MATHS
CLASS X

➢ GENERAL INSTRUCTIONS:
▪ All questions are compulsory.
▪ The question paper consists of 25 questions divided in to three sections-A, B and C.
  section A contains 10 questions of 3 marks each. Section B is of 10 questions of 4 marks
  each and section C is of 5 questions of 6 marks each.
▪ There is no overall choice. However internal choice has been provided in two questions
  of three marks each, two questions of four marks each and two questions of six marks
  each.
▪ In question on theorems, the drawing should be neat and exactly as per the given
  measurements.
▪ Use of calculator is not permitted.

SECTION-A

1. Find the value of k for which the given system of equation has unique solution:
   2x+3y-5=0, kx-6y-8=0

                              OR

A part of monthly expenses of a family is constant and remaining varies with the price of
wheat. When the rate of wheat is Rs 250 a quintal, the total monthly expenses of the family
are Rs 1000 and when it is Rs 240 a quintal, the total monthly expenses are Rs 980. Find the
total monthly expenses of the family when the cost of wheat is Rs 350 a quintal.

2. Find the value of k for which the quadratic equation have real roots:
   $2x^2+px+8=0$

3. If x-3 is the G.C.D of x^3-2x^2+px+6 and x^2-5x+q. find the value of 6p+5q.

4. Simplify:

$$\frac{1}{x-1} - \frac{1}{x+1} - \frac{2}{x^2+1} - \frac{4}{x^4-1}$$

5. If p^{th} term of an A.P be 1/q and the qth term be 1/p, show that the sum of pq terms is

$$\frac{1}{2}(pq+1)$$

6. A ceiling fan is marked at Rs 485 cash or for Rs 105 cash down payment followed by 3
   equal monthly installments. If the rate of interest charged under this installment plan is
   16% per annum, find the monthly installment.

7. In the given figure AB and CD are two parallel tangents to a circle with centre O. ST is a
   tangent segment between the two parallel tangents touching the circle at Q. show that
   $\angle SOT=90^0$
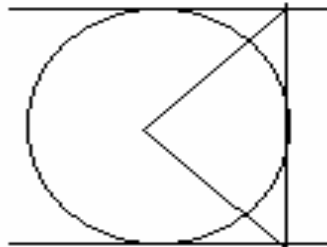
8. Mahesh borrowed a sum of money and returned it in three equal quarterly instalments of
   rs 17576 each. Find the sum borrowed, if the rate of interest charged was 16% per
   anuum compounded quarterly. Find also the total interest charged.

9. The bisectors of the opposite angles A and C of a cyclic quadrilateral ABCD intersect the circle at the points E and F, respectively. Prove that EF is a diameter of the circle.

OR

ABCD is a parallelogram. The circles through A, B, C intersect CD (produced) at E. prove that AE=AD.

10. Solve for x:

$$2\left(\frac{2x+3}{x-3}\right)-25\left(\frac{x-3}{2x+3}\right)=5; given\ that\ x\neq3,\frac{-3}{2}$$

SECTION-B

11. Determine graphically the coordinates of the vertices of a triangle, the equations of whose sides are

y=x; y=4x; x+y=5

12. Two chords AB and CD of lengths 5cm and 11 cm respectively of a circle are parallel to each other and are on the same side of its centre. If the distance between AB and CD is 3 cm, find the radius of the circle.

13. Water is flowing at the rate of 5 km per hour through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide. Determine the time in which the level of water in the tank will rise by 7cm.

OR

A cylindrical road-roller made of iron is 1 m long. Its internal diameter is 54 cm and the thickness of the iron sheet used in making the roller is 9 cm. find the mass of the roller, if 1cm^3 of iron has 7.8 g mass.(Π=3.14).

14. Prove the following identity:

$$\frac{\tan\theta+\sec\theta-1}{\tan\theta-\sec\theta+1}=\frac{1+\sin\theta}{\cos\theta}$$

OR

Without using trigonometric table, evaluate

(i) $$2\frac{\cos67^0}{\sin23^0}-\frac{\tan40^0}{\cot50^0}-\cos0^0+\tan15^0.\tan25^0.\tan60^0.\tan65^0.\tan75^0$$

(ii) If A, B, C are the interior angles of triangle ABC, prove that

$$\tan\left(\frac{B+C}{2}\right)=Cot\left(\frac{A}{2}\right)$$

15. Draw a circle of radius 4 cm. mark a point P on the exterior of the circle. From P draw two tangents to the circle without using the centre of the circle.

16. The three vertices of a rhombus, taken in order, are (2,-1), (3, 4) and (-2, 3). Find the fourth vertex.

17. Show that the points A (a, a), B (-a,-a) and C (-a√3, a√3) form an equilateral triangle.

18. 18 cards, numbered 1, 2, 3,………..18 are put in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the card drawn bears (i) an even number (ii) a number divisible by 2 or 3.

19. Pie chart in the given figure represents the number of votes polled by four candidates in an election. The votes polled by paramjit kaur were 160. read the pie chart and answer the following questions:

(i)   what is the total number of votes polled

(ii)   What is the minimum number of votes polled?
            By how many votes did the winner defeat the nearest contestant?
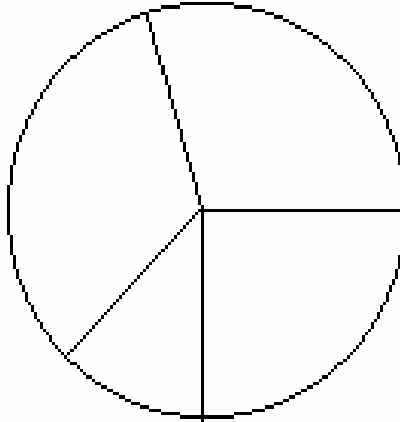
20. In the following frequency distribution, the frequency of the class –interval (40-50) is missing. It is known that the mean of the distribution is 52. Find the missing frequency.

Wages	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No of workers	5	3	4	-	2	6	13

SECTION-C

21. Dr Salim is a senior citizen aged 67 years. He earns rs 21,000 per month. He donates Rs 6,000 to the prime minister relief fund (100% relief) and Rs 4,000 to an educational institution (50% relief). He contributes Rs 60,000 towards PPF and purchases N.S.C worth Rs 15,000. He pays income tax of Rs 600 per month for the first 11 months of the year. Find the income tax to be paid by him in the last month of the year.

22. A bird is sitting on the top of a tree, which is 80m high. The angle of elevation of the bird, from a point on the ground is 45^0; the bird flies away from the point of observation horizontally and remains at a constant height. After 2 seconds, the angle of elevation of the bird from the point of observation becomes 30^0. Find the speed of the bird.

OR

An aeroplane, when 3000 m high, passes vertically above another aeroplane at an instant when the angles of elevation of the two aeroplanes from the same point on the ground are 60^0 and 45^0 respectively. Find the   vertical distance between the two aeroplanes.

23.   An iron pillar consists of a cylindrical portion 2.8 m high and 20 cm in diameter and a cone 42 cm high is surmounting it. Find the weight of the pillar, given that 1 cm^3 of iron weighs 7.5 gms.

OR

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

24. PAB is a secant to a circle intersecting it at A and B and PT is a tangent to the circle. Prove that PA.PB=PT^2
Use the above theorem in the following:
Two circles intersect each other at A and B. the common chord AB is produced to meet common tangent PQ to the circle at D. prove that DP=DQ.

25. If two chords of a circle intersect inside or outside a circle, prove that the rectangle formed by two parts of one chord is equal in area to the rectangle formed by the two parts of the other.
Use the above in the following:

AB and CD are two chords of a circle intersecting each other at P such that AP=CP.
Prove that AB=CD

INCOME TAX SLAB

1. (A) For men (below 65 years)

Taxable income	Rate
Up to Rs. 1,00,000	Nil
Rs. 1,00,001-1,50,000	10% of amount exceeding rs. 1,00,000
Rs 1,50,001-2,50,000	Rs.5000+20% of the amount exceeding Rs.1,50,000
Exceeding Rs 2,50,000	Rs. 25,000+30% of the amount exceeding Rs 2,50,000

2. Women (below 65 years)

Taxable income	Rate
Up to Rs. 1,35,000	Nil
Rs 1,35,001-Rs 1,50,000	10% of the amount exceeding Rs 1,35,000
Rs 1,50,001-Rs 2,50,000	Rs 1,500+20% of them amount exceeding Rs 1,50,000
Exceeding Rs 2,50,000	Rs 21,500+30% of the amount exceeding Rs 2,50,000

3. (C) For senior citizens (65 years or more)

Taxable income	Rate
Up to Rs 1,85,000	Nil
Rs 1,85,001-2,50,000	20% of the amount exceeding Rs 1,85,000
Above Rs 2,50,000	Rs 13,000+30% of amount exceeding Rs 2,50,000

4. Surcharge: 10% of the amount of tax payable if the taxable income exceeds rs 10,00,000

5. Educational cess: 2% of the amount of tax payable.

6. Concession for saving: notified savings (PF, LIC, PPF, mutual fund etc) up to a maximum of rs 1, 00,000 are exempted from payment of income tax.

(iii)