ALGEBRA

Note : Please Refer to All Notes Q. P. March 2008.

Q. 1. Solve any six of the following subquestions : (12)

(i) If $(4, a)$ is the point lying on the graph of equation $7x + 2y = 42$, then what is the value of a ?

(ii) Decide whether $(x - 1)$ is a factor of $x^3 - 3x^2 - 6x + 8$.

(iii) **Simplify :** $\dfrac{6x^2 y^3 z}{6z^2} \times \dfrac{10z^2}{12xy^2}$

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

$x^2 - 4x + 3 = 0, \quad x = 1, 2.$

(v) Find the decimal equivalent of a binary integer 1001_2.

(vi) Using th formula $t_n = a + (n - 1) d$, find t_7 of an A.P. **6, 10, 14, ...**

(vii) A die is thrown. Find the probability that an odd number comes up.

(viii) The share of face value Rs. 10 is purchased at Rs. 125 market price and brokerage at 2% was paid. Find the brokerage paid per share.

Q. 2. Attempt any four of the following sub-questions : (12)

(i) Solve the following equations by Cramer's rule :

$2x + 3y = 8$
$3x + 2y = 7$

(ii) Find H.C.F. of the following polynomials : $2(m^3 - 8); \ 4(m - 2)^2$.

(iii) Convert the following numbers into binary numbers (Use division-remainder technique)

832_{10} and 742_{10}.

(iv) For A.P. $S_{16} = 784$, $d = 6$, find a.

(v) The following pie-diagram represents the number of valid votes by four students who contested for school captain. The total number of valid votes polled was 720.
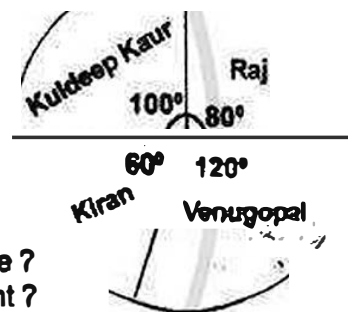
Answer the following questions :

(i) Who has won the election ?

(ii) What is the minimum number of votes obtained by the candidate ?

(iii) By how many votes did the winner defeat the nearest contestant ?

(iv) The value of purchasing an article is Rs. 860 and the value of its selling is Rs. 920. Find M-VAT with invoice method at the rate 12.5%.

Q. 3. Solve any four of the following sub-questions : (12)

(i) The G.C.D. of two polynomials is $(x + 3)$ and their L.C.M. is $x^3 - 7x + 6$. If one of the polynomials is $(x^2 + 2x - 3)$, find the other.

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

$n^2 + 5n + 5 = 0.$

(iii) By converting the following numbers to decimal number system, solve the following.

$11111_2 - 10101_2 + 101_2$

(iv) A coin is tossed thrice. A is the event that head appears once. B is the event that head appears at the most twice. C is the event that head does not appear. Write down the S, $n(S)$, A, B, C and $n(A)$, $n(B)$, $n(C)$.

(v) A typewriter is available for Rs. 5,820 cash or Rs. 1,260 cash down payment followed by three equal monthly instalments. Under this plan, the rate of interest is 16% p.a. Find the monthly instalments.

(vi) Ashwini purchased an instrument for Rs. 18,304 which includes 12% discount on the printed price and then 4% central sales tax on the ramaining sale price. Find the printed price.

Q. 4. Solve any three subquestions from the following : (12)

(i) 9 years ago, grandfather's age was 9 times his grandson's age at that time. After 15 years, his age will be thrice as his grandson's age, find their present ages.

(ii) Solve : $1+\dfrac{\dfrac{1}{p}}{q+r} + 1+\dfrac{\dfrac{1}{q}}{r+p} + 1+\dfrac{\dfrac{1}{r}}{p+q}$

(iii) Solve : $(x^2 + x)(x^2 + x - 2) = 24.$

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

(v) Calculate mode :

No. of Absent days (x)	No. of Students (f)
0-10	30
10-20	70
20-30	50
30-40	45
40-50	40

(vi) 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 LIC. Calculate the income tax he will be required to pay for the year 2006-2007.

Q. 5. Solve any three sub-questions from the following : (12)

(i) Draw the graph of the line $2x + 3y = 6$. Find the coordinates of the points where this line cuts X-axis and Y-axis. Name the points as A and B respectively.

(ii) Solve : $\left[\dfrac{a-3b}{a^2-9b^2} \times \dfrac{a^2-7ab+10b^2}{a^2-3ab-10b^2}\right] + \dfrac{a-2b}{a^2+3ab+2b^2}$

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

(iv) Find the mean by step deviation method :

Pocket Money (Per day in Rs.)	No. of Students
0-10	3
10-20	7
20-30	5
30-40	2
40-50	6

(v) A washing machine is sold for Rs. 10,000 cash or for 5 monthly equal instalments of Rs. 2,080 each. If the first instalment is to be paid at the very date of purchasing, find the rate of interest p.a. charged in this scheme.

(vi) A sum of Rs. 2,142 was invested in equity shares of face value Rs. 10 each at Rs. 7 market price and brokerage at 2% was paid, how many shares were purchased ?