Time : 2 ½ hors.   Max Marks : 50

PART – A   **Marks : 35**

Time : 2 hours

SECTION – I

Marks : 2 x 5 = 10

Note : 1. Answer any five questions choosing at least two from each of the following two groups, i.e. , Group A & B.
2. Each question carries 2 marks.

Group – A
(Real numbers, Sets, Polynomials, Quadratic Equations)

1. Explain why 7 x 11 x 13 + 13 is a composite number.

2. If A = { 1, 2, 3, 4, 5 } and B = { 4, 5, 6, 7 }, find A – B and B – A.

3. Check whether $x^2 + 3x + 1$ is a factor of $3x^4 + 5x^3 – 7x^2 + 2x + 2$.

4. If a polygon of 'n' sides has $\frac{1}{2}$n(n-3) diagonals , then how many sides will a polygon having 65 diagonals.

Group – B
(Linear equations in two variables, Progressions, Co-ordinate geometry)

5. Two angles are complementary. The larger angle is 3^0 less than twice the measure of the smaller angle. Find the measure of each angle.

6. How many terms of the A.P: 24, 21, 18, ------------- must be taken so that their sum is 78.

7. Which term of the G.P: $\sqrt{3}$, 3, $3\sqrt{3}$, 9, ------------- is 729 ?.

8. If (2,3); (x,y) and (3, -2) are the three vertices of a triangle and its centroid is again (x,y), find (x,y).

SECTION – II

Marks: 1 x 4 = 4

Note :   1. Answer any four of the following.
2. Each question carries 1 mark.

9. Expand log $(\frac{128}{625})$.

10. Define equal sets and give an example.

11. Find the quadratic polynomial having zeroes $\frac{1}{4}$ and -1.

12. Define coincident pair or linear equations and give an example.

13. find the determinant of $x^2 + 4x + 5 = 0$ and hence comment on the nature of its roots.

14. Find the slope of the line joining the points A($-3\frac{1}{2}$, 3); B(-7, $2\frac{1}{2}$).

SECTION – III

Marks: 4 x 4 = 16

Note :   1. Answer any four questions choosing two from each of the following groups. i.e. A and B.
2. Each question carries 4 marks.

Group – A
(Real numbers, Sets, Polynomials, Quadratic Equations)

15. Prove that $3 + 2\sqrt{5}$ is irrational by the method of contradiction.

16. If A = {x / x ∈ N , x ≤ 30 and x is a multiple of 3},

    B = {x / x ∈ N , x is a prime number less than 30}

    C = {x / x ∈ N , x < 30 and x is an odd number} and

    D = {x / x ∈ N , x ≤ 30 and x is an even number}. Find

     (i). A∩C   (ii). B∩D   (iii). B – C   (iv). A – D

17. Divide $3x^2 – x^3 - 3x + 5$ by $x – 1 – x^2$ and verify the division algorithm.

18. In a class of 60 students, each boy contributed rupees equal to the number of girls and each girl contributed rupees equal to the number of boys. If the total money then collected was Rs. 1600, how many boys are there in the class?

Group – B
(Linear equations in two variables, Progressions, Co-ordinate geometry)

19. A boat goes 30 Km. upstream and 44 Km. downstream in 10 hours. In 13 hours it can go 40 Km. and 55 Km. downstream. Determine the speed of the stream and that of the boat in still water.

20. 200 logs are stacked in the following manner : 20 logs on the bottom row, 19 in the next row ,18 in the next row to it and so on. In how many rows are the 200 logs placed and how many logs are in the top row.

21. If the geometric progressions 162, 54, 18 ---------- and $\frac{2}{81} , \frac{2}{27} , \frac{2}{9} ,$ - - - - - - have their nth term equal , find the value of 'n'.

22. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are (0, -1) ;(2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

SECTION – IV
(Polynomials, Linear equations in two variables)

Marks: 1 x 5 = 5

Note :   1. Answer any one of the following.

         2. This question carries 5 marks.

23. Draw the graph of the polynomial $p(x) = x^2 + 3x – 4$ and hence find its zeroes from the graph.

24. Solve the pair of linear equations $2x + y – 5 = 0$ and $3x – 2y – 4 = 0$ graphically.

Time : 2 ½ hors.   Max Marks : 50

PART – A   **Marks : 35**

Time : 2 hours

SECTION – I

Marks : 2 x 5 = 10

Note : 1. Answer any five questions choosing at least two from each of the following two groups, i.e. , from A & B

2. Each question carries 2 marks.

Group – A
(Real numbers, Sets, Polynomials, Quadratic Equations)

1. Write 2 log3 + 3 log5 – 5 log2 as a single logarithm.
2. State the reason why (i). {1, 2, 3, --------- , 10} $\neq$ {x / x$\in$ N and 1 < x < 10 } and

   (ii). {2, 3, 5, 7, 9 } ≠ {x / x is a prime number}
3. Find the zeroes of the quadratic polynomial $4s^2 – 4s + 1$ and verify the relationship between the zeroes and the coefficients .
4. Find the roots of the quadratic equation $5x^2 – 7x – 6 = 0$ by the method of completing the square.

Group – B
(Linear equations in two variables, Progressions, Co-ordinate geometry)

5. The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number.
6. The first and last term an A.P. are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum.
7. Find the ratio in which the y-axis divides the line segment joining the points (5, -6) and (1, -4).
8. Find the coordinates of the point which divides the line segment joining the points (a+b, a-b) and (a-b, a + b) in the ratio 3:2 internally.

SECTION – II

M

Note :   1. Answer any four of the following.

2. Each question carries 1 mark.

9. Express $\frac{23}{2 \times 5}$ in decimal form without actual division.
10. If A = {1, 2, 3, 4, 5 } and B = {4, 5, 6 } , find (i). A - B and (ii). B – A.
11. Find the sum and product of the zeroes of $x^3 + 4x^2 – 5x – 2$.
12. " 5 pencils and 7 pens together cost Rs. 50, where as 7 pencils and 5 pens cost Rs.40". Express this in the form of linear equations.
13. Verify whether $\frac{3}{2}$ is the root of the quadratic equation $2x^2 – 5x + 3 = 0$.
14. If the points A(6,1): B(8,2): C(9,4) and D(p, 3) are the vertices of a parallelogram in the same order, find the value of p .
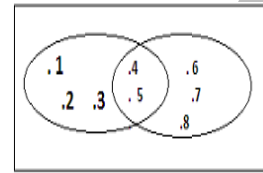
SECTION – III

Note :   1. Answer any four questions choosing two from each of the following groups. i.e. A and B.

2. Each question carries 4 marks.

Group – A
(Real numbers, Sets, Polynomials, Quadratic Equations)

15. a) Show that 12^n cannot end with the digit 0 or 5 for any rational number 'n'.

b) Represent $\sqrt{5}$ on the number line.

16. From the adjacent Venn- diagram, find

i) A and n(A).   (ii) B and n(B)

(iii) AUB and n(AUB)   (iv) A – B and n(A – B)

17. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x), the quotient and the remainder were (x – 2) and (2x+4) respectively. Find g(x).

18. Two water tanks can together fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

Group - B
(Linear equations in two variables, Progressions, Co-ordinate geometry)

19. Solve the pair of equations $\frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}$ and $\frac{1}{2(3x+y)} - \frac{1}{2(3x-y)} = \frac{-1}{8}$ by reducing them to a pair of linear equations.

20. In a school students thought of planting trees in and around the school to reduce the air pollution. It was decided that the number of plants that each section of each class will plant, will be the same as the class. i.e., which they are studying. e.g. a section of class 1 will plant 1 tree, a section of class II plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students?

21. Find the value of 'k' for which the points (8, 1); (k, -4) and (2, -5) are collinear.

22. Show that the points (-4, -7); (-1, 2) ; (8, 5) and (5, -4) taken in order are the vertices of a rhombus.

SECTION – IV
(Polynomials, Linear equations in two variables)

Note :   1. Answer any one of the following.

2. This question carries 5 marks.

23. Draw the graph of the polynomial $y = x^3 - 4x$ and hence find the zeroes from the graph.

24. Draw the graph of 3x + 4y = 2 and 6x + 8y = 4 and comment on the nature of this pair of linear equations and number of solutions.

MATHEMATICS PAPER – 1. PART – B.

Time : ½ hour   Max marks : 15.

Note :   1. All questions are to be answered.
         2. Each question carries ½ mark.
         3. Answers are to be written in the question paper only.
         4. Marks will not be given for over-writing, re-writing or erased answers.

I. Write the correct answer in the brackets provided against each question in capital letters.   10 x ½ = 5

1. Which of the following is a non-terminating decimal.   (   )

A) $\frac{13}{25}$ B) $\frac{47}{20}$ C) $\frac{27}{15}$ D) $\frac{25}{14}$

2. If A and B are two sets and $B \subset A$, then $A \cap (B - A) = $ - - - - - -   (   )

A) A   B) B   C) $\emptyset$ D) μ

3. $\log_{10}2 + \log_{10}5 = $ - - - - -   (   )

A) $\log_{10}7$ B) 1   C) $\log_{10}25$ D) $\log_{10}(\frac{2}{5})$

4. If -1 is a zero of the polynomial $-2x^3 + 4x^2 + 7x + k$, then k = - - - - -   (   )

A) -1   B) 1   C) -9   D) 5

5. The graph of a cubic polynomial intersect x-axis at most at ----- distinct points   (   )

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

6. If $pl + qm + r = 0$ and $lx + my + n = 0$ represent intersecting lines, then - - - - - - -   (   )

A) $pm \neq ql$ B) $qn = rm$ C) $pn \neq rl$ D) $pm = ql$

7. The 10th term of the G.P. : $3, 1, \frac{1}{3}, \frac{1}{9},$ - - - - - - - - - is - - - - - - - - - -   (   )

A) $(\frac{1}{3})^8$ B)) $(\frac{1}{3})^9$ C)) $(\frac{1}{3})^{10}$ D)) $(\frac{1}{3})^7$

8. If a, b, c are in A.P. then b = - - - - - - - - - -   (   )

A) $a - c$ B) $a + c$ C) $\frac{a+c}{2}$ D) $\frac{a-c}{2}$

9. The distance between the points (0, -8) and (0, -3) is -------------------- units.   (   )

A) 11   B) -5   C) -8   D) 5

10. The point of concurrence of the medians of a triangle whose vertices are (3, -1); (-4, 2) and

A) (7, 2)   B) (3, 0)   C) (2,0)   D) (-7,-2)   (   )

II. Fill in the blanks with suitable answers   10 x ½ = 5

11. The prime factorization form of 78 = ----------------------

12. The logarithmic form of $2^6 = 64$ is ----------------------

13. The quotient obtained when $p(x) = x^3 + 3x^2 - x - 3$ is divided by $(x - 1)$ is ----------------

14. The coordinates of the point where the line $2x - 3y + 6 = 0$ intersect the x-axis is ------------------

15. The value of k , when the pair of lines $2x + 4y = 10$ and $3x - ky = 15$ represent coincident lines is -------

16. If A and B are two disjoint sets, then $n(A \cup B) = $ ----------------------

17. The number of terms need to make the sum as zero of the progression 18, 16, 14, - - - - - - - is -----------

18. The distance between the origin and the point (x,y) is --------------------

19. The centroid of a triangle divides each median of a triangle in the ratio -----------------------

20. If -2 is a zero of the polynomial $kx^2 + 3x - 14$, then k = --------------------

III. Match the following.   10 x ½ = 5

Group - A

21. If A, B and C are disjoint sets, then (A-B)U(A-C) = ---- (   )   A) $\frac{b}{a}$

22. $\log_a 1$ = -----   (   )   B) B U C

23. The zero of p(x) = ax + b is -------   (   )   C) 20

24. The value of $4x + \frac{8}{y}$, when x = 4 and y = -2 is ----   (   )   D) $\frac{-b}{a}$

25. The LCM of 6, 16 and 24 is --------   (   )   E) A

                                                                                         F) 12

                                                                                         H) 48

                                                                                         I) 0

Group – B

26. If α ,β are the roots of $2x^2 + 3x + 1 = 0$, then

    $(1 + \alpha)(1 + \beta)$ = ----   (   )   A) 1

27. The angle between the lines x = 0 and y = 0 is ---   (   )   B) 0^0

28. If A(p, 2): B(-3, 4) and C(7, -1) are collinear,

    then p= --   (   )   C) 16

29. Which term of the A.P. :3, 8, 13, - - - - - is 78?   (   )   D) -2

30. If 1 is a root of $kx^2 – 5x + 3 = 0$, then k = ------   (   )   E) 0

                                                                                         F) 2

                                                                                         G) 90^0

                                                                                         H) 180^0

MATHEMATICS PAPER – 1. PART – B.

Time : ½ hour   Max marks : 15.

Note :   1. All questions are to be answered.
         2. Each question carries ½ mark.
         3. Answers are to be written in the question paper only.
         4. Marks will not be given for over-writing, re-writing or erased answers.

I. Write the correct answer in the brackets provided against each question in capital letters. 10 x ½ = 5

1. Which of the following is an irrational number.   (   )

   A) $\sqrt{\frac{64}{9}}$ B) $\sqrt{256}$ C) $\sqrt{32}$ D) $\sqrt{196}$

2. If A and B are two disjoint sets , then A – B = -------   (   )
        A) μ   B) Ø   C) B   D) A

3. The product of the zeroes of the cubic polynomial $3x^3 – 7x^2 +15x + 2$ is ----   (   )

        A) -4   B) 4   C) -5   D) $\frac{7}{3}$

4. The quadratic polynomial whose zeroes are 2, -1 is -----   (   )
        A) $x^2 – x - 2$ B)) $x^2 + x, + 2$ C)) $x^2 – x + 2$ D)) $x^2 + x - 2$

5. If 2x – y + k = 0 and 8x – 4y – 16 = 0 represent dependent pair of linear equations ,
   then k = --------   (   )
        A) 4   B) -4   C) $\frac{1}{4}$ D) $\frac{-1}{4}$

6. The sum of first 'n' natural numbers is -------------   (   )
        A) $\frac{n(n-1)}{2}$ B) n(n + 1)   C) $\frac{n(n+1)}{4}$ D) $\frac{n(n+1)}{2}$

7. The 7th term of the G.P. : 1, $\frac{-1}{2}$, $\frac{1}{4}$, - - - - - - - is --------------   (   )

        A) $\frac{-1}{8}$ B) $\frac{1}{16}$ C) $\frac{-1}{32}$ D) $\frac{1}{64}$

8. If (3, 1) ;(k, 0) and (1, 2) are collinear, then k = ----------   (   )
        A) 3   B) 4   C) 5   D) -2

9. If log   343 = ------------------   (   )
        A) 3   B) – 3   C)$\frac{1}{3}$ sD) $\frac{-1}{3}$

10. the nature of the roots of $2x^2 – 3x + 5 = 0$ is -------------   (   )
        A) Not real and equal   B) Real and equal
        C) Not real and distinct D) Real and distinct

II. Fill in the blanks with suitable answers   10 x ½ = 5

11. HCF of 72 and 108 is -----------------------

12. $\log_{10} 0.001$ = -------------------------------

13. The quadratic polynomial in which the sum and product of the zeroes are -3 and 2 is --------------------

14. The pair of linear equations px + qy + r = 0 and lx + my + n = 0 represent parallel lines if ------------------

15. If n(A) = 23, n(B) = 37, n(AUB) = 45, then n(A∩B) = ---------------------

16. If α, β, γ are the zeroes of the cubic polynomial $4x^3 – 6x^2 + 8x – 5$,then αβ + βγ + γα = ------------------

17. If the nth term of the G.P. : 3, $\sqrt{3}$, 1, - -- - - - - - is $\frac{1}{243}$, then n = -------------------

18. The slope of the line x = 5 is ---------------------------

19. If the distance between (-3, 0) and (0, k) is 5 units , then k = ----------------------

20. The discriminent of $2x^2 + 5x – 3 = 0$ is --------------------

III. Match the following. $\qquad$ 10 x ½ = 5

Group - A

21. If A = { x/ x^2 = -9 and $\in$ N}, then n(A) = ------ $\qquad$ ($\quad$) $\qquad$ A) $\frac{1}{2}$

22. If α , β are the zeroes of the polynomial $\qquad$ B) -1

   X^2 – 8x + 4, then $\frac{1}{\alpha}$ + $\frac{1}{\beta}$ = ------ $\qquad$ ($\quad$) $\qquad$ C) 2

23. The HCF of two consecutive integers is ----- $\qquad$ ($\quad$) $\qquad$ D) 3

24. $\log_x \sqrt{x}$ = ----------- $\qquad$ ($\quad$) $\qquad$ E) 0

25. If two lines 3x – 12y + 4 = 0 and –kx -4y +13 = 0 $\qquad$ F) 1

   Represent parallel lines , then k = -------- $\qquad$ ($\quad$) $\qquad$ G) 4

Group – B

26. The slope of a line makes an angle of 45^0

   With positive x-axis is --------------- $\qquad$ ($\quad$) $\qquad$ A) $\sqrt{3}$

27. The discriinent of x^2 – 5x + 4 = 0 is --------------- $\qquad$ ($\quad$) $\qquad$ B) 10

28. The slope of the line joining the points $\qquad$ C) 1

   ($\sqrt{3}$, 0) and (0, -3) is ------------------- $\qquad$ ($\quad$) $\qquad$ D) -$\sqrt{3}$

29. Sum of first ten odd natural numbers is ------ $\qquad$ ($\quad$) $\qquad$ E) -5

30. If k – 3, k + 2 and 2k – 1 are in A.P. , then k = --- $\qquad$ ($\quad$) $\qquad$ F) 9

$\qquad$ G) 100

$\qquad$ H) 5

$\qquad$ I) 8

Time : 2 ½ hors.   Max Marks : 50

PART – A   **Marks : 35**

Time : 2 hours

SECTION – I

Marks : 2 x 5 = 10

Note :   1. Answer any five questions choosing at least two from each of the following two groups, i.e. , from A & B

2. Each question carries 2 marks.

Group – A
(Similar triangles, Tangents and secants to a circle, Mensuration)

1. The hypotenuse of a right angle triangle is 6 m. more than twice of the shortest side. If the third side is 2 m. less than the hypotenuse. Find the sides of the triangle.

2. If a circle touches all the four sides of a quadrilateral ABCD at points PQRS, then prove that AB +CD = BC + DA.

3. A cone of height 24 cm. and radius of base is 6 cm. is made up of modeling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

4. A solid rod has a cylindrical shape. Its height is 11 cm. and base diameter is 7 cm. Find the volume of 50 rods.

Group – B.
(Trigonometry, Applications of Trigonometry, Statistics, Probability)

5. A, B and C are interior angles of a triangle ABC, then prove that $\sin\left(\frac{B+C}{2}\right) = \cos\left(\frac{A}{2}\right)$

6. **Y**ou want to erect a pole of height 10 m. with the support of the three ropes. Each rope has to make an angle 30^0 with the pole. What should be the length of the rope?

7. Write the formula to find median of grouped data and explain the symbols in it.

8. A box contains 5 red, 8 white and 4 green identical marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be i) a red ?. ii) not green ?.

Section – II   **Marks: 1 x 4 = 4**

Note :   1. Answer any four of the following.

2. Each question carries 1 mark.

9. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 10 minutes.

10. What are the properties of similar triangles.

11. Calculate the volume of a sphere of radius 2.1 cm. (Take $\pi = \frac{22}{7}$)

12. When a die is rolled twice, find the probability of getting same number both the times.

13. If tanA = cotB, where A and B are acute angles, prove that A + B = 90^0.

14. Find the mode of the following data.

   20, 3, 7, 13, 3, 4, 6, 7, 19, 15, 7, 18, 3.

SECTION – III
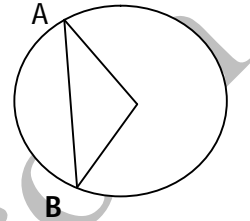
Note :   1. Answer any four questions choosing two from each of the following groups. i.e. A and B.
         2. Each question carries 4 marks.

Group – A
(Similar triangles, Tangents and secants to a circle, Mensuration)

15. State and prove converse of Thale's theorem.

16. Find the area of the segment AYB showing in the adjacent figure,
    radius of the circle is 21 cm. and AOB = 120^0
    (Take $\pi = \frac{22}{7}$ and $\sqrt{3}$ = 1.732)

17. A storage tank consists of a circular cylinder with a hemisphere stuck on either end. If the external diameter of the cylinder is 1.4 m. and its length is 8 m. Find the cost of painting it on the outside at the rate of Rs. 20.00 per m^2 .

18. A container shapes like a right circular cylinder having diameter 12 cm. and height of 15 cm. is full of ice cream. The ice cream is to be filled into cones of height 12 cm. and diameter 6 cm. having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.

Group – B.
(Trigonometry, Applications of Trigonometry, Statistics, Probability)

19. If cosecθ + cotθ = k, then prove that cosθ = $\frac{k-1}{k+1}$

20. A contractor wants to set up a slide for the children to play in the park. He wants to set it up in the height of 2 m. and by making an angle of 30^0 with the ground. What should be the length of the slide.

21. Rahim takes out all the hearts from the cards. What is the probability of
    (i) Picking out an ace from the remaining pack.
    (ii) Picking out a diamond.
    (iii) Picking out a card that is not a heart.
    (iv) Picking out the Ace of hearts.

22. The following distribution shows the daily pocket allowances of children of a locality. The mean pocket allowance is Rs. 18. Find the missing frequency (f).

Daily pocket allowance (in Rupees)	11 -13	13 - 15	15 - 17	17 - 19	19 - 21	21 - 23	23 -25
Number of children	7	6	9	13	f	5	4

SECTION – IV
(Similar triangles, Applications of trigonometry)

Marks: 1 x 5 = 5

Note :   1. Answer any one of the following.

       2. This question carries 5 marks.

23. Construct a triangle of sides 4 cm., 5 cm. and 6 cm.. Then construct a triangle similar to it , whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle.

24. The angle of elevation of a jet plane from a point A on the ground is 60^0 . After a flight of 15 seconds, The angle of elevation changes to 30^0 . If the jet plane is flying at a constant height of $1500\sqrt{3}$ m., find the speed of the jet plane. ($\sqrt{3}$ = 1.732)

Time : 2 ½ hors.   Max Marks : 50

PART – A   Marks : 35

Time : 2 hours

SECTION – I

Marks : 2 x 5 = 10

Note : 1. Answer any five questions choosing at least two from each of the following two groups, i.e. , from A & B

2. Each question carries 2 marks.

Group – A
(Similar triangles, Tangents and secants to a circle, Mensuration)

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

2. A round table has 6 equal designs as shown in the figure. If the radius of the tanle top is 14 cm. , find the cost of making the designs with paint at the rate of Rs. 25 per cm^2.

3. The curved surface area of a cone is 4070 cm^2 and its diameter is 70 cm. What is the slant height .

4. Two cubes each of volume 64 cm^2 are joined end to end together. Find the surface area of the resultant cube.

Group – B.
(Trigonometry, Applications of Trigonometry, Statistics, Probability)

5. If sin (A – B) = $\frac{1}{2}$, cos (A + B) = $\frac{1}{2}$, 0^0 < (A + B) $\leq 90^0$, A > B, find A and B.

6. Rajender observes a person standing on the ground from a helicopter at an angle of depression 45^0. If the helicopter flies at a height of 50 m. from the ground, what is the distance of the person from Rajender.

7. Write the formula to find mean of grouped data in step deviation method and explain the symbols in it.

8. One card is drawn from a well shuffled deck of 52 cards . Find the probability of getting.

(i) a red face card   (ii) a spade

SECTION – II

Marks: 1 x 4 = 4

Note :   1. Answer any four of the following.

2. Each question carries 1 mark.

9. Calculate the length of a tangent from a point 15 cm. away from the centre of the circle of radius 9 cm

10. A ladder of 25 m. long reaches a window of a building 20 m. above the ground. Find the distance of the foot of the ladder from the building.

11. Find the total surface area of the hemi-sphere of diameter 7 cm.

12. Harpreet tossed two different coins simultaneously. Find the probability of getting at least one tail.

13. Show that $\tan^2\theta + \tan^4\theta = \sec^4\theta - \sec^2\theta$

14. How do we obtain the median of a grouped data graphically.

<div align="center">SECTION – III</div>

<div align="right">Marks: 4 x 4 = 16</div>

<div align="center"><u>Group – A</u></div>

Note :   1. Answer any four questions choosing two from each of the following groups. i.e. A and B.
       2. Each question carries 4 marks.

15. State and prove "Baudhayan theorem".

16. A chord of a circle of radius 12 cm. subtends an angle of 120^0 at the centre. Find the area of the corresponding (i) Minor segment (ii) Major segment

17. Spherical marbles of diameter 1.4 cm. are dropped into a cylindrical beaker of diameter 7 cm. which contain some water. Find the number of marbles that should be dropped into the beaker , so that water level raised by 5.6 cm.

18. A solid toy is in the form of a right circular cylinder with hemi-spherical shape at one end , a cone at the other end. Their common diameter is 4.2 cm. and height of the cylindrical and conical portions are 12 cm. and 7 cm. respectively. Find the volume of the solid toy (Take $\pi = \frac{22}{7}$)

<div align="center"><u>Group – B</u>
(Similar triangles, Tangents and secants to a circle, Mensuration)</div>

19. Prove that $(\sin A + \csc A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

20. Two men on either side of a temple of 30 m. height, observe its top at the angles of elevation 30^0 and 60^0 respectively. Find the distance between the two men.

21. A box contains 90 discs, which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number. (ii) perfect square. (iii) a number divisible by 5. (iv) multiple of 3.

22. If the median of 60 observations given below is 28.5. Find the values of x and y.

Class interval	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	5	x	20	15	y	5

<div align="center">Section - IV</div>

<div align="right">Marks: 1 x 5 = 5</div>

Note :   1. Answer any one of the following.

23. Draw a circle of radius 6 cm. From a point 10 cm. away from its centre, construct the pair of tangents to the circle and measure their lengths . Verify by using Pythagoras theorem.

24. From the top of a building, the angle of elevation of the top of a cell tower is 60^0 and the angle of depression to its foot is 45^0. If the distance of the building from the tower is 7 m. then find the height of the tower.

MATHEMATICS PAPER – 2. PART – B.

Time : ½ hour   Max marks : 15.

Note : 1. All questions are to be answered.

           2. Each question carries ½ mark.

           3. Answers are to be written in the question paper only.

           4. Marks will not be given for over-writing, re-writing or erased answers.

I. Write the correct answer in the brackets provided against each question in capital letters. 10 x ½ = 5

1 .$\Delta ABC \sim \Delta PQR$. AC = 5 cm. , PR = 7 cm., ar(ΔPQR) = 196 cm^2, then ar(ΔABC) = ---- sq.cm   (   )

A) 98   B) 84   C) 100   D) 126

2. In the adjacent figure , if the area of the minor sector AXB

    Is 154 sq.cm, the radius of the circle is ----------- (in cm.)   (   )

A) 28   B) 14   C) 7   D) 10.5

3. The diagonals of a rhombus are 13 cm. and 8 cm. , then its area is -------------- sq.cm. (   )

A) 104   B) 26   C) 146   D) 52

4. If the surface area and volumes of a sphere are equal , then its radius r = ------ cm.   (   )

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

5. A cube of side 6 cm. is reshaped into a cuboid. If the length and breadths of the cuboid are

    9 cm. and 8 cm. respectively, the height of the cuboid is ---- cm.   (   )

A) 3   B) 6   C) 5   D) 12

6. If $\tan\theta = \cot\theta$, then $\sec\theta + \csc\theta = $ ---------   (   )

A) $\sqrt{2}$ B) 1   C) $2\sqrt{2}$ D) 0   (   )

7. If the length of the shadow of a tree is 16 m. an0d the angle of elevation of the top

    Of the tree is 60^0, then the height of the tree is ------------- m.   (   )

A) $\frac{8}{3}$ B) $8\sqrt{3}$ C) $16\sqrt{3}$ D) 16

8. The probability of having 53 Thursdays in a leap year is --------------   (   )

A) $\frac{2}{7}$ B) $\frac{53}{366}$ C) $\frac{1}{366}$ D) $\frac{1}{7}$

9. Ogive curve is used to measure ---------------   (   )

A) Mean   B) Median   C) Mode   D) Deviation

10. If E is an event of a random experiment, which of the following is correct---   (   )

A) $0 < p(E) < 1$ B) $0 \leq p|E) < 1$ C) $0 \leq p(E) \leq 1$ D)) $0 < p(E) \leq 1$

II. Fill in the blanks with correct answers   10 x ½ =5

11. The converse of the statement " In ΔABC, if AB = AC then $\angle$C = $\angle$B " is --------------------------------

        ----

12. A circle can have ---------------------- parallel tangents at most.

13. If the altitude of a right angle triangle is x, then its area is ----------------------

14. The ratio of the volumes of a cylinder and a cone of same geight and same base radius is -------------

15. If the radius of the base and height of a cone are 7 cm. and 24 cm. respectively, then its slant height

     is ------------------cm.

16. The value of cos 20^0 sin 70^0 – sin 20^0 cos 70^0 is --------------------

17. The angle of depression of a building from the top of a tower is 45^0 . If the horizontal distance

     between the tower and the building is 200 m. then the height of the tower is --------------------- m.

18. If the probability for occurring an event is $\frac{4}{13}$, then the probability for not occurring the event is -------

19. The median of first 20 natural numbers is ----------------
20. $(\sec^2\theta - 1)(\text{cosec}^2\theta - 1) =$ --------------------

III. Match the following.   10 x ½ =5

Group - A

21. ΔABC ~ Δ DEF and their areas are respectively 64 cm² and 121 cm² respectively. If EF = 15.4 cm. then BC = --------- ( )		A) πrl
22. The area of a sector whose angle is 60⁰ and radius 7 cm is -- ( )		B) 2(l + b)
23.Total surface area of a cone is ------------ ( )		C) Triangle
24. Lateral surface area of a cuboid is ---------- ( )		D) $\frac{77}{3}$
25. Two ------- are always similar ( )		E) πr (r + l)
		F) 11.2
		G) Equilateral triangle
		H) 2h (l + b)

Group - B

26. $\sin^2 49^0 + \sin^2 43^0 =$ ------- ( )		A) $\frac{-1}{2}$
27. If secθ – tanθ = $\frac{1}{2}$, then secθ + tanθ= ----------- ( )		B) Horizontal line
28. The line joining the eye of an observer and the object is Called ----------- ( )		C) 0
		D) 1
29. The probability of uncertain event is ------ ( )		E) -20
30. If the mean of 2, 7, x, 11 is zero, then x = ---- ( )		F) 2
		G) – 16
		H) Line of sight.

MATHEMATICS PAPER – 2. PART – B.

Time : ½ hour   Max marks : 15.

Note :   1. All questions are to be answered.
         2. Each question carries ½ mark.
         3. Answers are to be written in the question paper only.
         4. Marks will not be given for over-writing, re-writing or erased answers.

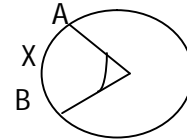I. Write the correct answer in the brackets provided against each question in capital letters. 10 x ½ = 5

1. ΔDEF is formed by joining the mid points of the sides of ΔABC. The area of Δ ABC is 52 cm^2. The area
   of ΔDEF is ------- cm^2.   (   )
   A) 26   B) 104   C) 208   D) 13

2. In Δ ABC, D,E and F are the points on AB, BC and CA respectively. BE = 1.2 cm., EC = 7.2 cm. AF = 2 cm.
   and FC = 12 cm., then which of the following is correct.   (   )
   A) DE ll AC   B) EF ll BA   C) EF ⊥ AB   D) DF ll BC

3. In the adjacent figure area of the sector OAXB is $\frac{1}{5}$ of
   the area of the circle . The value of x = -----   (
   A) 60^0 B) 75^0 C) 72^0 D) 57^0

4. The number of small spherical bullets of diameter 3.5 mm. can be made by melting a cylindrical rod of
   radius 10.5 and length 7 cm. is -----------   (   )
   A) 1080   B) 540   C) 135   D) 150

5. The volume of a cylinder id 308 m^3. And its height is 8 m., the diameter of the cylinder is – (   )
   A) 7.0   B) 0.70   C) 3.50   D) 0.35

6. If tan (A + B) = $\sqrt{3}$ and tan A = 1, then $\angle$B =-----   (   )
   A) 60^0 B) 45^0 C) 30^0 D) 15^0

7. If the shadow of a tree is $\sqrt{3}$ times its height , then the angle of elevation of sun is --- (   )
   A)) 60^0 B) 30^0 C) 45^0 D) 75^0

8. Two dice are thrown simultaneously. The probability of getting prime numbers on both the faces is --
   A) $\frac{1}{12}$ B) $\frac{1}{8}$ C) $\frac{1}{4}$ D) $\frac{1}{6}$ (   )

9. In finding the mean of grouped data in "Assumed mean method", we use the formula

   $\overline{X}$ = a + $\frac{\sum fd}{\sum f}$. Here d$_i$ denotes ----------   (   )
   A) Assumed mean B) class mark C) class size   D) The deviation of assumed mean from class mark
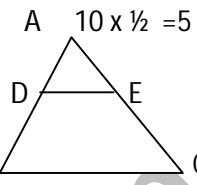
10. Which among the following equals to tanθ---------   (   )
   A) $\frac{cos\theta}{\sqrt{1-cos\theta}}$ B) $\frac{sin\theta}{\sqrt{1-sec\theta}}$ C) $\frac{sin\theta}{\sqrt{1-sin\theta}}$ D) $\frac{\sqrt{1-\sin\theta}}{sin\theta}$
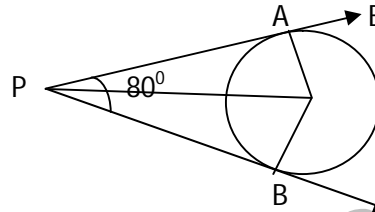
II. Fill in the blanks with correct answers   A   10 x ½ =5

11. In the adjacent figure DE ‖ BC. AD = 3 cm. , DB = 7 cm and
    EC = 10.5 cm. Then AC = ---------------- cm.

            20.

12. If the tangents PA and PB from a point P
    to a circle with centre 'O', inclined to each
    other at an angle of 80^0. Then $\angle$POA = -----

13. The areas of two triangles are in the ratio 16 : 9. The ratio of their medians is ----------------

14. The base radius and height of a cylinder are equal to the radius of a sphere. Then the ratio of the
    volume of the cylinder to that of the sphere is -----------

15. The value of $\sin^2\theta + \frac{1}{1+tan2\theta}$ = -------------------

16. If the angle of elevation of a tree from a point at a distance of 20 m. is 60^0 . The distance between
    the observer and the top of the tree is ------------------------------ m.

17. A bag contains 4 green, 8 red, 3 blue and 5 yellow marbles. A marble is taken out at random. The
    probability for the drawn marble be either green of blue is -----------------------------

18. From a well shuffled deck of 52 cards, a card is drawn at random. The probability of the drawn card
    to be a face car is ----------------------

19. The mean of scores 4, 5, 8, x, 7, 9 is 2x. Then x = ------------------

20. $\frac{\tan 45}{cosec\ 30}$ + $\frac{\sec 60}{\cot 45}$ + $\frac{2\sin 90}{\cos 0}$ = ----------------------

III. Match the following.   10 x ½ =5

Group –A

21. The angle between the tangent of a circle and the radius passing through the point of contact is ----------------	( )	A) $\frac{4.5}{r}$ B)180
22. A man goes 8 m. due west and 15 m. due north. then his distance from the starting point is -----	( )	C) 23 m. D) 17 m.
23. Negation of a statement p is represented by ------	( )	E) →p
24. Total surface area of a cylinder of radius r and height h is ---	( )	F) 2πr(r + H)
25. The ratio between the total surface area and volume of a hemisphere of radius r is -------------------	( ) ( )	G) 90^0 H) ~ p

Group – B

26. $\frac{sec\theta}{tan\theta}$ - tan θ = --------	( )	A) tanθ
27. 2 $\tan^2 45^0$ + 12 $\cos^2 60^0$ =--------------------	( )	B) 4√2
28. In Δ ABC, $\angle$B = 90^0, $\angle$A = 45^0, AB = 4 cm. Then AC = ----	( )	C) cotθ
29. When three coins are tossed simultaneously, the total possible outcomes are ----------	( )	D) 6 E) 5
30. The class mark of the class 1 – 10 is ---------------	( )	F) 2 G) 5.5 H) 8