

Question numbers 1 to 10 carry 3 marks each.

1. Solve the system of equations:

$$\frac{bx}{a} - \frac{ay}{b} + a + b = 0 \quad \text{and} \quad bx - ay + 2ab = 0.$$

2. Given that:

$$P = \frac{x+2y}{x+y} + \frac{x}{y}, Q = \frac{x+y}{x-y} - \frac{x-y}{x+y} \quad \text{and} \quad R = \frac{x+2y}{x+y} - \frac{x}{x+y}$$

3. If  $(x+2)(x-3)$  is the HCF of the polynomials  $p(x) = (x^2 + x - 2)(3x^2 - 8x + c)$  and  $q(x) = (x^2 + x - 12)(2x^2 + x + b)$ , find the values of  $c$  and  $b$ .
4. Using the quadratic formula, solve the equation:  $A^2b^2x^2 - (4b^4 - 3a^4)x - 12a^2b^2 = 0$ .
5. A household article is available for ₹970 cash or ₹210 cash down payment followed by three equal monthly installments. If the rate of interest charged under the installment plan is 16% per annum, find the amount of each installment
6. A man borrows ₹25,200 from a finance company and has to repay it in two equal annual installments. If the interest is charged at the rate of 10% per annum compounded annually, calculate the amount of each installment.
7. The speed of a boat in still water is 11 km/hr. It can go 12 km upstream and return downstream to the original point in 2 hours 45 minutes. Find the speed of the stream.
8. A bucket made up of a metal sheet is in the form of a frustum of a cone. Its depth is 24 cm and the diameters of the top and bottom are 30 cm and 10 cm respectively. Find the cost of milk which can completely fill the bucket at the rate of ₹20 per liter and the cost of the metal sheet used, if it costs ₹10 per 100 cm<sup>2</sup>. (Use  $\pi = 3.14$ )
9. Mrs. Ruchi's salary is Rs.32,250 per month exclusive of HRA. She donates ₹12,000 to Prime Minister's Relief Fund (100% exemption). She also donates ₹6,000 to a school and gets a relief of 50% on this donation. She contributes ₹5,000 per month towards her Provident Fund. She pays a quarterly premium of Rs.2,500 towards her LIC policy and invests ₹25,000 in NSCs. If ₹2,700 is the tax deducted each month from her salary for 11 months, find the tax deducted from her salary in the last month of the year.

#### Income Tax Rates:

Slab	Tax Rate
Up to Rs.1,35,000	No tax
From Rs.1,35,001 to Rs.1,50,000	10% of the taxable income above Rs.1,35,000
From Rs.1,50,001 to Rs.2,50,000	Rs.1,500 + 20% of the income exceeding Rs.1,50,000
Rs.2,50,001 and above	Rs.21,500 + 30% of the amount exceeding Rs.2,50,000

**Education Cess:** 2% of the income tax