OFFICE OF THE DDPI,

KOLAR DISTRICT

KOLAR

CLASS: 10^{TH} STANDARD

SUBJECT: MATHEMATICS

GLANCE ME ONCE

YEAR : 2018 -19

1. Arithmetic progressions

I. Four alternatives are given for every question. Choose one appropriate answer:

1. The common difference of the Arithmetic progression -10, -6,-2,2 .... is

   A)-16 B) -4 C) 4 D) 2

2. The n^{th} term of the Arithmetic progression 11,9,7,5 .... is

   A) 9-2n B) 9+2n C) 13-2n D) 12+2n

3. The sum of first 'n' odd natural numbers is

   A) 2n-1 B) 2n+1 C) n^2-1 D) n^2

4. If k, 2k-1 and 2k+1 are three consecutive terms of an AP, then the value of 'k' is

   A) -3 B) -2 C) 3 D) 6

5. The common difference of an AP $\sqrt{7}, \sqrt{28}, \sqrt{63}$ -------- is

   A) $\sqrt{70}$ B) $\sqrt{112}$ C) $\sqrt{84}$ D) $\sqrt{97}$

II. One mark questions:

1. What is an Arithmetic progression?
2. Give an example for infinite Arithmetic progression.
3. In an Arithmetic progression, if 'a' is the first term and 'd' is the common difference then write the formula used to find its n^{th} term.
4. If 'a' is the first term 'd' is the common difference and 'n' is the number of terms in an AP, then write the formula used to find its sum to first 'n' terms.
5. Find the common difference of the Arithmetic progression 1,-1,-3,-5............
6. Write an Arithmetic progression in which first term is 'x' and common difference is 'y'.

III. Two mark questions:

1. The 17^{th} term of an Arithmetic progression exceeds its 10^{th} term by 7. Find the common difference.
2. Find the number of two-digit numbers that are completely divisible by 3.
3. Find the 20^{th} term from the last term of the AP 3,8,13 .... 253.
4. Find whether 55 is a term of the AP 7,10,13 ....
5. The first term of an Arithmetic Progression is -5 and last term is 45. If the sum of the terms is 120, then find the number of terms.
6. Find the sum of first 1000 positive integers.
7. Find the sum of first 40 positive integers divisible by 6.
8. If 2x, x+10, 3x+2 are in Arithmetic progression, then find the value of 'x'.
9. If the sum of 'n' terms of an Arithmetic progression is $s_n=3n^2+5n$ then find its common difference.
10. If five times the fifth term of an A.P is equal to 8 times its eighth term, show that its 13^{th} term is zero.

IV. 3 marks / 4 marks questions:

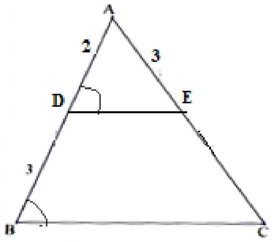
1. In an Arithmetic Progression 4^{th} term and 8^{th} term are in the ratio 1:2. If the 10^{th} term is 30. Find the Arithmetic Progression.
2. The sum of three numbers in an Arithmetic Progression us 12 and their product is 48. Find those numbers.
3. The angles of a quadrilateral in an Arithmetic Progression. If the least angle is 15^0, then find the remaining angles.
4. If 'm' times the nth term of an A.P is equal to 'n' times its nth term, show that its $(m+n)^{th}$ term is Zero.
5. Find four numbers in AP whose sum is 20 and the sum of whose squares is 120.
6. A man repays a loan of Rs. 3,250/- by paying Rs.20/- in the first month and then increases the payment by Rs. 15 every month. How long will it take him to clear the loan?

7. If the sum of 3^{rd} and 8^{th} terms of an A.P is 7 and the sum of 7^{th} and 14^{th} terms is -3, find the 10^{th} term.

8. the sum of first seven terms of an Arithmetic Progression is 182. If its 4^{th} and 17^{th} terms are in the ratio 1:5, find the Arithmetic Progression.

2. Triangles

I.Choose the correct alternative in each of the following:



1. In the figure $\angle ADE = \angle ABC$ then CE =

   A) 2 B) 5 C) $\frac{3}{4}$ D) $\frac{9}{2}$

2. The areas of two similar triangles are respectively 9 cm^2 and 16 cm^2. The ratio of their corresponding sides is

   A) 3:4 B) 4:3 C) 2:3 D) 4:5

3. $\Delta ABC \sim \Delta PQR$ such that ar ($\triangle ABC$) = 4 ar (ΔPQR) if BC=12 cm then QR=

   A) 6 cm B) 8 cm C) 7 cm D) 10 cm

4. XY is drawn parallel to the base BC of a ΔABC cutting AB at X and AC at Y. If AB=4BX and YC=2cm the n AY=

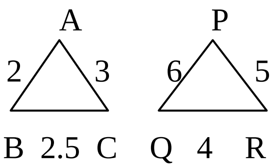
   A)2 cm B) 4 cm C) 6 cm D) 8 cm

5. A man goes 24 m due west and then7 m due north. How far is he starting point?

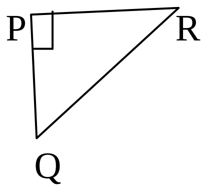
   A) 17 m B) 25 m C) 26 m D) 31 m

II. Answer the following questions VSA:

1. State Basic proportionality theorem or Thale's theorem.

2. 

In the figure $\Delta ABC \sim \Delta PQR$. Name the similarity criterion used here.

3. 

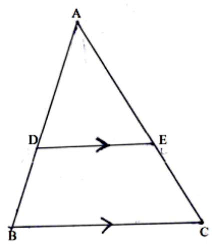
In Δ PQR $\angle QPR = 90^o$, then PQ^2 =.

4. State Pythagoras theorem.

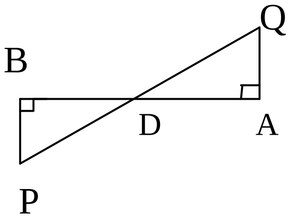
5. What is the length of the diagonal of a square of side 6 cm?

III. Answer the following questions : (2 marks)

1. In ΔABC, DE||BC. If AD=1.5 cm, DB = 3 cm and AE = 1cm then find EC.

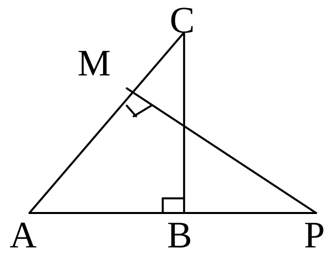


2. In the figure . $AQ \perp AB$, $PB \perp AB$, if AD = 20cm, BD = 12 cm and PB = 18 cm then find the length of AQ



3. In the trapezium ABCD AB||CD. AC and BD are diagonals which intersect each other at ‘o’ prove that $\frac{OA}{OC} = \frac{OB}{OD}$

4. In figure, ABC and AMP are two right triangles, fight angled at B and M respectively prove that $\Delta ABC \sim \Delta AMP$



5. The vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

6. $\Delta ABC \sim \Delta DEF$ their areas are respectively 64 cm^2 and 121 cm^2. If EF = 15.4 cm then find BC.

7. Diagonals of a trapezium ABCD with AB||DC intersect each other at the point ‘o’. If AB = 2 CD, find the ratio of the areas of triangles AOB and COD.

8. ABC is an isosceles triangle with AC =BC. If $AB^2 = 2AC^2$, prove that ABC is a right triangle.

9. A ladder 10m long reaches a window 8m above the ground. Find the distance of foot of the ladder from the base of the wall.

10. Two poles of height 6 m and 11 m stand on a plane ground. If the distance between the feet of the poles is 12 m, find the distance between their tops.

IV. Answer the following long answers (3 marks):

1. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

   Or

   State and prove Basic proportionality theorem (Thales theorem)

2. Prove that if in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio and hence the two triangles are similar (AAA criterion)

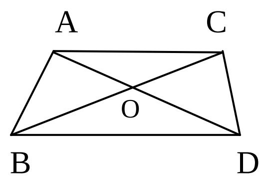
3. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

4. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

   Or

   State and prove Pythagoras theorem.

5. In the figure, ABC and DBE are two triangles on the same base BC. If AD intersect BC at ‘o’ show that $\frac{ar(ABC)}{ar(DBC)} = \frac{AO}{DO}$



6. Prove that the sum of the squares of the sides of a Rhombus is equal to the sum of the squares of its diagonals.
3. An aeroplane leaves an airport and flies due north at a speed of 1000km/hr. At the same time another aeroplane leaves the same airport and flies due west at a speed of 1200km/hr. How far apart will be the two planes after 1½ hour?

3. Pair of Linear Equation

I. 1 mark questions:

1. Write the standard form of pair of linear equations in two variables.
2. Write the conditions for pair of liner equations to have unique solution.
3. Write the conditions for pair of linear equations to have many solutions.
4. Under what conditions the pair of linear equations will be parallel?

II.2 marks questions:

1. Solve: a + b =8, a – b =2
2. Solve: 7x – 15 y =2, x + 2y =3
3. Check whether pair of linear equations 3x + 2y = 5 and 2x–3y = 7 is consistent.

III. 3 marks questions:-

1. Solve: 5x + 3y = 35 and 2x – 4y = 28
2. Solve: $\frac{2}{x} + \frac{3}{y} = 13$ and $\frac{5}{x} - \frac{4}{y} = -2$
3. Ritu can row down steam 20km in 2 hr and upstream 4km in 2 hr. Find her speed of rowing in still water and the speed of the current.
4. A fraction when $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to the denominator. Find the fraction.

V. 4 mark questions:

Solve equations by graphically

1. x + y = 5; x – y = 4
2. 2x + y = 4 ; x - y = -1
3. x + 2y = 8 ; x –y = 5
4. x + y = 2; x - 2y = 5
5. x + y = 6 ; x – y = 2

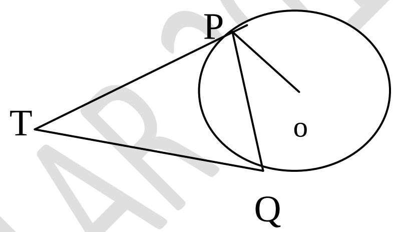
4.CIRCLES

I. Solve and answer the following questions: (1 Marks)

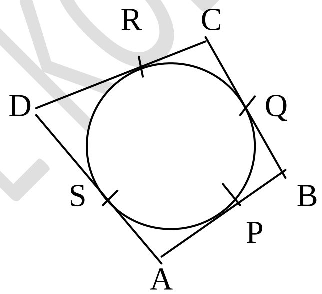
1. What is a tangent?
2. What is measure of angle between a tangent and the radius at the point of contact?
3. What is a secant?

III. 3mark questions:

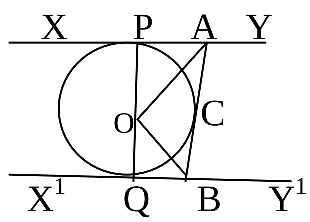
1. 'The tangent at any point of a circle is perpendicular to the radius through the point of contact' prove it.
2. Prove that "the lengths of the tangents drawn from an external point to a circle are equal."
3. Two tangents TP and TQ are drawn to a circle with centre 'o' from an external point T. Prove that $\angle PTQ = 2\angle OPQ$



4. ABCD is drawn to circumscribe a circle. Prove that AB+ CD = AD+BC



5. In the figure XY and X^1Y^1 are the two parallel tangents to x a circle with centre 'o' and another tangent AB with the point of contact C intersecting XY at A and X^1Y^1 B. Prove that $\angle AOB = 90^0$.



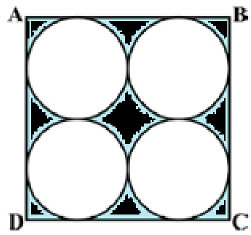
5. Areas related to circles

I. 1 Mark Questions:

1. Write the formula to find the area of a quadrant of a circle.
2. What is the formula to find the area of a sector of a circle?
3. There is a circle of radius x units. What is the formula to find area of a sector if the central angle is 'θ'

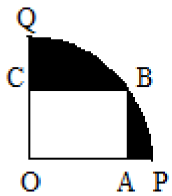
II. 2 mark questions:

1. Find the area of sector of a circle with radius 6 cm and angle of sector 60^0.
2. Find the area of the shaded region when ABCD is a square of side 14 cm.

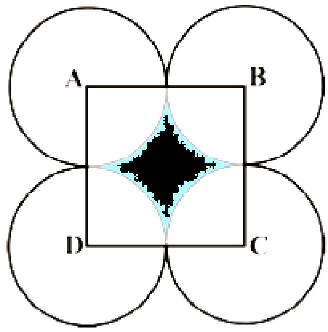


3. Find the area of the shaded region if PQ=24 cm, PR=7cm and 'o' is the centre of the circle given.

4. OABC is a square inscribed in a quadrant OPBQ. If OA = 20cm find the area of the shaded portion.



4. ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally two of remaining three circles. Find the area of the shaded region.



6.Constructions

I. (2 mark questions)

1.Draw a line segment of length 7.6 cm and divide it in the ratio 5:8.
2. Construct a pair of tangents to a circle of radius 4 cm of the angle between the radii is 70^0.
3. Construct a pair of tangents to a circle of radius 5 cm from a point 9 cm from the centre.
4. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60^0.

II. 3 mark questions:

1. Construct a triangle similar to the triangle with sides 4cm, 5cm and 6cm and then a triangle similar to it whose sides are in the ratio of $\frac{2}{3}$ of the corresponding sides of the triangle.
2. Construct a ΔABC with side BC = 6 cm, AB = 5cm and $\underline{|ABC} = 60^o$. Then construct a triangle whose sides are of the corresponding sides of the ΔABC.
4. Construct a equilateral triangle ABC with sides 5 cm construct a triangle similar to ABC, such that each side is $\frac{7}{6}$ of the corresponding sides of triangle ABC.

7. Co-ordinate geometry

I. 1 mark questions:

1. Formula to find the distance between two points.
2Find the distance between origin and point (5, -8)
3. Write the co-ordinates of origin.
4. Write the formula to find mid point of a line joining any two points.

II. Answer the following: (2 marks)

1. Find the distance between the points (2,3) and (4,1)
2. Determine of the points (1,5) , (2,3) and (-2, -11) are collinear.
3. Check whether (5,-2), (6, 4) and (7,-2) are the vertices of an isosceles triangle.
4. Find the value of ‘y’ for which the distance between the points (2, -3) and (10, y) is 10 units.
5. Find the co-ordinates of the points which divide the line segment joining the points (4-3) and (8,5) in the radio 3:1 internally.
6. In what radio does the point (-4,6) divide the line segment joining the points (-6,10 and (3, -8)?
7. Find the co-ordinates of a point A, where AB in the diameter of a circle whose centre is (2, -3), (-1, 0) and (2, -4)
8. Find the area of the triangle whose vertices are (2, 3), (-1, 0) and (2, -4)

8. Real Numbers

I. Short answer questions: (1 mark)

1. Express 196 as product of prime factors.
2. Express 1024 as product of prime factors.
3. Find HCF of 55 and 210.
4. Find HCF of 18 and 45.
5. Find LCM of 72 and 105.
6. IS (17 x 5 x 11 x 2 + 2) A composite number.
7. Write the decimal expansion of $\frac{6}{15}$
8. State Euclid's division lemma.
9. State fundamental theorem of Arithmetic.

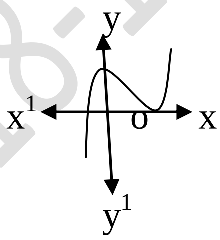
I. Answer the following questions: (2 mark)

1. Prove that $5+\sqrt{6}$ is an irrational.
2. Prove that $2\sqrt{3}-4$ is an irrational.
3. Prove that $\sqrt{3}+\sqrt{2}$ is an irrational.
4. Prove that is $\sqrt{2}$ is an irrational.

9. POLYNOMIALS

I. Four alternatives are given against every question choose the correct answer.

1. The sum and product of the zeroes of the quadratic polynomial is -4 and 1. Then the quadratic polynomial is
   a) x^2-4x+1 b) x^2+4x+1 c) x^2-4x-1 d) x^2+4x-1
2. The sum of the zeroes of $3x^2-2x-8$ is
   a) $\frac{2}{3}$ b) $\frac{-2}{3}$ c) $\frac{-8}{3}$ d) $\frac{3}{2}$
3. In the figure the graph of a polynomial is y=f(x) given, the number of zeroes of f(x) is



   a) 1 b) 2 c) 3 b) 4
4. In a polynomial $ax^2 + bx + c$ whose a+0 then the resultant polynomial is
   a) Linear polynomial b) Quadratic polynomial
   c) Zero polynomial d) Constant polynomial

II. Solve the following problems. (1 marks)

1. Write the general form of quadratic polynomial.
2. Find the sum of the zeroes of quadratic polynomial $x^2 -5$.
3. Write the degree of the polynomial $x^3 -3x^2 -5x +7$.
4. What is the maximum number of zeroes a quadratic polynomial can have?
5. Find the value of $P(x)= x^2 + 2x – 5$ at P(1).
6. Find the zero of the polynomial $2x + 3$.

III. Answer the following questions. (2 marks)

1. Divide $p(x) = x^3 + 6x^2 + 11x-6$ by $g(x) = x^2 + x -1$
2. If x = 1 is a zero of the polynomial $p(x)=x^3 -2x^2 + 4x + k$ find the value of 'k'.
3. Find the zeroes of the polynomial $x^2 – 7x + 12$.
4. Find the sum and product of the zeroes of the polynomial $x^2 – 2x – 8$.
5. Find the quadratic polynomial having zeroes 5 and 3.
6. Find the quadratic polynomial whose sum and product of the zeroes are $\frac{1}{4}$ and -1.

IV. Answer the following questions. (2 marks)

1. Find all the zeroes of $p(x) = x^3 + 13x^2 + 32x+20$. If one of its zero is -2.
2. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x) the quotient and remainder were (x-2) and (-2x + 4) respectively. Find g(x).
3. Find all the zeroes of the polynomial $p(x)=x^4-3x^3-x^2+9x-6$ if two of its zeroes are $\sqrt{3}$ and - $\sqrt{3}$

10. QUADRATIC EQUATION

I. Choose the correct answer.

1. Which of the following equation has two equal root?

   a) $x^2 -2x-1 = 0$ b) $x^2 - 2x +1 = 0$ c) $2x^2 - 2x + 1 = 0$ d) $x^2-2x-3 = 0$

   The nature of the roots of a quadratic equation $ax^2 + bx + c = 0$ depends on

   a) $b^2 -4ac$ b) $b^2 -ac$ c) $b^2 +4ac$ d) $b^2 +ac$

2. The roots of the quadratic equation $3x^2 – 6x = 0$ are

   a) (0,2) b) (3,6) c)(0,-2) d) (0,6)

3. The nature of the roots of the quadratic equation $2x^2 – 4x + 3 = 0$ are.

   a) real and distinct b) real and equal
   c) no real roots d) imaginary

4. The sum of the squares of two consecutive natural numbers is 20. Represent this statement in the form of a quadratic equation.

   a) $x^2 + (x + 1)^2 =20$ b) $x^2 –(x – 1)^2 = 20$
   c) $(x + 1) – x^2 =20$ d) $x^2 + (x + 1)^2 + 20 = 0$

II. One mark questions:-

1. Write the standard form of the quadratic equation.
2. Write the discriminant of the quadratic equation $ax^2 + bx + c = 0$
3. If $b^2 -4ac< 0$ then find the nature of the roots of quadratic equation $ax^2 + bx + c = 0$.

III. Two marks questions:-

1. Solve the equation $x^2 – 2x - 4 = 0$ using quadratic formula.
2. Find the value of ‘k’ if the roots of the equation $9x^2 – 3kx +4 = 0$ are equal.
3. Determine the nature of the roots of the quadratic equation $2x^2 + 5x + 5= 0$.
4. One side of a rectangle exceeds its other side by 2 cm. If its area is 195cm2. Find the sides of the rectangle.
5. The length of the rectangular mango grove is twice its breadth and its area is $800m^2$. Find its length and breadth.

IV. Three marks questions:-

1. Find the roots of the equation $x^2 - 6x - 2 = 0$ by the method of completing the square.
2. The diagonal of a rectangular field is 60m more than the shorter side. If the longer side is 30 m more than the shorter side. Find the sides and the field.
3. The altitude of a triangle is 6 cm is greater than its base. If its area is 108 cm^2. find its base and height.
4. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13cm. find the other two sides.

V. Four marks questions:-

1. A train travels 15 km / hr faster, it would take one hour less to travel 180 km. find the original speed of the train.
2. A shopkeeper buys a number of books for Rs. 80/-. If he had bought 4 more books for the same amount each book would have cost Rs. 1/- less. How many books did he buy?
3. The side of a square exceeds the side of the another square by 4 cm and the sum of the areas of the two squares is 400 sq.cm. Find the dimensions of the squares.
4. The sum of the ages of a father and his son is 45 years. Five years ago, the product of their ages was 124, determine their present ages.
5. A dealer sells a toy for Rs. 24/- and gains as much percent as the cost price of the toy. Find the cost price of the toy.

11. AN INTRDOCUTION TO TRIGNOMETRY

I. Choose the most appropriate answers for the following questions:-

1. For an acute angle 'θ' if sec θ = $\frac{5}{4}$ then the value of cos θ is
   a) $\frac{5}{3}$ b) $\frac{16}{25}$ c) $\frac{4}{5}$ d) $\frac{25}{16}$
2. If θ =90^0 then the value of $\sin^2 \theta + \cot^2 \theta$ is
   a) 2 b) 1 c) 0 d) $\frac{1}{2}$
3. If |A is an acute angle, then sin (90^0 - A) =
   a)cosec A b) sec A c) tan A d) cos A
4. If $\sin^2 A + \sin^2 (90^0 - A)$ =
   a) 1 b) 0 c) $\sin^2 90^0$ d) 2 $\sin^2$ A
5. For an acute angle 'θ' if 2 sin θ =1 then value of 'θ'is
   a) 45^0 b) 60^0 c) 30^0 d) 0^0
6. $\sin^2 30^0 - \cos^2 60^0$ is
   a) $\frac{1}{2}$ b) 0 c) - $\frac{1}{2}$ d) 1
7. $\tan 0^0$ =
   a) sin 90^0 b) cos 0^0 c) cos 90^0 d) sec 0^0
8. The value of tan 40^0 – cot 50^0 is same as
   a) sin 90^0 b) cos0^0 c) cos90^0 d) sec0^0
9. If θ = 30^0 then sin θ sec θ =
   a) $\frac{\sqrt{3}}{4}$ b) $\sqrt{3}$ c) $\frac{4}{\sqrt{3}}$ d) $\frac{1}{\sqrt{3}}$
10. sin 90^0 cos 90^0=
    a) tan 90^0 b) sec90^0 c) cot90^0 d) cosec90^0

II. Answer the following questions:-

1. If 2 cos θ = 1 find sec θ.

2. If $3 \tan\theta = \sqrt{3}$ Find 'θ'.

3. If $\frac{1-\cos^2\theta}{\sin\theta} = 1$, find 'θ'

4. Show that $\sec^2\theta - \tan^2\theta = 1$

5. Evaluate $\cot 60^0 \cos 30^0 - \sin 60^0 \tan 30^0$

6. Evaluate $\operatorname{cosec}^2(90^0 - \theta) - \tan^2\theta$.

7. Evaluate: a) $\frac{\sin 36^0}{\cos 54^0}$ b) $\tan A = \frac{3}{4}$ and $A + B = 90^0$ find cot B

8. Evaluate : $\tan 48^0 \tan 23^0 \tan 42^0 \tan 67^0$

9. Show that $(1 + \tan^2\theta)\cos^2\theta = 1$

10. If cosA= sinB, Show that $A + B = 90^0$.

III. Answer the following questions:-

1. If $\sin A = \frac{3}{5}$, find cot A.

2. Find A, if tan 3A =cot 2A, where 3A and 2 A are acute angles.

3. Find θ if $\operatorname{cosec}(\theta+54^0) = \sec\theta$ where $\theta+54^0$ is an acute angle.

4. Show that $\sin\frac{(B+C)}{2} = \cos\frac{A}{2}$ where A, B and C are interior angles of Δ ABC.

5. Verify $\sin 2\theta = \frac{2\cot\theta}{\sec 2\theta}$ for $\theta = 30^0$.

6. Show that sinAcosB-cosA x sinB=sin(A-B) where $A=60^0$ and $B=30^0$.

7. Find 'θ' if $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$ where 'θ' is an acute angle.

8. Find 'A' if $\sin 2A = \cos(A-18^0)$ where 2A is an acute angle.

9. Show that $\frac{2\cos^3\theta - \cos\theta}{\sin\theta - 2\sin^3\theta} = \cot\theta$

10. If $\theta = 30^0$, show that $\cos 2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$.

11. Find 'θ' if $\cos\theta = \cos 60^0 \cos 30^0 - \sin 60^0 \sin 30^0$.

12. Show that $\frac{\cos 30^0 + \sin 60^0}{1+\cos 90^0+\sin 90^0} = \sin 60^0$

13. Show that $\frac{\sin\theta}{1-\cos\theta} = \operatorname{cosec}\theta + \cot\theta$

14. Prove that $\tan\theta + \frac{1}{\tan\theta} = \sec^2\theta$

15. Prove that $\frac{(1+\cot^2\theta)\tan\theta}{\sec^2\theta} = \cot\theta$

16. If 4sinA – 3cosA=0, then find tanA + cotA.

17. Find 'θ' if $\sin \theta = \cos(\theta - 30^0)$, where 'θ' and $(\theta - 30^0)$ are acute angles.
18. In a right angled triangle $\angle A$ and $\angle B$ are acute angles. If cos A=cos B show that $\angle A = \angle B$
19. If $\tan A = \frac{5}{12}$, find $(\sin A + \cos A) \sec A$
20. Find A and B, if $\sin(A+B)=1$ $\cos(A-B)=1$ where $0^0 < (A+B) \leq 90^0$ and $A \geq B$.

IV. Prove the following questions:- (3 marks)

1. $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$
2. $\frac{1-\cos\theta}{1+\cos\theta} = (\text{cose}\theta - \cot\theta)^2$
3. $\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{1-2\cos^2 A}$
4. $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\,\text{cosec}\,\theta$
5. $\frac{\sin\theta}{1-\cos\theta} + \frac{\tan\theta}{1+\cos\theta} = \sec\theta\,\text{cosec}\,\theta + \cot\theta$
6. $\frac{1}{\sec A - 1} + \frac{1}{\sec A + 1} = 2\,\text{cosec}A \cot A$
7. $\sqrt{\frac{1-\cos A}{1+\cos A}} + \sqrt{\frac{1+\cos A}{1+\cos A}} = 2\,\text{cose}A$
8. $\tan^2 A - \sin^2 A = \tan^2 A \sin^2 A$
9. $\sqrt{3}\ \tan^2\theta = 3\sin\theta \quad \sin^2\theta - \cos^2\theta$
10. $\tan\theta = \frac{12}{5}$ find $\frac{1+\sin\theta}{1-\sin\theta}$
11. $\sin\theta = \frac{3}{5}$ $(\tan\theta + \sec\theta)^2$
12. $\frac{\tan^3\theta}{1+\tan^2\theta} + \frac{\cot^3\theta}{1+\cot^2\theta} = \sec\theta\,\text{cosec}\theta - 2\sin\theta\cos\theta$
13. $\frac{\cos A}{\text{cosec}A+1} + \frac{\cos A}{\text{cosec}A-1} = 2\tan A$
14. $\frac{1+\cos\theta - \sin^2\theta}{\sin\theta(1+\cos\theta)} = \cot\theta$
15. $\frac{\tan^2 A}{1+\tan^2 A} + \frac{\cot^2 A}{1+\cot^2 A} = 1$

12. APPLICATIONS ON TRIGONOMETRY

I. Answer the following questions:- (2 marks)

1. Find the height of a vertical pole, if the angle of elevation is 30^0 when its top is observed from a point 60m away from its foot.
2. From the top of a building 30 $\sqrt{3}$ high, the angle of depression of a car on the ground is observed to be 60^0. Find the distance of the care from the base of the building.
3. Find the angle elevation, when an object at the top of a building of height 70 m is observed from a point on the ground 70 $\sqrt{3}$ m away from the base of the building.
4. Find the angle of depression, when a person standing on the ground is observed from the tip of tower $50\sqrt{3}$ m high, who is standing $50\sqrt{3}$ m away from the foot of the tower.
5. Find the angle of depression of an observer 100 $\sqrt{3}$ cm tall, looks at the tip of his shadow which 1m from his foot.
6. From the top of building 16m high, the angular elevation of the top of a hill is 60^0 and angular depression of the foot of the hill is 30^0. Find the height of the hill.
7. Two wind mills of height 50m and 40m are standing on either side of a field. A person observes their tips from a point in between them. If the angle of elevation is 45^0 in each instance, find the distance between the windmills.
8. The angles of elevation of the top of a tower as seen from the top and bottom of a building are 30^0 and 60^0 respectively. If the height of the building is 15m, then find the height of the tower.
9. On a horizontal plane, there is a vertical tower with a flag pole on the top of it. At a point 9m away from the foot of the tower the angles of elevation of the top and bottom of the flag pole are 60^0 and 30^0 respectively. Find the height of the flag pole.
10. Two boats approach a light house in mid-sea from opposite directions. The angles of elevation of the top of the light house from the boats are 30^0 and 45^0 respectively. If the distance between them is 100m, find the height of the light house.
11. A kite flying at a height of 80m above the ground is tied tightly to a nail on the top of a building of height 10m, by thread. If the angle subtended by the thread with the building is 30^0, find the length of the thread.
12. An observer, 1.5m tall is standing 28.5m away from the foot of a tower. If the angle of elevation of the top of the tower from his eyes is 45^0, find the height of the tower.

13. STATISTICS

I. Choose the correct answer.

1. The class mark of the class interval 20-25 is

   a) 22 b)22 and 23 c) 22.5 d) 23

2. For a frequency distribution, mean, median and mode are related as

   a) Mode = 3 mean – 2 Median
   b) Mode = 2 Median – 3 Mean
   c) Mode = 3 Median – 2 Mean
   d) Mode = 3 median + 2 Mean

3. For the following distribution the modal class is

x	5	10	15	20	25
f	6	8	6	10	5

a) 0 -10 b) l0-20 c) 20 -30 d) 30-40

II. Answer the following questions:- (1 marks)

1. Calculate the mean of the following frequency distributions.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	7	10	15	8	10

2.

Class interval	0-10	10-20	20-30	30-40
Frequency	3	7	3	2

Calculate mean

3. The arithmetic mean of the following data is 14. Find the value of ‘k’

x	5	10	15	20	25
f	7	k	8	4	5

4. A survey conduct on 20 households in a locality group of students resulted in the following frequency table for the number of members in a household.

Family size	1-3	3-5	5-7	7-9	9-11
No of families	7	8	2	2	1

III. Answer the following questions:- (3 marks)

1. Find the median of the following frequency distribution.

Class interval	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	7	10	15	8	10	5	3

2. If the median of the distribution given below is 28.5, find the value 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

3. The following table gives production yield per hectare of wheat 100 farms of a village draw a less than ogive.

Production yield	50-55	55-60	60-65	65-70	70-75	75-80
No of formers	2	8	12	24	38	16

4. The monthly profit (in) of 100 shops are distributed at follows: Draw more than type ogive.

Profit per shop	0-50	50-100	100-150	150-200	200-250
No of shops	12	18	27	20	17

5. The annual rainfall records of a city for 66 days it given in the following table. Calculate the median rainfall using ogives of more than type and less than type.

Rainfall in cm	0-10	10-20	20-30	30-40	40-50	50-60
No of days	22	10	8	15	5	6

14. PROBABILITY

I. Choose the correct answer.

1. The probability of winning a game is 0.58 then the probability of losing the same game is.
   a) 1 b) 0.52 c) 0.42 d) 0.32
2. If two coins are tossed simultaneously then the probability of getting at least one head is
   a) $\frac{3}{4}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) 1
3. Which one of the following cannot be the probability of an event?
   a) 0 b) $\frac{1}{2}$ c) 1 d) $\frac{5}{4}$
4. The probability of Sangeetha winning the tennis match is 0.62. what is the probability of Reshma winning the same mach?
   a) 0.38 b) 0.62 c) 1 d) 0.48

II. Answer the following questions. (1 mark)

1. What is the probability of a sure event?
2. What is the probability of an impossible event?
3. What is the sum of probabilities of all elementary events in a random experiment?

III. Answer the following questions. (2 marks)

1. A dice is thrown once. Find the probability of getting
   a) a prime number b) a square number
2. Two dice are thrown at the same find the probability of getting
   a) same number on both dice b) different number on both dice
3. A bag contains cards numbered from 1 to 10 one card is drawn at random from the bag. Find the probability of getting?
   a) an odd number b) a cube
4. A bag contains 4 green, 5 white, 5 black and 3 red balls. A ball is taken out of the random. Find the probability that the ball taken is?
   a) Red b) not black
5. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.
6. Two coins are tossed simultaneously. Find the probability of getting.
   i) at most one tail ii) exactly two heads.

15. Surface area and volumes

I. Four alternatives are given against every question / incomplete statement. Choose the correct answer.

1. The total surface area of a hemisphere is
   a) $2\pi r^2$ b) $3\pi r^2$ c) $4\pi r^2$ d) $6\pi r^2$
2. The total surface area of a cube of edge 'a' units is
   a)a^2 b) $4a^2$ c) $3a^2$ d) $6a^2$
3. If two solid hemispheres of same base radius 'r' are joint together along their bases, then curved surface area of this new solid is.
   a) $4\pi r^2$ b) $3\pi r^2$ c) $2\pi r^2$ d) πr^2
4. The ratio of volume of a cube to that of a sphere which will exactly fit inside the cube is
   a) $3 : 4\pi$ b) $3:\pi$ c) $6:\pi$ d) $2:\pi$
5. If three metallic sphere of radius 6 cm, 8 cm and 10 cm are melted to form a single large sphere, the diameter of the large sphere is.
   a) 12 cm b) 20 cm c) 24 cm d) 36 cm
6. The radii of the circular ends of a frustum are 6cm and 14 cm. if its slant height is 10cm, then its vertical height is
   a) 6 cm b) 8cm c) 4 cm d)7cm

II. Answer the following questions:-

1. Complete the table.

Name of the solid	L.S.A	T.S.A	Volume
1. cylinder			
2. cone			
3. hemisphere			
4. sphere			
5. frustum			

2. Write the total surface area of a cuboid of length 'l' breadth 'b' and height 'h'
3. What is the volume of a cube of edge 'a'?

III. Answer the following questions:- (2 marks)

1. Two cubes of volume $64cm^3$ are joined end to end. Find the surface area of the resulting cuboid.
2. A toy is in the form of cone mounted on a hemisphere of same radius 7 cm. if the total height of the toy is 31cm find its total surface area.
3. A 20m deep well with diameter 7m is dug and the earth from digging in evenly spread out to form a platform 22m x 14m. Find the height of the platform.
4. How many silver coins, each of 1.75cm diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.50cm x 10 cm x 3.5cm?
5. The slant height of a frustum of a cone are 5 cm and the perimeters of its circular ends are 20cm and 12 cm. find the curved surface area of the frustum.

6. The perimeters of the ends of a frustum of a cone are 48cm and 36cm. If the height of the frustum be 11 cm and find its volume.
7. A sphere of radius 3 cm is melted to form a cone the height of cone is 3cm. Find the radius.

IV. Answer the following questions:- (3 marks)

1. A solid consisting of a right circular cone of height 120cm and radius 60cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder fall of water such that if touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and height is 180 cm.
2. A tent in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1m and 4 m respectively and slant height of the top is 2.8m.
   a) Find the area of the canvas used for making the tent.
   b) Find the cost of canvas of the tent at the rate Rs. 500/m^2 also find the volume of air enclosed in the tent.
3. The rain water from a roof of 22m x 20m drains into a cylindrical vessel having diameter of base 2m and height 3.5m. If the vessel is just fall, find the rain fall in cm.
4. A container, opened from the top and made up of a metal sheet 1 is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8cm and 20cm respectively. Find the cost of the milk. Which can completely fill the container, at the rate of Rs. 20/- per litre? Also find the cost of metal sheet used to make the container, if it costs Rs. 8/- per 100cm^2.