TIME:3HR **M.MARKS: 100**

CLASS: X
MATHEMATICS

General Instructions

(i) All questions are compulsary.

(ii) This question paper consists of 25 *questions divided into three sections. Section A (Q.1to 10), Section B (Q.* 11 *to 20) and Section* C *(Q* 21 *to* 25).

(iii) As far as possible answer questions in serial order. When you are not sure of answering the question, you may leave it for the tine being and proceed further without wasting your time.

(iv) When you wish to re-answer any question, please cancel the first one.

(v) Use of a calculator is not permitted.

(vi) Keep some time for revision.

(vii) Please, write down the serial number of the question before attempting it.

(viii) Use of calculator is not allowed. However, you can use Mathematical Tables.

SECTION A

(*Question numbers* 1 *to 10 carry three marks each).*

1. Find the value of k for which the system of equations have a unique solution:
   $x - ky = 2$, $3x + 2y = -5$

2. Find the GCD (HCF) of the polynomial $2x^4 - 2y^4$, $3x^3 + 6x^2y - 3xy^2 - 6y^3$

3. Simplify : $\frac{x}{x-y} - \frac{y}{x+y} - \frac{2xy}{x^2-y^2}$

4. Solve using quadratic formula, for x : $a(x^2 + 1) = x(a^2 + 1)$

5. Which term of A.P. 3, 15, 27, 39 ------- is 132 more than 54th term.

6. Find the sum of the following A.P. 1 + 3+ 5+ 7 ----------199

7. A cooler is sold for Rs.4000 cash or for Rs.1600 cash down payment and two installments of Rs.1300 paid monthly. Find the rate of interest.

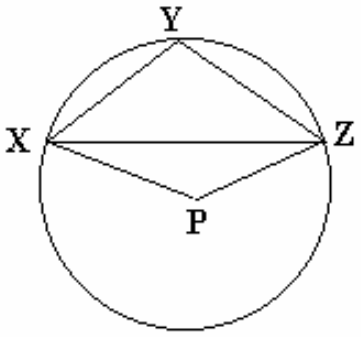
8. A loan of Rs.12,000 is obtained by Shiela to repair her house. The amount is to be paid

back in equal 2 annual instalments. How much is each instalment, if the interest is compounded annually on balance at 5% p. a.

9. Show that the diagonals of a trapezium divide each other proportionally.

10. In the given figure P is the centre of the circle. Prove that

$\angle XPZ = 2(\angle XZY + \angle YXZ)$



SECTION B

Question numbers 11 *to 20 carry four marks each.*

11. Solve graphically the equation $x - y = 10$, $2x - 3y = -10$.

12. Simplify: $\dfrac{2x^2+7x-4}{3x^2-13x+4} \div \dfrac{4x^2-1}{6x^2+x-1}$

13. What point on the X- axis is equidistant from the points (7,6) and (– 3,4)

14. Prove that $\left(\dfrac{1}{\sec^2\theta-\cos^2\theta}+\dfrac{1}{\operatorname{cosec}^2\theta-\sin^2\theta}\right)\sin^2\theta\cdot\cos^2\theta = \dfrac{1-\sin^2\theta\cdot\cos^2\theta}{2+\sin^2\theta\cdot\cos^2\theta}$

15. An agricultural field is in the form of a rectangle of length 20m and width 14m. A 10m deep well of diameter 7m is dug in a corner of the field and the earth taken out of the well is spread evenly over the remaining part of the field. Find the rise in its level.

16. Draw a pie chart representing the following data showing the number of Students who like different subjects:

Subject	No. of Students
Physics	45
Chemistry	20
English	60
Maths	30
Biology	10

17. A die is thrown once. Find the probability of getting: (i) an even no. (ii) a prime no. (iii) a no. greater than 4 (iv) a no. greater than 3.

18. Find the ratio in which the point (- 3, p) divides the line segment joining the points (- 5, - 4**)** and (- 2, 3). Find also the value of p.

19. The weekly observations of cost of living index in a certain city for the year 2000-0 are given alongside. Compute the mean weekly cost of living index by using Step Deviation Method.

Cost of Living Index	No. of Weeks
140 - 150	5
150 - 160	10
160 - 170	20
170 - 180	9
180 - 190	6
190 - 200	2
Total	52

20. Draw a ΔABC with base BC = 4.1 cm $\angle B = 60°$ and side AB = 5 cm. Draw its incircle.

SECTION C

Question numbers 21 *to* 25 *carry* 6 *marks each*.

21. Ram Lal has a total annual income of Rs. 1,60,000. He contributes Rs.4,000 per month in his G.P.F. and pays an annual LIC premium of Rs. 15,000. If he pays Rs.250 per month for the first 1 1 months as income tax, find his income tax liability for the last month. Use the following slab for calculating the income tax.

Standard Deduction: (i) (1/3)rd of total income if the income is up to Rs. 1,50,000 (Maximum Rs. 30,000)

(ii) Rs. 25,000 if the income is from Rs150000 to Rs300000

(iii) Rs. 20,000 if the income is from Rs300000 to Rs500000

(iv) Nil, if the income is above Rs.500000

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Rate of Income Tax : (i) Up to Rs.50000: Nil

(ii) Rs.50001- 60000: 10% of income exceeding Rs.50000

(iii) Rs.60001 –150000 Rs.1000+20% of income exceeding

Rs.60000

(iv) Above Rs.150000 Rs.19000+30%of income exceeding

Rs.150000

Rebate: (i) 20% of total savings if taxable income is up to

Rs.150000 (Maximum Rs.14000)

(ii) 15% of total saving if taxable income is above

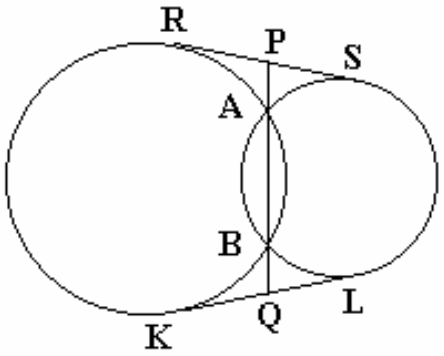
Rs.150000 (Maximum Rs. 10500)

(iii) Special income tax rebate to women employees at the
rate of 100% (Maximum Rs.5,000)

Surcharge: 5% of net tax.

22. Prove that the ratio of the areas of two similar triangles is equal to the ratio
of the squares of their corresponding sides. Using the above : prove that area
of an equilateral triangle described on the side of a square is half the area of
an equilateral triangle described on its diagonal.

23. If PAB is a secant to a circle intersecting it at A and B and PT is a tangent then. Prove that $PA.PB = PT^2$. Using this theorem prove PA = QB if KL and RS are two commor tangents to the 2 intersecting circles as shown .



24. From the top of a house the angles of depression of two ships on the opposite sides
of it are observed to be α and β. If the height of the house be h meters and the line
joining the ships passes through the foot of the houae, show that the distance between

ships is $h [\tan \alpha + \tan \beta] \big/ \tan \alpha \tan \beta$ metres.

25. A container made up of a metal sheet is in the form of a frustum of cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively.

Find the cost of milk which can completely fill the container at the rate of Rs.15 per litre.