

# ALGEBRA

Time : 2.30 Hrs.) **Question Paper : March 2009** (Max. Marks : 60)

**Note :** Please see to Question Paper March 2008.

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

(12)

(i) Solve :  $16x^2 - 25 = 0$ .

(ii) Find the I.C.M. of :  $14x^2$ ;  $35x^3y$ .

(iii) If  $x = 2$ ,  $y = 3$  is the solution of  $2x + ky = 13$ , find  $k$ .

(iv) Simplify :  $\frac{x-8}{2x+7} + \frac{3x+13}{2x+7}$ .

(v) Convert the decimal integer  $(50)_{10}$  to its binary equivalent.

(vi) A sum of Rs. 3,570 was invested in equity shares of face value Rs. 10 each at Rs. 70 market price and brokerage at 2% was paid. How many shares were purchased?

(vii) Find 7th term of A.P. 7, 11, 15, 19, ....

(viii) A die is thrown. A is the event that a number divisible by 2 comes up. Write down the sample space S and event A.

**Q. 2 :** Attempt any four subquestions from the following.

(12)

(i) Sum of ages of mother and her daughter is 50. After twenty years mother's age will be twice as that of her daughter's age at that time. Find their present ages.

(ii) For A.P.  $S_{10} = 210$ ;  $a = 3$ , find  $d$ .

(iii) Find the H.C.F. of the following polynomials :  $a^3 - 27$ ,  $2a^2 - 12a + 18$ .

(iv) Add the following binary numbers. Verify your answer in the decimal number system.  
 $11001_2 + 1011_2$ .

(v) The pie diagram given below shows the spending of a family on various items and its savings during a year. Study the diagram and answer the questions given below



(a) If the total income of the family is Rs. 1,75,000, how much does he spend on children's education?

(b) Find the expenses on housing.

(vi) Sukhadev has purchased ten hot pressed plywood flush doors. The sale price of one piece is Rs. 1,125 and the rate of central sales tax is 4%. Find the net selling price of 10 pieces.

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

(12)

(i) The H.C.F. of two polynomials  $p(x) = (x - 3)(x^2 + x - 2)$  and  $q(x) = x^2 - 5x + 6$  is  $(x - 3)$ . Find the L.C.M. of  $p(x)$  and  $q(x)$ .

(ii) Solve the following quadratic equation by formula method :  
 $y^2 - 6y + 2 = 0$ .

(iii) Two coins are tossed. Find the probability that no head turns up.

(iv) Simplify :  $110011_2 - 11100_2 + 1100_2$ .

(v) A motor-cycle production company sells one piece of motor-cycle to the first sales dealer at the cost of Rs. 30,800. He sells it to the sub-dealer for Rs. 34,000 when the sub-dealer sells it to customer for Rs. 36,000. Find the VAT to be paid at every stage of trading at the rate of 4%.

(vi) A cooking range can be purchased for Rs. 4,800 cash or for Rs. 2,700 cash down payment together with Rs. 2,198 to be paid after four months in one instalment. Find the rate of interest.

**Q. 4 : Attempt any three subquestions from the following :**

**(12)**

(i) Solve :  $4z^2 + \frac{6}{z^2} = 11$ .

(ii) Mr. Shreyas has monthly salary of Rs. 10,500. He contributes Rs. 1,500 to the Provident Funds monthly and pays annual premium of Rs. 3,000 to L.I.C. Calculate the income tax he will be required to pay for the year 2006-2007.

(iii) If the third and sixth terms of an A.P. are 7 and 13 respectively, find a, d, and write the A.P.

(iv) Solve the following simultaneous equations by Cramer's rule :  $3x - 4y = 10$ ;  $4x + 3y = 5$ .

(v) if  $x = 10 - .3$ ,  $y = 9.3$ ; then find the value of :

$$x + \frac{1}{x+y} \frac{y^2}{x^3 - y^3}$$

(vi) Rainfall (in cm) recorded in 50 cities on a particular day. Find mean of the rainfall by Assumed mean method. (Take A = 50)

Rainfall (in cm)	No. of Cities
36 - 40	6
40 - 44	7
44 - 48	10
48 - 52	7
52 - 56	7
56 - 60	9
60 - 64	4

**Q. 5 : Attempt any three subquestions from the following.**

**(12)**

(i) Two digit number is formed out of the digits 0, 1, 2, 3, 4, where digits are not repeated.

Find the probability of the events that :

(a) the number formed is an even number. (b) the number formed is greater than 40.

(ii) Solve the following simultaneous equations by using graphical method

$$x + y = 7; 2x - 3y = 9.$$

(iii) Simplify :  $\frac{m^2 + 3m - 4}{m^2 + 16m + 64} \div \left( \frac{m^2 - 9m + 18}{m^2 - 2m - 48} \cdot \frac{m + 8}{m + 4} \right)$

(iv) Find the median from the frequency distribution table given below

Height (in cm)	No. of Students
100 - 110	5
110 - 120	8
120 - 130	20
130 - 140	10
140 - 150	7

(v) A certain amount of money is borrowed with a promise to pay it back in two years in two equal annual installments 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.

(vi) A person purchased equity shares of Rs. 10,200 when the market price was Rs. 100. Out of these shares he sold 60 equity shares with market price Rs. 125 and the remaining shares were sold at Rs. 90. He had to pay 2% brokerage each time. What was his gain or loss on the whole?