MATHS ALGEBRA (PAPER-I)

1. Attempt any *six* subquestions from the following :   12

    (*i*) Simplify :

    $$\frac{x+5}{x-2} + \frac{3x-4}{x-2}.$$

    (*ii*) Convert the following decimal number into binary equivalent :

    $$43_{10}.$$

    (*iii*) Find the H.C.F. of the following polynomials :

    $$24a^2b^3, \ 16ab^2.$$

    (*iv*) Verify whether the following sequence is an A.P. or not. If it is an A.P. find common difference d :

    $$3, \ 8, \ 13, \ 18, \ \ldots\ldots\ldots$$

(v)   Suresh invested Rs. 2,856 in shares of face value Rs. 10, each at Rs. 140 market price and brokerage at 2% was paid. How many shares he purchased ?

(vi)   Solve :

$$4x^2 - 7x = 0.$$

(vii)   Two coins are tossed simultaneously. A is the event of getting both tails. Write 'S' and A.

(viii) $3x + 4y = 5$ and $4x + 3y = 2$, find the value of $(x + y)$.

2.   **Attempt any *four* subquestions from the following**   12

(i)   Find L.C.M. of the following polynomials :

$$x^2 - 6x - 7, \, x^2 - 49.$$

(ii)   17, 21, 25, 29, ...is an A.P., find S_{12}.

(iii)   By converting the following numbers into decimal number system and solve

$$1101_2 + 1010_2 - 1011_2.$$

(*iv*)   Solve the following simultaneous equations b   Cramer's rule :

$$3x - 2y = 1 \quad x + 4y - 12.$$

(*v*)   Marks obtained by a student in an examination are given below. Draw a pie diagram representing this information :

Subject	Science	English	Maths	Marathi	Total
Marks	100	85	90	85	360

(*vi*)   The marked price of a taxabl article is Rs. 6,000 which is sold to the first dealer at the same rate who sells it to the subdealer for Rs 6,500 and the subdealer sells it to a customer for Rs. 6,700. Find the M-VAT at every stage of trading at the rate of 4%.

3.   **Attempt any *four* subquestions from the following :**   12

(*i*)   Factorise :

$$2m^3 - 5m^2 - 22m - 15.$$

(*ii*)   Solve the following quadratic equation by perfect square method :

$$y^2 - 8y + 1 = 0.$$

(*iii*)   A die is thrown. Find the probability of the event that a number divisible by 3 comes up.

(*iv*)   Simplify :

$$10101_2 - 11001_2 + 1010_2.$$

(*v*)   A ceiling fan is available for Rs. 845 in cash or for Rs. 500 cash down payment together with Rs. 175 to be paid in next two months in two equal instalments. Find the rate of interest under this plan.

(*vi*)   Yusufbhai purchased an instrument for Rs.. 9,776 which includes 6% discount on the printed price and then 4% central sales tax on the remaining sale price. Find the printed price of that instrument.

Attempt any *three* subquestions from the following :   12

(*i*)   Solve the following simultaneous equations by graphical method :

$$y = 5 - 2x; \quad 3x = y + 5.$$

(*ii*) Solve :

$$3(x + 5) + \frac{2}{x + 5} = 5.$$

(*iii*) Simplify :

$$\frac{\dfrac{6y - 3}{y - 4} - 3}{\dfrac{4y - 2}{y - 4} - 2}$$

(*iv*) If the 5th and 12th terms of an A.P. are 14 and 35 respectively, find the first term '*a*' and common difference '*d*' and general term t_n.

(*v*) Smt. C. Archana has her gross annual income for the year 2006-2007 is Rs. 1,48,000 and her savings are as follows :

(1) L.I.C. Rs. 4,800 p.a.

(2) P.L.I. Rs. 2,750 p.a.

Find the net income tax to be paid by Smt. C. Archana for the financial year 2006-2007.

(*vi*) Find the median for the following frequency distribution :

Class Interval (x)	Frequency (f)
0–5	2
5–10	7
10–15	18
15–20	10
20–25	8
25–30	5

Attempt any *three* subquestions from the following   12

(*i*)   A two digit number is 4 times the sum of its digits. If 18 is added to the number, the new number obtained is that by interchanging the digits of the original number. Find the number

(*ii*)   Simplify :

$$\left[\frac{x}{1+x} - 1\right]\left[1 + \frac{x}{1-x}\right] \div \frac{1+x^2}{1-x^2}.$$

(iii) There are 40 tickets numbered 1 to 40 in a box. A ticket is drawn randomly. What is the probability that the ticket drawn :

(1) Bears an odd number

(2) Bears a number which is a perfect square

(iv) Calculate mode for the following frequency distribution :

Marks (x)	No. of Students (f)
0–10	4
10–20	16
20–30	15
30–40	20
40–50	7
50–60	5

(v) If an electronic instrument is available for Rs. 6,000 cash or for Rs. 1,035 cash down payment and three equal half yearly instalments at the rate of 20% per annum compound interest. Find the amount of each instalment.

(vi) Mr. John invested Rs. 3,672 in equity shares of face value Rs. 10 at Rs. 300 market price. Company declares a dividend of 90% on them. After getting the dividend all these shares were sold at the rate of Rs. 275 each. In each of the transactions he paid 2% brokerage. Did he gain or loss in the total transaction ? By how much ?