

ALGEBRA

Time : 2½ Hours) **QUESTION PAPER : OCTOBER-2009** (Max. Marks : 60

1. Attempt any six of the following sub-questions :

12

(i) Solve the following simultaneous equations

$$x - y = 12; x + y = 8.$$

(ii) Find the LCM of $28b^3$, $42b^2$.

(iii) Simplify :

$$\frac{6y}{7-3} - \frac{18}{y-3}$$

(iv) Examine whether the values given against the quadratic equation are the solutions of that equation or not

$$m^2 + 4m + 3 = 0, m = -1, 2.$$

(v) A sum of Rs 1500 was invested in equity shares. If one share costs Rs 150, find the number of shares purchased.

(vi) If $n(C) = 5$, $n(S) = 20$, then find the probability of event C.

(vii) Find the 10th term of an A.P., if $a = 7$ and $d = 4$.

(viii) Convert the decimal integer to its binary equivalent by using the expansion method :

$$82_{10}$$

2. Attempt any four of the following sub-questions :

12

(i) Solve the following simultaneous equations using the method of elimination by substitution : $2x - y - 3 = 0$; $4x - y - 5 = 0$.

(ii) The HCF and LCM of two polynomials are $x^2 - 3x + 9$ and $2(x + 3)(x^2 - 3x + 9)$ respectively. If one of those polynomials is $x^3 + 27$, find the other.

(iii) Find mode

Class Interval	0-10	10-20	20-30	30-40
Frequency (f)	2	4	9	7

(vi) An offset machine costs Rs. 4,50,000. The rate of Central Sales Tax is 4%. Find the total sales tax and sale price of the machine.

(v) If for an A.P., first term is $a = 6$ and the common difference is $d = 5$, find S_n and S_{10} .

(vi) Solve : $11111_2 - 10101_2 + 101_2$.

3. Attempt any four of the following sub-questions : 12

- i) Find the HCF and LCM of the following polynomials :
 $x^3 - 8x^2 + 19x - 12$; $x^3 - 64$.
- ii) Solve the quadratic equation by the perfect square method :
 $2y^2 + 2y - 3 = 0$.
- iii) Find the difference between the greatest 4 bit binary number and the smallest 4 bit binary number.
- iv) The marked price of a taxable article was Rs. 4,000, which is sold to the first dealer at the same rate. He sold it to the second dealer for Rs. 4,240. The second dealer sold it to a customer for Rs. 4,320. Find M-VAT at every stage of trading at the rate of 4%.
- v) A set of tables is available for Rs. 3,200 cash or Rs. 2,000 cash down payment and Rs. 1,290 to be paid after six months in one instalment. Find the rate of interest charged under the instalment scheme.
- vi) Two coins are tossed. Find the probability that
 - 1) at least one head turns up;
 - 2) no head turns up.

4. Attempt any three of the following sub-questions : 12

(i) Simplify :

$$\frac{1}{1 + \frac{p}{q+r}} + \frac{1}{1 + \frac{q}{r+p}} + \frac{1}{1 + \frac{r}{p+q}}$$

(ii) A two - digit number is six times the sum of its digits. The number obtained by interchanging the digits is less by 9 than the original number. Find the original number.

(iii) Solve :

$$\left(x^2 + \frac{1}{x^2}\right) - 7\left(x + \frac{1}{x}\right) = -14$$

(iv) A lady teacher earns Rs. 14,400 p.m. She contributes Rs. 2,000 towards Government Provident Funds. Also, she deposits Rs. 10,000 annual premium of LIC. In the same financial year, she pays Rs. 1,000 to the Prime Minister Relief Fund. Also, she pays Rs. 3,000 towards house loan (out of which Rs. 500 is the interest) per month. Find how much Income Tax she has to pay at the end of the financial year 2006-07.

(v) Find the median :

Class	6-10	11-15	16-20	21-25	26-30
Frequency (f)	20	30	50	40	10

(vi) If 7 times the seventh term of an A. P. is equal to 11 times the eleventh term, show that the 18th term of the A. P. is zero.

5. Attempt any three of the following sub-questions : 12

i) Solve the following simultaneous equations by Graphical method :
 $x - y + 1 = 0$; $x + y = 5$.

ii) Find the value of : $\left(\frac{a}{b} - \frac{b}{a}\right) \div \left(\frac{a^2 - b^2}{a - b}\right) \times \frac{ab}{a + b + 1}$, if $a = 5$ and $b = 4$

iii) Subhash invested an equal amount in two companies by purchasing equity shares with market price Rs. 65 and Rs. 85 each. At the end of the year both companies declared the dividends at 26% and 34% each. In which company is it profitable to invest his money ?

iv) Find the probability that a leap year selected at random will have 53 Sundays.

v) Calculate the mean of the marks scored by the students in a class test from the following data by using assumed mean method :

Marks (x)	0-10	10-20	20-30	30-40	40-50	50-60
No. of Students (f)	12	18	27	20	17	6

vi) A certain amount of money is borrowed with a promise to pay it back in two years in two equal annual instalments with compound interest calculated at the rate of 10% p.a. If a man pays Rs. 10,890 as each instalment, find the sum borrowed and the interest paid.