MATHEMATICS
CLASS X

SECTION - A (3 Marks)

Q:1) If the roots of the equation (x-a) (x-b) –k = 0 be C and D then prove that roots of the equation (x-c) (x-d) +k = 0 are a and b

Q: 2) . Find the real value of x and y that will make $(2x-3y-13)^2 + (3x+5y+9)^2 = 0$

Q: 3) Simplify: $\dfrac{a(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b^2)}{(ab + bc - b^2 - ac)(c-a)}$

Q: 4) Find the H.C.F of the polynomials : $p(x) = (x-y)(4x^4+y^4)$, $q(x) = (2x^3 - xy^2 - y^3)(x^2-y^2)$,
$r(x) = 4(x^4 + x^2y^2 + 2x^3y + xy^3 + x^2y^2) + y^4$

Q: 5) A sum of Rs.5600 is paid back in 4 yearly installments. How much is each installment, if interest is calculated annually on balance at 8% per year and be included in each installment.

Q: 6) What annual payment will discharge a debt of Rs. 9537 due in 2 years at 25/4% per annum, compounded annually?

Q: 7) If I is the incentre of triangle and A I meets BC at D. Prove that AI/ BD= (b+c)/a

Q:8) Find how many numbers are there between 101and 504 which are divisible by 3 or 5.

OR

The sum of n terms of a series is $2n^2 + 3$. Is the series A.P. If so find it.

Q: 9) Prove that the sum of the later half of 2n terms of an A.P. is equal to the one third of the sum of 3n terms of the A.P.

Q: 10) I is the incentre of $\triangle$ ABC. AI when produced meets the circumcircle of $\triangle$ABC in D. If $\angle$ BAC=66^o , le $\angle$ACB =80^0. Calculate 1). $\angle$ DBC 2). $\angle$IBC 3). $\angle$ BID.

SECTION – B (4 Marks)

Q: 11) Solve for x $x^{x\sqrt{x}} = (x\sqrt{x})^x$

Q: 12) Solve the equations graphically y=x, y=2x, x+y=6. Find area of triangle so formed . Does the point 2,0) and (3.5,2.5) lie on any line, write their equation.

Q: 13) In the circle with centre O,DE is the tangent at D and DOC is diameter. AE is another straight line such that EB=EP, B being on the circle and ED=2r. Show that $EP^2 = ED \times PD$

Q: 14) A cone, a hemisphere and a cylindrical stand on equal bases of radius R and have equal Height H. Find ratio of their whole surfaces and volume.

Q:15) Eliminate Θ from both equations $\tan\Theta + \sin\Theta = m$, $\tan\Theta - \sin\Theta = n$.

OR

Find the numerical value of expression: Log cot 1^0 + log cot 3^0 +……+ log cot 89^0

Q: 16) Find the value of m such that the pts (m+1,1) (2m+1,3) and (2m+2,2m) are collinear (by using section formula). OR If the opposite angular points of a square are (3,4) and (1,-1). Find the coordinates of remaining angular parts of square

Q : 17) In any △ ABC, prove analytically that $AB^2+AC^2 = 2(AD^2+BD^2)$. If D is midpoint of BC

Q: 18) Marks obtained by 40 students of class are shown below. The mean of the distribution is estimated as 35.75. Calculate the value of missing frequencies f1 , f2, given f1: f2 = 3:1

MARKS	Above 10	Above 20	Above 30	Above 40	Above 50	Above 60	Above 70	Above 80
No. of boys	40	34	26	F1	6	F2	1	0

Q: 19) One of two events must occur: If the chance of one is 2/3 of the order, then find odds in favour of the other.

Q20). There are three children in family. Find 1). The probability of exactly one girl in the family. 2). At least one girl in the family. 3). At most one girl.

OR

An unbiased die is tossed twice. Find the probability of getting a 4,5, or 6 on the first toss and 1,2,3 or4 on the second toss.

SECTION – C (6 Marks)

Q: 21) A ladder rest against wall at angle α to horizontal. Its foot is pulled away from wall through distance 'A' so that it slides distance 'B' down the wall making angle β with horizontal. Prove that A= B tan [(α + β) / 2]. You can use these formula e

Sin α – sin β = 2 sin (α – β) /2. Cos (α + β) /2, cos α – cos β = 2 sin (α + β) /2 .sin (β – α) /2

OR A tower is 'b meter high having a flag staff at its top. The tower and the flag staff subtend equal angles at the points distant 'a' meter from the tower. Show that the length of the flag staff is $b(a^2+b^2) / (a^2 – b^2)$. You are given that $\tan2\Theta = 2\tan\Theta / 1-\tan^2\Theta$

Q22). State and prove acute angled theorem in a right angle triangle. Using above Theorem express a median in terms of its sides in an acute angled $\triangle$

Q: 23) If a line segment joining two points subtends equal angles at two other points lying on the same side of the line containing the segment, the four points are concyclic. Prove it. Using above Them. Prove that perpendiculars let fall from vertices of a triangle are concurrent.

OR

If two chords of a circle intersect internally or externally then products of the lengths of segments are equal. Using above Them Prove that AB^2 = AC. AP + BD. BP. If. In triangle ABC , angle C is a right angle. A semi circle is drawn on AB as diameter. P is any point on AC produced. When joined, BP meets semi- circle in point D.

Q: 24) If V and S are the volume and total surface area of right circular cone and v and s are volume and surface areas of an inscriber sphere. Prove that V/v=S/s

Q:25) Ashok Kumar is a pensioner getting a pension of Rs. 9000 per month. Calculate the income tax if any paid by him in last month of year, when he does not make any saving