



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.B.A. & B.COM DEGREE EXAMINATION – BUSINESS ADMIN. & CORPO. SEC.

THIRD SEMESTER – NOVEMBER 2016

MT 3209 - BASIC MATHEMATICS

Date: 10-11-2016
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

Part A

Answer ALL Questions:

(10 x 2 = 20)

1. Define demand function.
2. A straight line PQ cuts the axes at the point M (4, 0) and N (0, 1). Find the length of MN.
3. If $A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}$ & $B = \begin{pmatrix} 1 & -1 \\ -3 & 2 \end{pmatrix}$, find AB and BA.
4. State Cayley Hamilton Theorem.
5. Define optimum solution.
6. When does a basic feasible solution would become a degenerate basic feasible solution?
7. What percent of 2.4 kg is 8 gms?
8. A man can row upstream at 7 kmph and downstream at 10 kmph. Find man's rate in still water and the rate of current.
9. A person walks 9 hrs at a speed of 3 km per hour and again walks 6 hours at a speed of 4 km per hour. What is the average speed in km per hour?
10. Write down the formula for Spearman's rank correlation.

Part B

Answer any FIVE Questions:

(5 x 8 = 40)

11. (a) Find the equation of a straight line which makes a negative intercept of 4 units on the X-axis and passes through the point (2, 4.5).

(b) Find the intercepts of the equation $x - y + 1 = 0$.

12. Prove that
$$\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3.$$

13. Solve the following simultaneous linear equation using Cramer's rule:

$$2x - 3y = 3$$

$$4x - y = 11$$

14. Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows:

	JOB					
	1	2	3	4	5	
PERSON	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

Determine the optimum assignment schedule.

15. Find the initial basic feasible solution for the following transportation problem by Least Cost method.

	To			Supply
	1	2	6	
From	0	4	2	7
	3	1	5	12
	10	10	10	11
Demand	10	10	10	

16. (a) A reduction of 20% in the price of sugar enables a purchaser to obtain 2.5 kg more for Rs. 160. Find the original rate and the reduced price per kg.

(b) 3 men can complete a piece of work in 6 days. Two days after they started the work, 3 more men joined them. How many days will they take to complete the remaining work? (4 + 4)

17. (a) A train M leaves Meerut at 5 a. m. and reaches Delhi. Another train N leaves Delhi at 7 a. m. and reaches Meerut at 10. 30 a. m. At what time do the two trains cross one another?
 (b) A train at 54 kmph takes 20 seconds to pass a platform. Next it takes 12 seconds to pass a man walking 6 kmph in the same direction in which the train is going. Find the length of the train and the length of the platform. **(4 + 4)**
18. From the following data, calculate standard deviation, coefficient of variation and variance.

Roll No	5	15	25	35	45	55
Marks	10	20	30	50	40	30

Part C

Answer any TWO Questions: **(2 x 20 = 40)**

19. (a) Find the equation to the straight line passing through the point (2, -3) and perpendicular to the line $x - 2y = 8$.
 (b) Give the mathematical equation of the supply function of a commodity such that the quantity supplied is zero when the price is Rs. 5 or below and it increases continuously at the constant rate of 10 units for each one rupee rise in price above Rs. 5.
 (c) If $f(x) = x^2 - 2x + 5$, find $f(x + 2) - f(x + 1) + f(x - 1)$. **(4 + 8 + 8)**

20. (a) Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$.

(b) Compute the inverse of the matrix:

$$\begin{pmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{pmatrix}$$

(8 + 12)

21. (a) Apply graphical method to solve the L. P. P:

Maximize $Z = x_1 - 2x_2$

Subject to

$-x_1 + x_2 \leq 1$

$6x_1 + 4x_2 \geq 24$

$0 \leq x_1 \leq 5$ and $0 \leq x_2 \leq 4$.

- (b) Determine basic feasible solution to the following transportation problem using North West corner rule:

		TO						
		A	B	C	D	E	SUPPLY	
FROM	P	2	11	10	3	7	4	
	Q	1	4	7	2	1	8	
	R	3	9	4	8	12	9	
		DEMAND	3	3	4	5	6	

(12 + 8)

22. (a) Find Karl Pearson's coefficient of correlation between age and playing habit of the people from the following information:

Age Group (years)	No of people	No of players
15 and less than 20	200	150
20 and less than 25	270	162
25 and less than 30	340	170
30 and less than 35	360	180
35 and less than 40	400	180
40 and less than 45	300	120

Also mention what does your calculated 'r' indicate?

- (b) Ramu was 4 times as old as his son 8 years ago. After 8 years, Ramu will be twice as old as his son. What are their present ages?

- (c) Two pipes A and B can fill a tank in 36 minutes and 45 minutes respectively. A water pipe C can empty the tank in 30 minutes. First A and B are opened. After 7 minutes, C is opened. In how much time, the tank is full? **(12 + 4 + 4)**
