ICSE MATHEMATICS MODEL PAPER 1

Answer all quetions in Section A and any four question from Section B.

You will NOT be allowed to write during the first 15 minutes.

This time is to be spent in reading the question paper.

All working, including rough work, must be clearly shown and must be done on

the same sheet as the right of the answer. Omission of essential working will

result in loss of marks.

Time: 21/2 Hours] (max. Marks : 80)

SECTION - A [40 Marks]

Answer ALL questions in this Section

1.	Nidhi has a cumulative time deposit account in a bank. He deposits Rs.600 per month for a period of 6 years. If at the end of maturity he gets Rs.53,712 find the rate of interest. [4]
2.	Solve the following inequations, and represent the solution set on a number line : $-\frac{52}{3} < x - \frac{22}{3} < \frac{1}{3}$; when (I) $x \in R$ (ii) $x \in Z$ [4]
3..	Pooja purchased goods worth Rs.4,500. She gets a rebate of 8% on it. After getting the rebate, sales tax is charged at the rate of 7%. find the amount she will have to pay for the goods. [4]
4.	Solve graphically the following system of linear equations: $2x - y = 2$ & $4x - y = 8$. Also, find the area of the triangle enclosed between the line $4x - y = 8$ and the axes. [4]

5.	In the adjoining figure, PQ is a diameter of the circle whose center is O. Given $\angle ROS = 42^0$. Calculate $\angle RTS$. [4]	
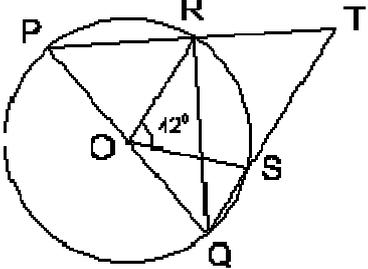
6.a If the functions $f(x) = px^2 + qx + r$ and $g(x) = lx^2 + mx + r$ have a common factor $(x + a)$, show that $a = (q - m)/(p - l)$.[4]

b $$\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{\sin^2 A - \cos^2 A} = \frac{2}{1 - 2\cos^2} \quad [4]$$

7 If $A = \begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix}$,

verify if $(A - B)^2 = A^2 - 2AB + B^2$. [4]

8 On the diagram given alongside plot the triangle ABC, whose vertices are at the points A(3,1), B(5,0) and C(7,4)

On the same diagram draw the image $A_1B_1C_1$ of the ABC under reflection in the x-axis

(i) Write down the co-ordinates of A_1, B_1, & C_1

(i i) Assign special name to figure ACC_1A_1

(i i i) Name two points which remain invariant when

reclected in line BC..(iv) Write down the equation of line AA_1

(v) Find the equation of line BC.
[4]

[4]
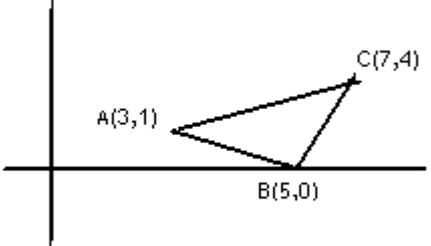
9 Draw a horizontal line AB = 6 cm. Locate a point C which is at a distance of 2 cm from A, towards B and 1 cm above the line AB. Similarly, locate a point D which is 3 cm away from B towards A and 2 cm above AB. Locate a point P which lies on AB and is equidistant from C and D. Measure and note the distance AP.[4]

10	• If $f(x) = 6x$, $x \in$ N, find a if $f(60) = 6f(a)$. • In the above example, state if $f(a) + f(b) = f(a + b)$. Prove your answer[4]

SECTION - B [40 Marks]

Answer any FOUR questions in this section

11a	A model of a rectangular water tank is made to a scale of 1 : 10.
	
	   i. Calculate the capacity of the tank in m^3 if the model has a capacity of 300 litres
	   ii. Calculate the depth of the tank if the area of cross-section of the model is 1 m$^{2]}$
	
	   [5]

b	In the adjoining figure ABC is a triangle right angled at B. BC = 21 cm and AB = 28 cm. A semi-circle with AC as diameter and a quarter circle with BC as radius are drawn. Calculate the area of the shaded portion.[5]
12a	a) P and Q are the mid-points of sides CA and CB respectively of ABC right angled at C. Prove that: $4(AQ^2 + BP^2) = 5AB^2$ [5]
b	A solid consisting of a right circular cone, standing on a hemisphere, is placed upright, in a right circular, full of water, touches the bottom Find the volume of water left in the cylinder having given that the radius of the cylinder is 3 cm and its height is 7 cm, the radius of the hemispohere is 2 cm and the height of the cone is 3 cm. Give your answer nearest cubic cm[5]

13a	Attempt this question on a graph paper. The table shows the distribution of marks gained by a group of 400students in an examination:

marks less than	10	20	30	40	50	60	70	80	90	100
no of students	5	30	30	60	105	180	270	355	390	400

Using a scale of 2 cm to represent 10 marks and 2 cm to represent50 students, plot these values and draw a smooth curve through the points. Estimate from the graph

(I) the median mark (ii) the quartile marks. (iii) the number of students who failed, if the pass mark is 35.[5]

b	Mr. Advani invests Rs. 80000 in 10% Rs. 100 shares at Rs. 125. If tax is deducted at 25%, find his annual income. When the share rises to Rs. 160 he sells half the shares and invests the proceeds in 18% Rs. 10 shares available at a discount of Rs. 2. Find his new annual income if tax is deducted at the same rate
14a	If a train travelled 5 km/h faster, it would take one hour less totravel 210 km. Find speed of the train.[5]
b	Divide Rs. 10933 in 2 parts such that if they earn compound interest at 5% p.a., the amounts after 3 years and 5 years will be the same[4]
15a	If x/a = y/b = z/c, prove that) $\dfrac{x^3}{a^3}+\dfrac{y^3}{b^3}+\dfrac{z^3}{c^3}=3\left(\dfrac{x+y+z}{a+b+c}\right)^3$ [5]
b	The total salary of Joginder Singh is Rs . 1,15,800 excluding HRA during a year. He pays a premium of Rs. 14,400 annually towards LIC and contributes premium of Rs 2000 per month towards GPF. Rs 500 is deducted every month from his salary as Income tax. Calculate the income tax Joginder Singh has to pay in the last month of the financial year. Assume the following income tax rates: Standard deduction a. Rs 18,000 for income upto 60,000. b. Rs 15,000 for income above Rs 60,000. c. Rate of tax on individual taxable income

Slab	Income - Tax
I. Upto Rs. 40,000	Nil
II. Rs. 40,001 to Rs 60,000	15% of the amount exceeding Rs 40,000
III. Rs 60,001 to Rs 1,20,000	Rs. 3,000+30% of the amount exceeding Rs 60,000.

C. Rebate in tax is 20% of the total savings or Rs 12,000 whichever is less.

[5]

16a	A cliff is 100 m high. A boat sailing away from the cliff is observed to have an angle of depression of 60^0. After 5 minutes the angle changes to 30^0. Calculate the speed of the boat in km/hr[5]
b	The points P(2, 6) and R(-2, -2) are opposite vertices of rhombus PQRS. Find the equation of the diagonal QS.[5]
17.a	PQR is a straight line, PQ = 20 cm and QR = 10 cm. Two triangles APQ and BQR are drawn on the same side of PQR such that AP = 8 cm, AQ = 18 cm, BR = 9 cm and BQ = 4cm. Prove that AP and BQ are parallel. If AB produced meets PQR produced at S, find RS.[5]
b	A student takes a rectangular piece of paper 30 cm long and 21 cm wide. Find the area of the biggest circle that can be cut out from the paper. Also, find the area of the paper left after cutting out the circle.[5]