

MATHEMATICS : ALGEBRA - I

Time : 2.30 Hrs.) **Question Paper : March 2010** (Max. Marks : 60)

Q. 1. Attempt any six of the following subquestions.

- (i) Find the value of the following determinant : $\begin{vmatrix} 3 & 4 \\ 1 & 2 \end{vmatrix}$
- (ii) Find the H. C. F. : $16(x+1)^2(x-2)$; $12(x+1)^3(x+2)$.
- (iii) A share of face value Rs. 10 was purchased for Rs. 280. The company declares a dividend of 70%. What is the rate of return on investment ?
- (iv) Convert the following decimal integer to its binary equivalent by using division remainder technique : 27_{10}
- (v) Simplify : $\frac{y^3 + 27}{y^2 - 3y + 9}$
- (vi) If $n(B) = 3$ and $n(S) = 12$, then find the probability of event B.
- (vii) Find the value of $b^2 - 4ac$ of the given quadratic equation $x^2 - 5x + 4 = 0$.
- (viii) Find the 8th term of the A. P. 5, 7, 9,

Q. 2. Attempt any four of the following subquestions.

(12)

- (i) If $(7, a)$ is the point lying on the graph of equation $2x + 3y = 20$, then what is the value of a ?
- (ii) A musician paid Rs. 9,360 for a music system. If the rate of central sales tax is 4%, find the list price of the music system when no discount is given.
- (iii) Find the H. C. F. and L. C. M. of the following polynomials :
 $m^2 - 8m + 7$; $m^2 - 12m + 35$.
- (iv) Solve : $111101_2 - 11110_2$
- (v) Find the sum of the first 100 terms of an A. P., whose first term is 5 and the 100th term is 401.
- (vi) Find the mean using the assumed mean method.

Class Interval.	Frequency
10-16	1
16-22	10
22-28	5
28-34	3
34-40	6

Q. 3. Solve any four of the following subquestions.

(12)

- (i) If the H. C. F. of the polynomials $(x-1)(x^2+x+a)$ and $(x-2)(x^2+x+b)$ is $(x-1)(x-2)$, find a and b .
- (ii) Solve the quadratic equation by factorization method : $\frac{1}{4}(x+3)^2 = 25$.
- (iii) Convert the binary integer to its decimal equivalent 110011_2 .
- (iv) A die is thrown. Find the probability that : (i) an odd number comes up, (ii) a perfect square comes up, (iii) a multiple of 7 comes up.
- (v) A mobile set is sold to wholesale dealer for Rs. 3,000. He sold the same set to a sub-dealer for Rs. 3,200 and a customer purchased it from the second dealer for Rs. 3,300. Find the M-VAT at every stage of trading at the rate of 12.5%.
- (vi) A DVD set is available for Rs. 5,500 cash or for Rs. 2,500 cash down payment and balance amount and interest on it. Rs. 3,195 to be paid after six months in one instalment. Find the rate of interest.

Q. 4. Attempt any three of the following subquestions. (12)

- (i) Sum of ages of mother and her daughter is 60. After 15 years mother's age will be twice as that of her daughter's age at that time. Find their present ages.
 (ii) The number of students admitted in different faculties of a college are given below :

Faculties	No. of Students
Science	1000
Commerce	1200
Arts	650
Law	450
Home Science	300

Draw a pie diagram to illustrate the information.

- (iii) Simplify : $\left[\frac{2y^2 + 3}{y - 1} + \frac{y + 3}{y + 1} \right] + \frac{2y}{y^2 - 1}$
 (iv) The sum of a number and its reciprocal is $\frac{41}{20}$, find the number.
 (v) If for an A. P. $S_{31} = 186$, find t_{16} .
 (vi) Smt. C Archana has her gross annual income for the year 2006-2007 of Rs. 1,48,000 and her savings are as follows : (i) L. I. C. Rs. 4,800 p.a.; (ii) PFI Rs. 2,750 p.a. Find the net income tax to be paid by Smt. C. Archana, for the financial year 2006-2007.

Q. 5. Attempt any three of the following subquestions. (12)

- (i) Draw the graphs of the lines $x + y = -2$ and $2x - y + 4 = 0$ on the same coordinate system. State the coordinates of point of intersection of two lines.
 (ii) Two digit number is formed out of digits 0, 1, 2, 3, 4 where digits are not repeated. Find the probability of the events that : (i) the number formed is an even number.
 (ii) the number formed is greater than 40.
 (iii) Calculate the 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

- (iv) 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.
 (v) Find the value of $\left(1 + x + x^2 + \frac{x^3}{1-x} \right) + \left(1 - y + y^2 - \frac{y^3}{1+y} \right)$ if $x = 100$ and $y = 98$.
 (vi) A person invested Rs. 8,160 in shares of face value Rs. 10 each at Rs. 80 market price and brokerage at 2% was paid. Company declares a dividend of Rs. 40% on them. Find his dividend.