid-points of the sides AB and AC. If F is the mid-point of side BC, find the area of $\triangle$DEF. **[3]**

32. If $\cos\theta = \frac{8}{17}$, find the other five trigonometric ratios. **[3]**

OR

Evaluate $\frac{\cos^2 35^o + \cos^2 55^o}{cosec^2 15^o - \tan^2 75^o} + \sqrt{3}$ (tan 13⁰ tan23⁰ tan30⁰ tan67⁰ tan77⁰)

33. Find the area of the shaded region in the given figure, where a circular arc of radius 6 cm has **[3]** been drawn with vertex of an equilateral triangle of side 12 cm as centre and a sector of circle of radius 6 cm with centre B is made. [Use $\sqrt{3}$ = 1.73 and π= 3.14.]
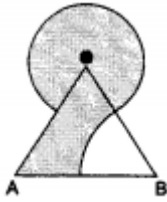
34. Find the mode of the following distribution: **[3]**

| Class Interval	Frequency
0 - 10	5
10 - 20	8
20 - 30	7
30 - 40	12
40 - 50	28
50 - 60	20
60 - 70	10
70 - 80	10

Section D

35. Construct tangents to a circle of radius 3 cm from a point on concentric circle of radius 5 cm **[4]** and measure its length.

OR

Draw an isosceles ΔABC in which AB = AC = 6 cm and BC = 5 cm. Construct a triangle PQR similar to ΔABC in which PQ = 8 cm. Also justify the construction.

36. In figure, DEFG is a square and $\angle$BAC = 90⁰, show that DE² = BD × EC **[4]**
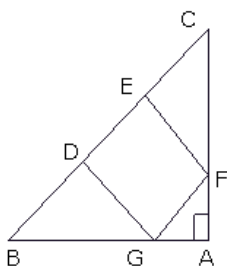
37. Form the pair of linear equations for the problem and find its solution by substitution method: **[4]** A fraction becomes $\frac{9}{11}$ if 2 is added to both 11 numerator and denominator. If 3 is added to both numerator and denominator it becomes $\frac{5}{6}$. Find the fraction.

<div align="center">OR</div>

On selling a T.V. at 5% gain and a fridge at 10% gain. A shopkeeper gains Rs. 2000. But if he sells the T.V. at 10% gain and the fridge at 5% loss. He gains Rs. 1500 on the transaction. Find the actual price of the T.V. and the fridge.

38. A rocket is in the form of a circular cylinder closed at the lower end with a cone of the same **[4]** radius attached to the top. The cylinder is of radius 2.5 m and height 21 m and the cone has the slant height 8 m. Calculate the total surface area of the rocket.

<div align="center">OR</div>

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

39. From a point on the ground, the angles of elevation of the bottom and the top of a **[4]** transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower

40. Change the following frequency distribution to more than type distribution and draw its **[4]** ogive. Using it, find its median.

Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
Frequency	6	8	10	6	4