SSC PUBLIC EXAMINATION QUESTIONS
MARCH '2015 TO JUNE 2019
REAL NUMBERS
1 MARK

1. Insert 4 rational numbers between $\dfrac{3}{4}$ and 1 without using formula $\dfrac{a+b}{2}$ (**M'15**)

2. The prime factorization of a natural number(n) is 2^3 x 3^2 x 5^2 x 7. How many consecutive zeroes will it have at the end of it? justify your answer. (**J'15**)

3. Find the value of $\log_5 125$ (**M'16**)

4. Write any two irrational numbers lying between 3 and 4. (**J'16**)

5. Find the value of $\log_{\sqrt{2}} 256$. (**M'17**)

6. Find the HCF and LCM of 90, 144 by prime factorization method (**J'17**)

7. Is $\log_3 81$ rational or irrational? Justify your answer. (**J'17**)

8. Expand $\log_{10} 385$. (**M'18**)

9. Find the value of $\log_{\sqrt{2}} 128$. (**J'18**)

10. Find the HCF of 24 and 33 by using division algorithm. (**M'19**)

11. Ramu says, "If $\log_{10} x = 0$, value of $x = 0$". Do you agree with him? Give reason. (**J'19**)

2 MARKS

1. Write any three numbers of two digits. Find the L.C.M. and H.C.F. for the above numbers by the "Prime factorization method" . (**M'15**)

2. Give an example for each of the following
   a. The product of two rational numbers is a rational number.
   b. The product of two irrational numbers is an irrational number. (**M'15**)

3. state with reasons which of the following are rational numbers and which are irrational numbers. (i) $\sqrt{225}$ x $\sqrt{4}$ (ii) $6\sqrt{50} + 8\sqrt{125}$. (**J'15**)

4. If $x^2 + y^2 = 7xy$ then show that $2 \log (x + y) = \log x + \log y + 2\log 3$ (**M'16**)

5. Express 2016 as product of prime factor. (**J'16**)

6. Write any two three digit numbers. Find their L.C.M. and G.C.D. by prime factorization method. (**M'17**)

7. Prove that $2 + \sqrt{3}$ is irrational. (**J'17**)

8. Show that $log \dfrac{162}{343} + 2 \log \dfrac{7}{9} - \log \dfrac{1}{7} = \log 2$. (**M'18**)

9. Lalitha says that HCF and LCM of the numbers 80 and 60 are 20 and 120 respectively. Do you agree with her ? Justify. (**J'18**)

10. If $x^2 + y^2 = 10xy,$ prove that $2 \log (x + y) = \log x + \log y + 2\log 2 + \log 3.$ (**J'19**)

4 MARKS

1. Prove that $3 + 2\sqrt{5}$ is an irrational number. (**M'15**)

2. Expand $\log \left(\dfrac{1125}{32}\right)$ (**J'15**)

3. Express the numbers 6825 and 3825 as a product of its prime factors.

    Find the HCF and LCM of the above numbers by using their products of prime factors.

    Justify your answer. (**J'15**)

4. Use Euclid's division Lemma to show that the cube of any positive integer is of the form $7m$ or $7m + 1$ or $7m + 6$. (**M'16**)

5. Prove that $\sqrt{2} - 3\sqrt{5}$ is an irrational number. (**M'16**)

6. Use Euclid's division lemma, show that the cube of any positive integer is of the form $3p$ or $3p + 1$ or $3p + 2$ for any integer 'p'. (**J'16**)

7. Prove that $\sqrt{3} - \sqrt{5}$ is an irrational number. (**J'16**)

8. Use Euclid's division lemma to show that the square of any positive integer is of the form $5n$ or $5n + 1$ or $5n + 4$ where n is a whole number. (**M'17**) & (**J'19**)

9. If $x^2 + y^2 = 27xy,$ then show that $log \left(\dfrac{x - y}{5}\right) = \dfrac{1}{2}[logx + logy]$ (**J'17**)

10. Show that cube of any positive integer will be in the form of $8m$ or $8m + 1$ or $8m + 3$ or $8m + 5$ or $8m + 7$, where m is a whole number. (**M'18**)

11. Prove that $\sqrt{3} + \sqrt{5}$ is an irrational number. (**M'18**)

12. Prove that $\sqrt{2} + \sqrt{11}$ is an irrational number. (**J'18**)

13. Prove that $\sqrt{2} + \sqrt{7}$ is an irrational number. (**M'19**)

14. Use division algorithm to show that the square of any positive integer is of the form $5m$ or $5m + 1$ or $5m + 4$ where m is a whole number. (**J'19**)

15. Show that $\sqrt{5} - \sqrt{3}$ is an irrational number. (**J'19**)

SETS

1 MARK

12. If A ={x : x ∈ N and x < 20} and B = { x : x ∈ N and x ≤ 5 } then write the set A – B in the set builder form. (**M'15**)

13. "B is a set of all months in a year having 30 days". Write the above set in the roster form. (**J'15**)

14. If A – B = {3,4, 5}, B – A { 1, 8, 9} and A∩B = { 6, 7}, then find A∪B. (**J'15**)

15. If A = $\left\{1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}\right\}$, then write A In set builder form. (**M'16**)

16. A = {$x : x$ ∈ N, x is a composite number and x < 13}. Write set A In the roster form. (**J'16**)

17. Represent A∩B through venn diagram, Where A = {1, 4, 6, 9,10}and B = { perfect squares less than 25}. (**M'17**)

18. If A = {1, 2, 3, 4, 5 }, b = { 3, 4, 5, 6 }, Find A∩B. (**J'17**)

19. Give one example each for a finite set and an infinite set. (**M'18**)

20. List all the subsets of the set A = { x, y, z } (**J'18**)

21. If A = {$x : x$ is a factor of 24}, then find n(A). (**M'19**)

22. If A = { 1, 2, 3}, Then find A - B and B – A (**J'19**)

2 MARKS

1. If A ={x : x ∈ N and x < 6} and B = { x : x ∈ N and 3 < x < 8 } then

   Show that A – B ≠ B – A with the help of Venn diagram. (**M'15**)

2. Answer the following questions and justify your answers.
   a. A ={x : x ∈ N, x < 2015 }, is it a finite set or infinite set ?
   b. B ={x : x + 5 = 5 } is it a null set or a Universal set ? (**J'15**)

3. A = { $x : x$ ∈ N, and x is a factor of 30} ; B = {$x : x$ ∈ N, and x is a prime factor of 30} draw Venn diagram for A∪B (**J'16**)

4. If A = { $x : x$ ∈ N, x < 10 }, B = { $x : x$ is a prime number and x x < 10 }, Then show that A – B ≠ B – A with the help of Venn diagram. (**J'17**)

5. If A ={1, 2, 3, 4}, B = {2, 4, 6, 8, 10}, then represent the Venn diagram of A − B. (**J'18**)

6. If = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, A = { 2, 3, 5, 8} and B = {0, 3, 5, 7, 10}. Then represent A∩B in the Venn diagram. (**M'19**)

7. If A ={ $x : x$ is a factor of 12} and B = {$x: x$ is a factor of 6} then find A∪B and A∩B. (**J'19**)

## 4 MARKS

1. X is a set of factors of 24 and Y is a set of factors of 36, then find sets X∪Y and X∩Y by using Venn diagram and comment on the answer. (**M'16**)

2. A = {x : x ∈ N and x is a multiple of 4}; B = {x : x ∈ N and x is a multiple of 6 }; C = {x : x ∈ N and x is a multiple LCM of 4 and 6} . Find A∩B. How can you relate the sets A∩B and C. (**J'16**)

3. From the following Venn diagram, write the elements of sets A and B. And verify n(A∪B) + n(A∩B) = n(A) + n(B). (**M'17**)
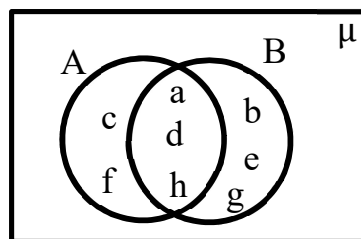
4. Using the Venn diagram, verify n(A∪B) = n(A) + n(B) – n(A∩B). (**J'17**)
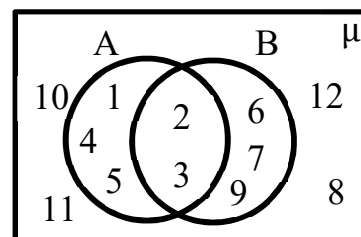
5. A = { $x : x$ is a perfect square, $x < 50, x \in N$ }, B = { $x : x = 8m + 1$, where m W, $x < 50, x \in N$}. Find A∩B and display it with Venn diagram. (**M'18**)

6. If A = {$x : x$ is a prime and $x < 10$ }, B = { $x : x$ is a factor of 6 }, then find A∩B, A∪B and A – B. (**J'18**)

7. If A = {$x : 2x + 1, x \in N, x \leq 5$ },   B = {$x : x$ is a composite number, $x \leq 12$}, then show that (A∪B) – (A∩B) = (A – B) ∪ (B – A). (**M'19**)

8. If A={$x : x$ is a prime less than 20} and B = {$x : x$ is whole number less than 10} then verify n(A∪B) = n(A) +n(B) – n(A∩B). (**J'19**)

POLYNOMIALS
1 M,ARK

1. If $x \neq -1$, then find the quotient of $\dfrac{x^5 + x^4 + x^3 + x^2}{x^3 + x^2 + x + 1}$ (**M'15**)

2. " We can write a trinomial having degree 7". Justify the above statement by giving one example. (**M'15**)

3. Write an example for a quadratic Polynomial that has no zeros. (**M'16**)

4. If $p(x) = x^3 – 3x^2 + 2x – 3$ is a polynomial, then find the value of $p(1)$. (**J'16**)

5. Srikar says that the order of the polynomial $(x^2 – 5)(x^3+1)$ is 6. Do you agree with him?

6. Find zeros of the polynomial P(x) = x^2 - 4. (**J'17**)

7. Verify the relation between zeros and coefficients of the quadratic polynomial is $x^2 – 4$. (**M'18**)

8. Weather $\dfrac{1}{2}$ and 1 all zeros of the polynomial $p(x) = 2x^2 – 3x + 1$ or not? Justify. (**J'18**)

9. If P(x) = x^4 + 1, then find P(2) – P(-2). (**M'19**)

10. – 3, 0 and 2 are the zeroes of the polynomial p(x) = x^3 + ($a – 1$) x^2 + bx + c Find a and c.(**J'19**)

11. Write any two linear polynomials having one term under three terms. (**J'19**)

2 MARKS

1. For what value of k, – 4 is a zero of the polynomial $x^2 – x – (2k + 2)$. (**J'15**).

2. Use the table given below to draw the graph. Use the graph drawn to find the values of a and b. (**J'15**)

x	-2	0	2	1	b
y	-3	1	a	3	-7

3. Length of a rectangle is 5 units more than its breadth. Express its perimeter in polynomial form. (**M'16**)

4. Show that 2 and $-\dfrac{1}{3}$ are zeros of the polynomial $3x^2 – 5x – 2$ (**J'16**)

5. Which of $\sqrt{2}$ and 2 is a zero of the polynomial $p(x) = x^3 – 2x$? Why? (**M'17**)

6. Divide $x^3 – 3x^2 + 5x – 3$ by $x^2 – 2$. And verify the division lemma. (**J'17**)

7. Complete the following table for the polynomial $y = p(x) = x^3 – 2x + 3$. (**M'18**)

x	-1	0	1	2
x^3				
$-2x$				
3				
y				
(x, y)				

8. If one of the zeros of the cubic polynomial $p(x) = ax^3 + bx^2 + cx + d$ is zero, then find the product of other two zeros of $p(x)$. ($a \neq 0$). (**J'18**)

9. Divide $x^3 – 4x^2 + 5x – 2$ by $x – 2$. (**M'19**)

4 MARKS

1. Lakshmi does not want to disclose the length, breath the height of a cuboid of her project. she has constructed a polynomial $x^3 – 6x^2 + 11x – 6$ by taking the values of length, breath and height as its zeros. Can you open the secret [i.e., find the measures of length, breath on the height] (**M'15**)

2. Draw the graph for the polynomial $p(x) = x^2 + 3x – 4$ and find its zeroes from the graph. (**M'15**)

3. Draw the graph of the polynomial $p(x) = 3x^2 + 2x – 1$ on the graph paper. Find its zeros from the graph. (**J'15**)

4. Draw the graph for the polynomial $p(x) = x^2 – 3x + 2$ and find the zeroes from the graph. (**M'16**)

5. Draw the graph of the polynomial $p(x) = x^2 – 5x + 4$ on the graph paper. Find its zeros from the graph. (**J'16**)

6. On dividing by $x^3 – 3x^2 + 5x – 7$ by $x^2 – 2x + 4$, If the remainder is in the form of $Ax + B$, find the values of A and B. (**J'16**).

7. Divide $3x^4 - 5x^3 + 4x^2 + 3x - 5$ by $x^2 - 3$ and verify the division algorithm.(**M'17**)
   The perimeter of a right angle triangle is 60 cm and it's hypotenuse is 25 cm. Then find the remaining two sides. (**M'17**)

8. Draw the graph of the polynomial $p(x) = x^2 - 5x + 6$ and find the zeros from the graph.(**M'17**)

9. Draw the graph of $p(x) = x^2 - 2x - 8$ and find the zeros of the polynomial from it. (**J'17**)

10. Total number of pencils required are given by $4x^4 + 2x^3 - 2x^2 + 62x$ - 66. If each box contains $x^2 + 2x - 3$ pencils, then find the number of boxes to be purchased. (**M'18**)

11. Draw the graph of the polynomial $p(x) = x^2 + x - 2$ on the graph paper. Find its zeroes from the graph. (**J'18**)

12. Draw the graph of the polynomial $p(x) = x^2 - 7x + 12$, then find its zeroes from the graph. (**M'19**)

13. Draw the graph for the polynomial $p(x) = x^2 + 3x - 4$ and hence find the zeros from the graph. (**J'19**)

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES
1 MARK

1. For what value of k, the following system of equations has a unique solution.
   $x - ky = 2$ and $3x + 2y = -5$ (**M'15**)

2. For what values of *m*, the pair of equations $3x + my = 10$ and $9x + 12y = 30$ have a unique solution. (**M'16**)

3. In a rectangle ABCD, AB = $x + y$, BC = $x - y$, CD = 9 and AD = 3. Find the values of x and y. (**J'16**)

4. Show that the pair Linear Equations $7x + y = 10$ and $x + 7y = 10$ are consultant. (**M'17**)

5. Write the Condition for the pair of linear equations in two variables to be parallel lines.(**J'17**)

6. If $x = a$ and $y = b$ is solution for the pair of equations $x - y = 2$ and $x + y = 4$, then find the values of a and b. (**M'18**)

7. Whether the following pair of Linear Equations are parallel? Justify.
   $6x - 4y + 10 = 0$, $3x - 2y + 6 = 0$. (**J'18**)

8. For what value of 't' the following pair of linear equations has a no solution? $2x - ty = 5$ and $3x + 2y = 11$. (**M'19**)

2 MARKS

1. If we multiply or divide both sides of a linear equation by a non- zero number, then the roots of that linear equation will remain the same'. is it true? ? If so, justify with an example. (**M'15**)

2. If the present ages of A and B are in ratio of 9 : 4 and after 7 years the ratio of the ages will be 5 : 3 then find their present ages. (**J'15**)

3. Solve the following pair of linear equations by substitution method. $2x - 3y = 19$ and $3x - 2y = 21$ (**M'16**)

4. If the measure of angles of a triangle are x^0, y^0 and 40^0, and difference between the measures of angles x^0 and y^0 is 30^0, then find values of x^0 and y^0. (**J'16**)

5. Given the linear equation $3x + 4y = 11$, write linear equations in two variables such that their geometrical representations form parallel lines and intersecting lines. (**M'18**)

6. Solve the pair of linear equations $2x + 3y = 8$ and $x + 2y = 5$ by Elimination method.(**M'19**)

7. For what values of m the following $mx + 4y = 10$ and $9x + 12y = 30$ system of equations will have no solution? Why ? (**J'19**).

4 MARKS

1. Solve the following pair of equations by reducing them to a pair of linear equations $\frac{5}{x-1} + \frac{1}{y-2} = 2$ and $\frac{6}{x-1} - \frac{3}{y-2} = 1$ (**M'15**)

2. Draw a graph for the following pair of linear equations in two variables and find their solution from the graph $2x + y = 5$ and $3x - 2y = 4$ (**M'15**)

3. Draw the graphs of the following equations $3x – y – 2 = 0$ and $2x + y – 8 = 0$ on the graph paper.
   i) Write down the co-ordinates of the point of intersection of the equations.
   ii) Find the area of the triangle formed by the lines and the X-axis. (**J'15**)

4. Draw the graph for the equations $2x – 3y = 5$ and $4x – 6y = 15$ on the graph paper and check whether they are consistent or not. (**J'15**)

5. Draw the graph for the following pair of linear equations in two variables and find their solution from the graph. $3x– 2y = 2$ and $2x + y = 6$ (**M'16**)

6. Draw the graph for the equations $2x – y – 4 = 0$ and $x + y = 0$ on the graph paper and check whether they are consistent or not. (**J'16**)

7. Draw the graph of $2x + y = 6$ and $2x – y + 2 = 0$ and find the solution from the graph. (**M'17**)

8. Show that the following pair of equations are consistent and show them graphically $x + 3y = 6$ and $2x – 3y = 12$ (**J'17**)

9. Find the solution of $x + 2y = 10$ and $2x + 4y = 8$ graphically (**M'18**)

10. Solve $\frac{5}{x-1} + \frac{1}{y-2} = 2$ and $\frac{6}{x-1} - \frac{1}{y-2} = 1$ (**J'18**)

11. Solve the following pair of linear equations by graph method.
    $2x + y = 6$ and $2x – y + 2 = 0$. (**J'18**)

12. Solve the equations by graphically $3x + 4y = 10$ and $4x – 3y = 5$. (**M'19**)

13. Sum of the present ages of two friends are 23 years, five years ago product of their ages was 42. Find their ages 5 years hence. (**M'19**)

14. Draw the graph of $x + y = 11$ and $x – y = 5$. Find the solution of the pair of linear equations. (**J'19**).

QUADRATIC EQUATIONS
1 MARK

1. Check whether 1 and $\frac{3}{2}$ are the roots of the equation $2x^2 - 5x + 3 = 0$. **(J'15)** **(M'16)**
2. If $b^2 - 4ac > 0$ in $ax^2 + bx + c = 0$, $(a \neq 0)$; then what can you say about roots of the equation?
3. Find the value of k, if 2 is one of the roots of the quadratic equation $x^2 - kx + 6 = 0$ **(J'16)**
4. Write the nature of roots of the quadratic equation $2x^2 - 5x + 6 = 0$ **(M'17)**
5. Write the nature of the roots of the quadratic equation $x^2 - 8x + 16 = 0$. **(J'17)**
6. Find sum and product of the roots of the quadratic equation $x^2 - 4\sqrt{3}\,x + 9 = 0$. **(M'18)**
7. Find the values of k for which the quadratic equation $4x^2 + 5kx + 25 = 0$ has equal roots. **(J'18)**
8. Find the roots of the quadratic equation $x^2 + 2x - 3 = 0$. **(M'19)**
9. Find the discriminant of the quadratic equation $3x^2 - 5x + 2 = 0$ and hence write the nature of its roots. **(J'19)**

2 MARKS

1. If $9x^2 + kx + 1 = 0$ has equal roots, then find the value of k. **(M'16)**
2. The sum of a number and its reciprocal is $\frac{10}{3}$ Find the number. **(M'17)**
3. Is it possible to design a rectangular Garden, whose length is twice of its breadth and area is 200 m^2 ? If so, so find its length and breadth. **(J'17)**
4. If the equation $kx^2 - 2kx + 6 = 0$ has equal roots, then find the value of k. **(M'18)**
5. Without calculating the roots of $x^2 - 5x + 6 = 0$, explain the nature of roots. **(J'18)**
6. Write the Quadratic equation, whose roots are $2 + \sqrt{3}$ and $2 - \sqrt{3}$. **(M'19)**
7. Find the roots of quartic equation $x^2 + 4x + 3 = 0$ by "completing square method". **(J'19)**
8. Shashanka said that $(x + 1)^2 = 2(x - 3)$ is a quadratic equation. Do you agree? **(J'19)**

4 MARKS

1. If the sum of the areas of two squares is 468 m^2 and the difference of their perimeters is 24m., then find the measurements of their sides. **(J'15)**
2. Sum of the squares of two consecutive positive even integers is 100; find those numbers by using quadratic equations. **(M'16)**
3. If -4 is a common root for the quadratic equations $2x^2 + px + 8 = 0$ and $p(x^2 + x) + k = 0$ **(J'17)**
4. Sum of squares of two consecutive even numbers is 580. Find the numbers by writing a suitable quadratic equation. **(M'18)**
5. If a number when increased by 12, equals 160 times of its reciprocal, then find the numbers. **(J'18)**
6. Sum of the areas of two squares is 850 m^2. If the difference of their perimeters is 40 m. Find the sides of the two squares. **(M'19)**
7. A train travels 360 km. at a uniform speed. If the speed had been 5 $km./h$ more, it would have taken 1 hour less for the same journey. Find the speed of the train. **(J'19)**

PROGRESSIONS

1 MARK

1. The hand-bore well dealer charges Rs 200/- for the first one metre only and raises drilling charges at the rate of rupees 30/- for every subsequent metre. Write a progression for the above data. (**M'15**)

2. In a flower garden, there are 23 plants in the first row, 21 plants in the second row, 19 plants in the third row and so on. If there are 10 rows in that flower garden, then find the total number of plants in the last row with the help of the formula $t_n = a + (n-1)d$. (**M'15**)

3. Write the common difference of an Arithmetic Progression, whose n^{th} term is given by $t_n = 3n + 7$. (**J'15**)

4. Find the sum of first 200 natural numbers. (**M'16**)

5. Is 'zero' is a term of the Arithmetic Progression 31, 28, 25, . .? Justify your answer. (**J'16**)

6. In a G.P. $t_n = (-1)^n.2017$. Find the common ratio. (**M'17**)

7. The nth term of AP is $6n + 2$. Find the common difference ($n \in N$) (**J'17**)

8. The sequence $\sqrt{3}$, $\sqrt{6}$, $\sqrt{9}$, $\sqrt{12}$, . . . form an Arithmetic Progression? Give reason. (**M'18**)

9. For the A.P. : $-3, -7, -11, ...$; can we find directly a_{30} - a_{20} without actually finding a_{30} and a_{20}. (**J'18**)

10. Radha says "1, 1, 1, ... are in A.P. and also in G.P". Do you agree with Radha? Give reason. (**M'19**)

11. Find the 11th term of the A.P. : 15, 12, 9, ... (**J'19**)

2 MARKS

1. If 7 times of 7th term of an Arithmetic Progression is equal to the 11 times of 11th term of it, then find the 18th term of that Arithmetic Progression. (**J'15**)

2. Measures of sides of a triangle are in Arithmetic Progression. Its perimeter is 30 cm., the difference between the longest and shortest side is 4 cm; then find the measures of the sides. (**M'16**)

3. Explain the tops in the formula $S_n = \frac{n}{2}[2a + (n-1)d]$ (**J'16**)

4. Find the sum of the first 10 terms of an A.P. 3, 15, 27, 39, ... (**M'17**)

5. Find the value of 'k' so that $k + 2$, $4k - 6$ and $3k - 2$ Are the three consecutive terms of an A.P. (**J'17**)

6. Find the 7th term from the end of the automatic progression 7, 10, 13, ... 184. (**M'18**)

7. In a rangoli design of 13 rows, every row increases its previous row by two dots and first row contains 5 dots, then how many total dots are in the design? (**J'18**)

8. Write the formula of nth term of G.P. and explain the terms in it. (**M'19**)

9. Which term of the G.P. : $\sqrt{2}$, 2, $2\sqrt{2}$, 4, ... is 32. (**J'19**)

4 MARKS

1. If the nth terms of the Geometric Progressions 162, 54, 18, ... and $\frac{2}{81}, \frac{2}{27}, \frac{2}{9}, \ldots \ldots$ are equal, then find the value of n (**M'15**)

2. If the sum of the first 7 terms of an Arithmetic Progression is 49 and that of first 17 terms is 289, then the first 'n' terms. (**M'15**)

3. A manufacturer of TV sets produced 500 sets in the third year and 700 sets in the seventh year. Assuming that the production increase uniformly by a fixed number every year. Find
   i) the production of TV sets in the 15th year
   ii) the total production of TV sets in the first 10 years. (**J'15**)

4. Find the sum of all the three digit numbers as, which are divisible by 4. (**M'16**).

5. The sum of the three terms which are in in an arithmetic progression is 33. if the product of the first and the third terms exceeds the second term by 29, find the Arithmetic Progression. (**J'16**)

6. Find the sum of all three digit natural numbers, which are divisible by 3 and not divisible by 6. (**M'17**)

7. The sum of 5th and 9th terms of A.P. is 72 and the sum of 7th and 12th terms is 97. Find the A.P. (**J'17**)

8. Which term of G.P.: 3, 9, 27, ... is 2187 ? (**J'17**)

9. Find the sum of all two digit odd positive integers which are divisible by 3 but not by 2. (**M'18**)

10. Find the sum of the integers between 100 and 500 that are divisible by 9. (**J'18**)

11. Find the sum of all two digit odd multiples of 3. (**M'19**)

12. Find the sum of all integers the between 1 to 50 which are not divisible by 3. (**J'19**)

COORDINATE GEOMETRY
1 MARK

1. Find the centroid of a triangle, Whose vertices are (3, 4), (–7, –2) and (10, –5). (**M'15**)

2. Find the distance between the points (0, 0) and (a, b). (**J'15**)

3. Find the midpoint of the line segment joining the points (–5, 5) and (5, –5). (**M'16**)

4. If the slope of the line passing through the two points(2, 5) and (5, 8) is represented by $\tan\theta$; (where $0^0 < \theta < 90^0$) in trigonometry, then find angle 'θ' (**J'16**)

5. A(0, 3), B(k, 0) and AB = 5. Find the positive value of k. (**M'17**)

6. Find the distance between the points (1, 5) and (5, 8). (**M'18**)

7. What is the other end of the diameter of the circle, who's the centre is (1, 2) and one end point of the diameter is (3, 4)? (**J'18**)

8. Find the centroid of a ΔPQR, when vertices are P(1, 1), Q(2, 2), R(−3, −3). (**M'19**)

9. Determine 'x' so that 2 is the slope of the line passing through A(− 2, 4) and B(x, −2). (**J'19**)

2 MARKS

1. Show that the points A(4, 2), B(7, 5) and C(9, 7) are collinear. (**M'15**)
2. A(3, 6),B (3, 2) and C(8, 2)are the vertices of a rectangle ABCD. Plot these points on a graph paper. From this find the co-ordinates of vertex D, so that ABCD will be a rectangle. (**J'15**)
3. Show that the points A(–3, 3) B(0, 0) C(3, –3) are collinear. (**M'16**)
4. The distance between the points $(8, x)$ and $(x , 8)$ is $2\sqrt{2}$ units, then find the value of x.(**J'16**)
5. Two vertices of a triangle are (3, 2), (–2, 1) and its centroid is $\left(\frac{5}{3}, -\frac{1}{3}\right)$. Find the third vertex of the triangle. (**M'17**)
6. Find the angle made by the line joining (5, 3) and (–1, – 3) with the positive direction of X – axis. (**M'17**)
7. Determine 'x', if the slope of the line joining the two points (4, x), (7, 2) is $\frac{8}{3}$ (**J'17**)
8. In the diagram on a lunar eclipse, the positions of the sun, earth and moon are Shown by (–4, 6) buy, (k, –25) and (5, –6) respectively, then find the value of k. (**M'18**)
9. Find the coordinates of the point divide the segment joining (2, 3) and (– 4, 0) in 1: 2.(**J'18**)
10. Akhila says,"points A(1, 3), B(2, 2), C(5, 1) are collinear". Do you agree with Akhila ? Why? (**M'19**)

4 MARKS

1. Name the type of quadrilateral formed by joining the points A(–1, –2), B(1, 0), C(–1, 2) and D(–3, 0) on a graph paper. Justify your answer. (**M'15**)
2. If A (–5, 7), B(–4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, then find the area of the quadrilateral ABCD. (**J'15**)
3. Find the co-ordinates of the points trisection of the line segment joining the points (–3, 3) and (3, –3) (**M'16**)
4. If the points P(– 3, 9), Q(a, b) and R(4, – 5) are collinear and $a + b = 1$, then find the values of a and b. (**J'16**)
5. The points C and D on the line segment joining A(–4, 7) and B(5, 13) Such that AC = CD = DB. Then find the co-ordinates of point C and D. (**M'17**)
6. The area of the triangle is 18 sq. units, whose vertices are (3, 4), (–3, –2) and (p, –1); then find the value of 'p'. (**J'17**)
7. Find the points of trisection of the line segment joining the points (–2, 1) and (7, 4). (**M'18**)
8. Show that the points A (–1 , –2), B (4, 3), C (2, 5) and D (–3, 0) in that order form a rectangle. (**J'18**)
9. Find the ratio in which X – axis divides the line segment joining the points (2, −3) and (5, 6). Then find the intersecting point on X – axis. (**M'19**).
10. Find the area of the Rhombus ABCD, whose vertices are taken in order, are A(– 1,1), B(1, –2), C(3, 1), D(1, 4). (**J'19**)

SIMILAR TRIANGLES

1 MARK

1. In a ΔDEF; A, B and C are the mid-points of EF, FD and DE respectively. If the area of ΔDEF is 14.4cm^2, then find the area of ΔABC. (**M'15**)

2. In a ΔPQR and ΔXYZ, it is given that ΔPQR ~ΔXYZ, ∠Y +∠Z = 90⁰ and XY : XZ = 3 : 4. Then find the ratio of sides in ΔPQR. (**J'15**)

3. In the given figure, ΔABC ~ΔADE, then find the value of 'x'. (**M'16**)
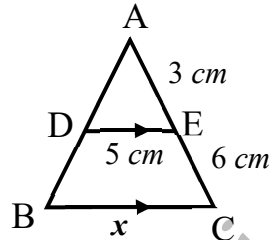
4. It is given that ΔABC~ΔDEF. is it true to say that $\frac{BC}{CD} = \frac{AB}{EF}$? Justify your answer. (**J'16**)

5. Draw the diagram corresponding to basic proportionality theorem. (**J'17**)

6. Srivani walks 12 m due to East and turns left and walks another 5 m, how far is she from the place she started ? (**M'18**)

7. Write the similarity by criterion by which pair of triangles are similar (**M'19**)
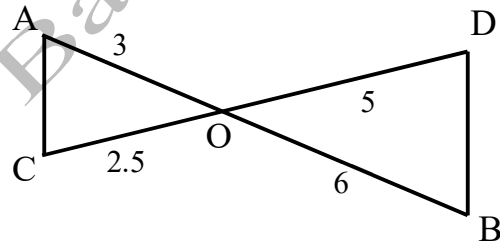
8. Madhavi said "All squares are similar". Do you agree with her statement? justify your answer. (**J'19**)

9. Draw a line segment of length 7.3 cm and divide it it in the ratio 3 : 4. (**J'19**)
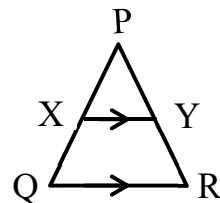
2 MARKS

1. A ladder of 3.9 *m* length is laid against a wall. The distance between the foot of the wall and the ladder is 1.5 *m*. find the height at which ladder touches the wall. (**M'15**)

2. Observe the below diagram and find the values of x and y. (**M'15**)
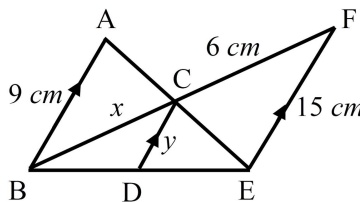
3. Observe the below figure.

   In a ΔPQR, if XY‖QR and PX = x – 2, XQ = x + 5, PY = x – 3 and YR = x + 3, then find the value of 'x'. (**J'15**)

4. ABC is an isosceles triangle and ∠B = 90⁰, then show that AC^2 = 2AB^2. (**M'16**)

5. AB is a chord of the circle and AOC is its diameter, such that $\angle ACB = 60^0$. If AT is the tangent to the circle at the point A, then find the measure of $\angle BAT$. (**J'16**)

6. In a ΔABC $AD \perp BC$ and $AD^2 = BD \times CD$,
   Prove that ΔABC is a right angled triangle. (**M'17**)
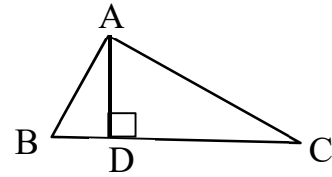
7. In ΔABC, PQ ∥ BC and AP = $3x - 19$, PB = $x - 5$, AQ = $x - 3$, QC = 3 cm. Find x. (**M'18**)

8. In ABC, D and E are points on AB and AC respectively. If AB = 14 cm; AD = 3.5 cm, AE = 2.5 cm and AC = 10 cm, show that DE ∥ BC. (**J'18**)

9. If the ratio of areas of two equilateral triangles is 25 : 36, then find the ratio of heights of the triangles. (**J'19**)

4 MARKS

1. Observe the figure given below:

   In ΔPQR, if XY∥PQ, PX/XR = 5/3 and QR = 7.2cm,

   then find the length of RY. (**M'15**)
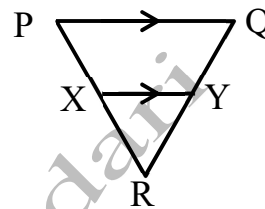
2. ABC is a right-angled triangle which is right angled at C. let AB = c, BC = a, CA = b and let p

   be the length of perpendicular from C on AB. Prove that $c = \dfrac{ab}{p}$. (**J'15**)

3. Draw a line segment of length 8.1 cm and divide it in the ratio of 5:4. Then measure the divided two parts. (this problem should be done by construction) (**J'15**)

4. Construct a triangle of sides 5cm, 6cm and 7cm then construct a triangle similar to it, whose

   sides are $\dfrac{2}{3}$ of the corresponding sides of the first triangle. (**M'16**)

5. Construct a triangle of sides 5cm, 6cm and 7cm. then construct a triangle similar to it, whose

   sides are $1\dfrac{1}{2}$ times the corresponding sides of the first triangle. (**J'16**)

6. ABCD is a trapezium with AB∥ DC,
   the diagonals AC and BD are intersecting at E.
   If ΔAED is similar to ΔBCE,
   then prove that AD = BC. (**M'17**)
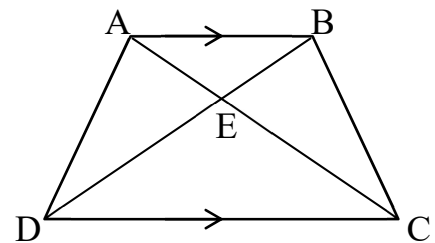
7. ABCD is a trapezium, in which AB∥ DC and its diagonals intersect each other at a point 'O'.

   show that $\dfrac{OA}{OB} = \dfrac{OC}{OD}$. (**J'17**)

8. Construct an equilateral triangle XYZ of side 5 cm and construct another triangle similar to

   ΔXYZ, each of its sides is $\dfrac{4}{5}$ of the sides of ΔXYZ. (**M'18**)

9. Construct a triangle ABC in which AB = 5 cm, BC = 7 cm and $\angle ABC = 50^0$, then construct a triangle similar to it, whose sides are $\dfrac{4}{5}$ of the corresponding sides of first triangle. (**J'18**)

10. Construct a triangle PQR, in which PQ = 4 cm, QR = 6 cm and $\angle PQR = 70^0$. Construct triangle such that each side of the new triangle is $\dfrac{3}{4}$ of the triangle PQR. (**M'19**)

11. In a right angle triangle, the hypotenuse is 10 cm more than the shortest side. If third side is 6 cm less than the hypotenuse, find the sides of the right angle triangle. (**M'19**)

12. In a right angle triangle, length of the hypotenuse is 6 cm more than its shortest side. The length of the other side is 3 cm less than the hypotenuse, then find the sides of right angle triangle. (**J'19**)

TANGENTS AND SECANTS TO A CIRCLE
1 MARK

1. How many tangents can be drawn to a circle from a point on the same circle ? justify your answer. (**M'15**)

2. Find the length of the tangent from a point, which is 9.1cm away from the centre of the circle, whose radius is 8.4cm. (**J'15**)

3. The length of the tangent from an external point 'P' to a circle with center 'O' is always less than 'OP'. Is this statement true? Give reasons. ((**J'16**)

4. The length of the minute hand of a clock is 3.5 cm. Find the area swept by minute hand in 30 minutes.(use $\pi = \dfrac{22}{7}$) (**M'17**)

5. The length of the tangent to a circle from a point 17 cm from its Centre is 18 cm. Find the radius of the circle. (**M'18**)

6. Find the length of the tangent to circle from a point 13 cm away from the centre of the circle of radius 5 cm. (**J'18**)

7. A point P is 25 cm from the centre O of the circle. The length of the tangent drawn from P to the circle is 24 cm. Find the radius of the circle. (**M'19**)

2 MARKS

1. Prove that " in two concentric circles, a chord of the bigger circle, that touches the smaller circle is bisected at the point of contact with the smaller circle". (**M'15**)

2. From an external point, two tangents are drawn to a circle. A line joining the external point and the centre of the circle bisects the angle between the tangents. Is this true? Justify your answer. (**J'15**)

3. Draw a circle with 5 cm radius and construct a pair of tangents to the circle. (**J'16**)

4. Find the area of the shaded region in the given figure. ABCD is a square upside 10.5 cm. (**M'17**)
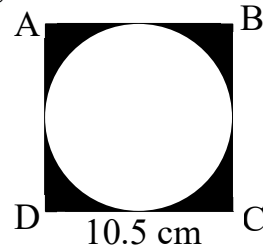
5. A circle of radius 3 cm is inscribed in a ΔABC and AF = 5 cm BF = 3 cm as shown in the figure. .(**J'18**)
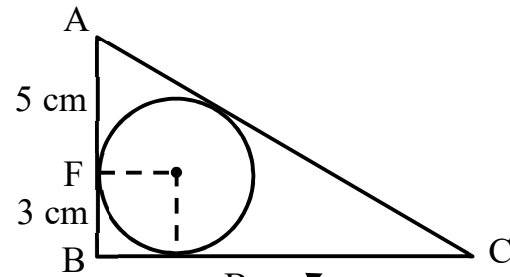
Somu centre the measure of the side AC is 17 cm. Do you are agree ? Give reasons.

6. In the given figure, TA and TB are tangents to the circle with centre 'O'. If ∠ATB = 80^0, then find the measure of ∠ABT. (**M'19**)
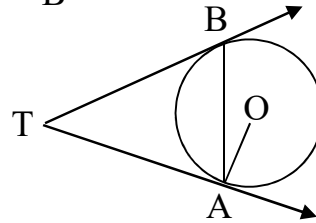
7. In the given figure AB, AC and PQ are tangents to a circle and AB = 6 cm. Find the perimeter of Δ APQ (**J'19**)
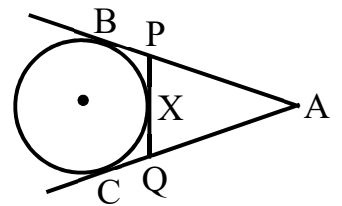
4 MARKS

1. Draw a circle with radius 3cm and construct a pair of tangents from a point 8cm away from the centre. (**M'15**)

2. Draw a circle of radius 5cm. from a point 8cm away from its centre, construct a pair of tangents to the circle. Find the lengths of tangents. (**M'16**)

3. Two concentric circles of radii 10cm and 6cm are drawn. Find the length of the chord of the larger circle which touches the smaller circle. ((**J'16**)

4. Draw a circle of diameter 6 cm from a point 5 cm away from its centre. Construct the pair of tangents to the circle and measure their length. (**M'17**)

5. Ten identical mementos is made by my school to awarding 10 students first prize winners in games if each mango is made as shown in figure (shaded portion) its base PQRS is silver plated from the front side at the rate of Rs.20/- per cm². Find the total cost of the silver plating of 10 Mentos. (OR=5 cm., RQ = 6 cm, PS = 8 cm). (**J'17**)

6. Draw two concentric circles of radii 1.5 cm and 4 cm. From a point 10 cm from its centre, construct the pair of tangent to the circle. (**J'17**)

7. A square ODEF is inscribed in a quadrant OPEQ of circle and OD = $14\sqrt{2}$ cm. Aarthi said that " the area of shaded region is 224 cm²". Do you agree ? Give reason. (**J'18**)

8. Draw a circle of radius 6 cm and construct two tangents to the circle so that angle between the tangents is 60°. (**J'19**)
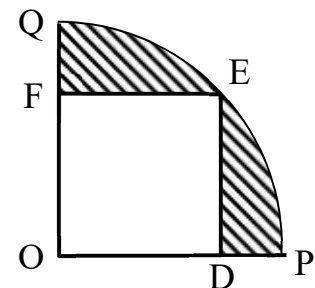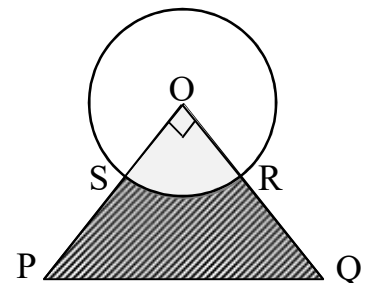
MENSURATION
1 MARK

1. If a cylinder and a cone are of the same radius and height, then how many cones full of milk can fill the cylinder? Answer with reasons. (**M'15**)

2. If the radius of hemisphere is $21cm$, then find its volume. (**J'15**)

3. "A conical solid block is exactly fitted inside the cubical box of side 'a', then the volume of conical solid block is $\frac{4}{3}\pi a^3$". Is this statement true? Justify your answer. (**M'16**)

4. If the surface area of a hemisphere is 'S', then express 'r' in terms of 'S'. (**M'16**)

5. Find the curved surface area of a cylinder of radius $14cm$ and height $21cm.\left(\pi = \frac{22}{7}\right)$ (**J'16**)

6. Write the formula to find curved surface area of a cone and explain each term in it. (**M'17**)

7. If a cone is inscribed in a cylinder, what is the ratio of their volumes? (**J'17**)

8. The vertex angle of a cone is 60^0. Find the ratio of the diameter with the height of the cone. (**J'17**)

9. "cuboid is one of right prism'. Is it true? Justify. (**J'17**)

10. Write the formula to find the volume of a cone and explain each term in it. (**J'18**)

11. Find the value of liquid hemispherical bowl can hold, where radius of the ball is 4.2 cm. (**J'18**)

12. In a hemispherical bowl of 2.1 cm radius ice-cream is there. Find the volume of the bowl. (**M'19**)

13. If the metallic cylinder of height 4 cm and radius 3 cm is melted under recast into a sphere, then find the radius of the sphere. (**J'19**)

14. Write the formula for finding lateral surface area of a cylinder and explain each term in it. (**J'19**)

2 MARKS

1. The radius of a spherical balloon increases from $7cm$ to 14 cm as air pumped into it. Find the ratio of the volumes of the balloon before and after pumping the air. (**M'15**)

2. Find the volume and surface area of a sphere of radius $42cm \left(\pi = \frac{22}{7}\right)$. ((**M'16**)

3. A solid metallic ball of volume **64cm³** melted and made into a solid cube. Find the side of the solid cube. (**M'16**)

4. A toy is in the form of a cone mounted on a hemisphere. The radius of the base and the height of the cone are $7cm$ and $8cm$ respectively. Find the surface area of the toy. (**J'16**)

5. The diameter of a solid sphere is 6 *cm*. It is melted and recast into a solid cylinder of height 4 *cm*. Find the radius of cylinder. (**M'17**)

6. The height and the base radius of a Cone and a Cylinder are equal to the radius of a Sphere. Find the ratio of their volumes. (**M'18**)

7. The diameter of the base of a right circular cone is 12 *cm* and volume 376.8 *cm*^{3}. Find its height ($\pi = 3.14$) (**J'18**)

8. A right circular cylinder has radius 3.5 *cm* and height 14 *cm*. Find curved surface area. (**M'19**)
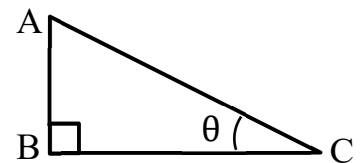
4 MARKS

9. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. If the length of the cylindrical part of the capsule is 14*mm* and the diameter of hemisphere is 6*mm*, then find the volume of medicine capsule. (**M'15**)

10. The area of a sector-shaped canvas cloth is 264*m*^{2}. With this canvas cloth, if a right circular conical tent is erected with the radius of the base as 7*m*, then find the height of the tent.(**J'15**)

11. DWACRA is supplied cuboidal shaped wax block with measurements 88*cm* x 42*cm* x 35*cm*. from this how many number of cylindrical candles of 2.8*cm* diameter and 8*cm* of height can be prepared? (**M'16**)

12. How many spherical balls each 7*cm* in diameter can be made out of a solid lead cube whose edge measures 66*cm*? (**J'16**)

13. The length of a cuboid is 12 *cm*, breadth and height are equal in measurements, and its volume is 432 *cm*^{3}. The cuboid is cut into two cubes. Find the lateral surface area of each cube. (**M'17**)

14. How many silver coins of diameter 5 *cm* and thickness 4 mm have to be melted to prepare a cuboid of 12 *cm* X 11 *cm* X 5 *cm* dimension? (**M'18**)

15. A metallic sphere of diameter 30 *cm* is melted and recast into a cylinder of radius 10 *cm*. Find the height of the cylinder. (**J'18**)

16. A toy is made with seven equal cubes of sides $\sqrt{7}$ *cm*. Six cubes are joined to six faces of a seventh cube. Find the total surface area of the toy. (**M'19**)

17. A cylindrical tank of radius 7 *m* has water to some level. If 110 cubes of the side off the side 7 *cm* are completely measured in it, then find the raise in water level. (**J'19**)

TRIGONAMETRY
1 MARK

1. Show that $\tan^2\theta - \dfrac{1}{cos^2\theta} = -1$. (**M'15**)

2. Explain the meaning of cos A. (**J'15**)

3. If $\tan\theta = \sqrt{3}$ (where θ is acute), then find the value of $1 + \cos\theta$. (**M'16**)

4. Evaluate : $\dfrac{\sin 58^0}{\cos 32^0} + \dfrac{\tan 42^0}{\cot 48^0}$. (**J'16**)

5. If Sin A = $\dfrac{1}{\sqrt{2}}$ and cot B = 1, prove that sin (A + B) = 1, where A and B are both are acute angles. (**M'17**)

6. Express $\cos\theta$ in terms of $\tan\theta$. (**M'17**)

7. If $\cos\theta = \dfrac{1}{\sqrt{2}}$, then find the value of $4 + \cot\theta$. (**M'17**)

8. Is it correct to say that $\sin\theta = \cos(90 - \theta)$ why? (**J'17**)

9. Find the value of tan 2A, if cos 3A = sin 45^0. (**M'18**)

10. Prove that $4\tan^2 45^0 - cosec^2 30^0 + \cos^2 30^0 = \dfrac{3}{4}$. (**J'18**)

11. Using the figure given of ΔABC, prove that $\sin^2\theta + \cos^2\theta = 1$ (**J'18**)

12. Evaluate cosec 39^0 . sec 51^0 – tan 51^0 . cot 39^0. (**M'19**)

13. In a right triangle ABC, right angled at 'C' in which AB = 13 cm, BC = 5 cm, determine the value of $\cos^2 B + \sin^2 A$. (**M'19**)

14. Ravi says "the value of tan 0^0.tan1^0.tan2^0. . . . . .tan89^0 is zero". Do you agree with Ravi? Give reason. (**J'19**)

2 MARKS

1. Show that $(1 + \cot^2\theta)(1 - \cos\theta)(1 + \cos\theta) = 1$. (**M'15**)

2. Show that $\sqrt{sec^2\theta + cosec^2\theta} = \tan\theta + \cot\theta$. (**J'15**)

3. Prove that $\sqrt{\dfrac{1-\sin\theta}{1+\sin}} = \sec\theta - \tan\theta$, (where θ is acute). ((**M'16**)

4. If tan (A + B) = 1 and cos (A – B) = $\dfrac{\sqrt{3}}{2}$, $0^0 <$ A+B < 90^0 and A > B; find A and B. (**M'16**)

5. If $x = a\sec\theta$ and $y = b\tan\theta$, then prove that $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$. ((**J'16**)

6. If A,B,C are interior angles of ΔABC,
   then show that $sin\left(\dfrac{A+B}{2}\right) + cos\left(\dfrac{A+B}{2}\right) = cos\dfrac{C}{2} + sin\dfrac{C}{2}$. (**J'17**)

7. Prove that $\sqrt{\dfrac{cosecA+1}{cosec\,A-1}} - \sqrt{\dfrac{cosecA-1}{cosec\,A+1}} = 2cotA$ **(J'17)**

8. What can you say about the values of sinA and cosA as the measure of an angle A increases from 0° to 90°? **(J'17)**

9. Find the measure of the angles A and B, if cos (A − B) = $\dfrac{\sqrt{3}}{2}$ and sin(A + B) = $\dfrac{\sqrt{3}}{2}$. **(M'18)**

10. If cosec (A + B) = 1 and cot (A − B) = $\sqrt{3}$, $0^0 < A + B \le 90^0$, A > B, then find A and B. **(J'18)**

11. Find the value of $\dfrac{tan^2 60^0 + cot^2 30^0}{sin^2 30^0 + cos^2 60^0}$ **(M'19)**

12. Prove that $\dfrac{1}{sin^2\theta} - cot^2\theta = 1$ **(J'19)**

4 MARKS

1. Find the value of $\dfrac{\sec 15^0}{\csc 75^0} + \dfrac{\sin 72^0}{\cos 18^0} - \dfrac{\tan 33^0}{\cot 57^0}$. **(M'15)**

2. If $cot\theta = \dfrac{9}{12}$, then find the value of $\dfrac{sin\theta + cos\theta}{sin\theta - cos\theta} + \dfrac{sec\theta + cosec}{sec\theta - cosec\theta}$. **(J'15)**

3. Evaluate : $\dfrac{tan^2 60^0 + 4cos^2 45^0 + 3sec^2 30^0 + 5cos^2 90^0}{cosec30^0 + sec60^0 cot^2 30^0}$ **(M'16)**

4. If $\dfrac{sin\theta}{1-cos} + \dfrac{sin\theta}{1+cos\theta} = 4$ $(0^0 < \theta < 90^0)$, then find the value of θ. **(J'16)**

5. Prove that $(1 + tan^2\theta) + \left(1 + \dfrac{1}{tan^2\theta}\right) = \dfrac{1}{sin^2\theta - sin^4\theta}$ **(M'17)**

6. If $\dfrac{cos\alpha}{cos\beta} = m, \dfrac{cos\alpha}{sin\beta} = n,$ then show that $(m^2 + n^2) cos^2\alpha = m^2 n^2$. **(J'17)**

7. If $cosec\theta + cot\theta = k$, then write all trigonometric ratios at θ in terms of k. **(J'17)**

8. Prove that $\dfrac{cos\,A}{1-tan\,A} + \dfrac{sin\,A}{1-cot\,A} = sin\,A + cos\,A$ **(M'18)**

9. Show that $(sec\theta - tan\theta)^2 = \dfrac{1-sin\theta}{1+sin\theta}$ **(M'18)**

10. Prove that $\sqrt{\dfrac{1-sin\theta}{1+sin\theta}} = sec\,\theta - tan\,\theta$ **(J'18)**

11. Show that $\dfrac{cos\theta}{1-sin\theta} + \dfrac{1-sin\theta}{cos\theta} = 2sec\theta$ **(M'19)**

12. If cosecA = $\sqrt{2}$, then find the value of $\dfrac{2sin^2 A + 3cot^2 A}{4(tan^2 A - cos^2 A)}$. **(J'19)**

APPLICATIONS OF TRIGONAMETRY

1 MARK

1. A person from the top of a building oh height $25m$ has observed another building's top and bottom at an angle of elevation of 45^0 and at an angle of depression 60^0 respectively. Draw a diagram for this data. (**M'15**)

2. A person observed the top of a tree at an angle of elevation of 60^0 when the observation point was $5m$ away from the foot of the tree. Draw a diagram for this data. (**J'15**)

3. "If the angle of elevation of Sun increases from 0^0 to 90^0, then the length of a tower decreases", is this statement true? Justify your answer. ((**M'16**)

4. If a tower of height 'h' is observed from a point with a distance 'd' and angle 'θ', then express the relation among h, d and θ. (**J'16**)

5. A pole and its shadow have same length, find the angle of the ray male with the earth at that time. (**M'18**)

2 MARKS

1. A boat has to cross a river. It crosses the river by making an angle of 60^0 with the bank of the river due to stream of the river and travels a distance of $450m$ to reach the another side of the river. Draw the diagram for this data. (**M'16**)

2. A person 25 m away from a cell tower observes the top of the cell tower at an angle of elevation 30°. Draw the suitable diagram for this situation. (**M'17**)

3. A State highway a leads to foot of the tower. A Man Standing at the top of the tower observes a car at an angle of depression of θ, which is approaching to the foot of the tower with a uniform speed. 6 seconds later the angle of depression is ϕ. Draw a diagram for this data and analyze. (**J'17**)

4. From the top of the tower of height h m height, Anusha observes the angles of depression of two points X and Y on the same side of the tower on the ground to be α and β. Draw the suitable figure for the given information. (**M'18**)

5. The angle of elevation of the top of a tower from a point on the ground, which is $50m$ away from the foot of the tower, is 45^0. Draw the diagram for the situation. (**J'18**)

6. From the top of the building the angle of elevation of the top of the 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 $30m$, draw the suitable diagram to the given data. (**M'19**)

7. From the top of the building, The angle of elevation of the top of a TV tower is and the angle is α^0 and the angle of depression to its (T.V.tower) foot is β^0 . if distance of the building from the tower is 'd' metres, draw the suitable diagram of the given data.(**J'19**)

4 MARKS

1. An observer flying in an latitude of 900m observes two ships in front of him, which are in the same direction at an angles of depression of 60^0 and 30^0 respectively. Find the distance between the two ships. (**M'15**)

2. A person from the top of a building of height 15meters observes the top and the bottom(foot) of a cell tower with the angle of elevation as 60^0 and the angle of depression as 45^0 respectively. Then find the height of the cell tower. (**J'15**)

3. Two poles of equal heights are standing opposite to each other, on either side of the road, which is 80m wide. From a point between them on the road, the angles of elevation of top of the poles are 60^0 and 30^0 respectively. Find the height of the poles. (**M'16**)

4. A tree is broken without separating from the stem by the wind. The top touches the ground making an angle 30^0 at a distance of 12m from the foot of the tree. Find the height of the tree before breaking. (**J'16**)

5. Two poles are standing opposite to each other on the either side of the road which is 90 feet wide. The angle of elevation from bottom of the first pole to the top of the second Pole is 45^0.The angle of elevation from the bottom of the second pole to the top of the first pole is $30°$. Find the heights of the poles. (use $\sqrt{3}$ = 1.732) (**M'17**)

6. The angle of elevation of top of the tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same to straight line with it, are complementary. Prove that the height of the tower is 6 m. (**J'17**)

7. From the top of a tower of 50m high, Neha observes the angles of depression of the top and foot of another building to be $45°$ and $60°$ respectively. Find the height of the building.(**M'18**)

8. Two boys on either side of their school building of 20 m height observes its top at the angles of elevation $30°$ and $60°$ respectively. Find the distance between two boys. (**J'18**)

9. The angle of elevation of the top of a hill from the foot of a tower is 60^0 and the angle of elevation of the top of the tower from the foot of the hill is 30^0. If the tower is 50 m high. Find the height of the hill. (**M'19**)

10. A man observes top of tower at an angle of elevation of $30°$. When he walked 40 m towards the tower, the angle of elevation is changed to 60^0. Find the height of the tower and distance from the first observation point to the tower. (**J'19**)

PROBABILITY

1 MARK

1. When a die is rolled once unbiased, what is the probability of getting a multiple of 3 out of possible outcomes? (**M'15**)
2. The probability of an event is always in between **0** and **1** why? (**J'15**)
3. Find the probability of getting a sum of the numbers on them is 7, when two dice are rolled at a time. ((**M'16**)
4. Find the probability of getting a prime number, when a card drawn at random from the numbered cards from 1 to 25. (**J'16**)
5. From the first 50 natural numbers, find the probability of randomly selected number is a multiple of 3. (**M'17**)
6. A dice is thrown once. Find the probability of getting a composite number. (**J'17**)
7. What is the probability of getting exactly 2 heads, when three coins are tossed simultaneously. (**M'18**)
8. When a dice is rolled, find the probability of getting on odd prime number. (**J'18**)
9. From English alphabet if a letter is chosen at random, then find the probability that the letter is a consonant. (**M'19**)
10. Write two examples for equally likely events. (**J'19**)

2 MARKS

1. There are 12 red balls, 18 blue balls and 6 white balls in a box. When a ball is drawn at random from the box, what is the probability of not getting a red ball? (**M'15**).
2. When a card is drawn from a well shuffled deck of 52 cards, then find the probability of NOT getting a red faced card. (**J'15**)
3. There are 5 red balls, 4 green balls and 6 yellow balls in a box. If a ball is selected at random, what is the probability of not getting a yellow ball? ((**J'16**)
4. One card is selected from a well shuffled Deck of 52 cards. Find the probability of getting a red card with prime number. (**M'17**)
5. From the following data, Find the probability of selecting "B" blood group student. (**J'17**)

Blood Group	A	B	AB	O
Number of students	10	13	12	5

6. What is the probability of a number picked from first 20 natural numbers is even composite number? (**M'18**)
7. A bag contains 7 red, 5 white it and 6 black balls. A ball is drawn from the bag at random; find the probability that the ball drawn is not black. (**J'18**)
8. A bag contains balls which are numbered from 1 to 50. A ball is drawn at random from the bag, the probability that it bears two digit number multiple of 7. (**M'19**)
9. A box contains 4 red balls, 5 green balls and P white balls. If the probability of randomly picked a ball from the box to be read ball is $\frac{1}{3}$, then find the number of white balls. (**J'19**)

4 MARKS

1. There are 100 flash cards labeled from 1 to 100 in a bag. When a card is drawn from the bag at random, what is the probability of getting……..
   - i) A card with prime number from possible outcomes
   - ii) A card without prime number from possible outcomes. (**M'15**).

2. A shopkeeper has 100 memory cards in a box. Among them, 15 memory cards are defective. When a person came to the shop to buy a memory card, the shopkeeper drew a memory card at random from the box. Then
   - (i) What is the probability that this memory card is defective?
   - (ii) After drawing the first memory card which is defective, it is not placed back in the box. Then another memory card is drawn at random. What is the probability that this memory card is NOT defective? (**J'15**)

3. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of red ball, find the number of blue balls in the bag. (**M'16**)

4. Two dice are rolled at same time and the sum of the numbers appearing on them is noted. Find the probability of getting each sum, from 3 to 5 separately. (**J'16**)

5. A bag contains some square cards. A prime number between 1 and 100 has been written on each card. Find the probability of getting a card that the sum of the digits of a prime number written on it, is 8. (**M'17**)

6. From the Deck of 52 cards, if a what is randomly chosen, find the probability of getting a card with (*i*) a prime number on it, (*ii*) face on it. (**M'18**)

7. Suppose you drop a dies at random on the circular region of diameter 28 cm as shown in the figure. What is the probability that it will land inside the rectangle? (**J'18**)
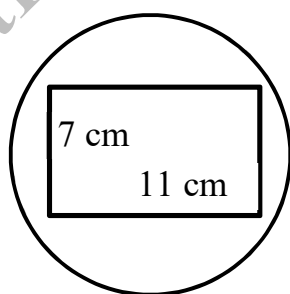
8. If two dice are thrown at the same time, find the probability of getting sum of the dots on top is prime. (**M'19**)

9. From a pack of 52 playing cards, Jacks, Queens, Kings and Aces of red colour are removed. From the remaining, a chord is drawn at random. Find the probability that the card drawn is (i) a block queen, (ii) a red card. (**J'19**)

STATISTICS
1 MARK

1.

Class Interval	10 – 25	25 – 40	40 – 55	55 – 70	70 – 85	85 –100
Frequency	2	3	7	6	6	6

   How do you find the deviation from the assumed mean for the above data? (**M'15**)

2. Write the formula to find the median of a grouped data and explain each term.(**M'16**)

3. When an observation in a data is abnormally more than or less than the remaining observations in the data, does it affect the mean or mode or median? Why? (**J'15**)

4. Write the formula to find the mean of a grouped data, using assumed mean method and explain each term. (**J'16**)

5. "The median of observations, – 2, 5, 3, – 1, 4, 6 is 3.5". Is it correct? (**M'17**)

6. Write the first 10 prime numbers and find their median. (**J'17**)

7. Write the formula to find the median of grouped data and explain the alphabet in it. (**M'18**)

8. Prathyusha stated that" the average of first 10 odd numbers is also 10". Do you agree with her? Justify your answer.(**M'18**)

9. Find the median of first seven composite numbers. (**M'19**)

10. Find the mode of the data 6, 8, 3, 6, 3, 7, 4, 6, 7, 3, 6. (**J'19**)

2 MARKS

1. The heights of six members of a family are given below in the table.

Height(in ft.)	5	5.2	5.4	5.6
Number of Family members	1	2	2	1

   Find the mean height of the family members. (**J'15**)

2. State the formula to find the mode for a grouped data. Explain each term in it. (**J'15**)

3. Find the value of $f_i x_i$ for the above data, where x_i is the mid value of each class. (**J'16**)

Class Interval	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency (f_i)	5	8	10	5	2

4. Write the formula of mode for grouped data and explain each term in it. (**M'17**)

5. The height of 12 members are given below in the table.

Height(in ft.)	5	5.2	5.4	5.6
Number of Family members	3	4	3	2

   Find the mean height of the family members. (**J'17**)

6. Find a median of $\frac{2}{3}, \frac{4}{5}, \frac{1}{2}, \frac{3}{4}, \frac{6}{5}$.   (**M'18**)

7. Find the mean of prime numbers less than 30. (**J'18**)

8. Write the mode formula for grouped data and explain the terms in it. (**M'19**)

9. Find the median of first 6 prime numbers. (**J'19**)

4 MARK

1. In a village, an enumerator has surveyed for 25 households. The size of the family(number of family members) and the number of families is tabulated as follows:-

Size of family (No. of members)	1 – 3	3 – 5	5 – 7	7 – 9	9 – 11
No. of families	6	7	9	2	1

   Find the mode of the data. (**M'15**)

2. Daily expenditure of 25 householders is given in the following table:

Daily expenditure of a family(Rs)	100–150	150–200	200–250	250–300	300–350
No. of households	4	5	12	2	2

   Draw a " less than type" cumulative frequency Ogive curve for this data. (**M'15**)

3. If the median of 60 observations given below is 28.5, then find the values of x and y. (**J'15**)

Class Interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	5	x	20	15	y	5

4. The following distribution gives the daily profits (in rupees) earned by 50 shops in a locality. Convert the above distribution to a 'less than type' cumulative frequency distribution and draw its Ogive. (**J'15**)

Daily Profits (in Rs.)	0 – 50	50 – 100	100 – 150	150 – 200	200 – 250	250 – 300
No. of shop	6	9	13	10	8	4

5. Consider the following distribution of daily wages of 50 workers of a factory. (**M'16**)

Daily wages in Rupees	200–250	250–300	300–350	350–400	400–450
No. of workers	6	8	14	10	12

   Find the mean daily wages of the workers in the factory by using step-deviation method

6. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production Yields(Quintals/Hect.)	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75	75 – 80
No. of farmers	2	24	16	8	38	12

   Draw both ogives for the above data. Hence obtain the median production yield. (**M'16**)

7. The scores of 20 students in a test is tabulated as follows. Find the mode of the data. (**J'16**)

Marks	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of students	1	6	7	4	2

8. The literacy rate (in percentage) of 35 cities is given in the following table. (**J'16**)

Literacy arte %	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
No. of. cities	3	11	10	8	3

   Prepare 'more than type' cumulative frequency table and draw ogive curve for this data.

9. The daily wages of 80 workers of a factory (**M'17**)

Daily wages(Rs.)	500–600	600–700	700–800	800–900	900–1000
Number of workers	12	17	28	14	9

   Find the mean daily wages of the workers of the factory using an appropriate method.

10. The following data gives the information on the observed lifespan (in hours)of 90 electrical components. Draw both ogives for the about data. (**M'17**)

lives span (in hours)	0–20	20–40	40–60	60–80	80–100	100–120
Frequency	8	12	15	23	18	14

11. Daily income of 40 coal-mine labours are given in the following table.

Daily Income in Rs.	100–150	150–200	200–250	250–300	300–350	350 - 400
Number of labours	4	3	3	8	13	9

Draw Ogive Curves (Cumulative frequency) for this data. (**J'17**)

12. Find the missing frequencies f_1 and f_2 if mean of 50 observations given below is 36.4 (**J'17**)

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	3	5	f_1	10	f_2	8	5

13. Incomes of the families in a locality are given. Find the mode of the data. (**M'18**)

Income in Rs.	1–200	201–400	401–600	601–800	801–1000
Number of families	7	10	16	12	3

14. Heights of the peoples of a particular school are given. Draw greater than compared to come and find the median height from it. (**M'18**)

Height (in cm)	90 - 100	100 - 110	110 - 120	120 - 130	130 - 140	140 - 150
No. of Pupils	5	2	3	8	8	6

15. The following table shows the ages of the patients admitted in a hospital during a year.

Age in years	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of Patients	8	15	25	27	18	7

Draw a less than ogive curve for the about data. (**J'18**)

16. The below distribution gives the weight of 40 students In a class. Find the median weight of the students. (**J'18**)

Weight in kg	30 – 35	35 – 40	40 – 45	45 – 50	50 – 55	55 – 60
No. of students	4	5	10	8	8	5

17. Draw less than Ogive for the following frequency distribution. Find the median from obtained curve. (**M'19**)

IQ	60–70	70–80	80–90	90–100	100–110	110–120	120–130
No. of students	2	5	12	31	39	10	4

18. Find the mean age of 100 residents of a colony from the following data. (**M'19**)

Age (in yrs)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of persons	10	15	25	25	10	10	5

19. If the mean of the following frequency distribution is 50, then find the value of k. (**J'19**)

Class	0 – 20	20 - 40	40 - 60	60 - 80	80 - 100
Frequency	17	20	32	k	19

20. The following table gives the marks obtained by buy 100 students in SA – I exams in Mathematics subject. Draw ogive graph of less than and greater than. (**J'19**)

Marks	50 – 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
No. of students	2	8	12	24	38	16