



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.COM., B.B.A. DEGREE EXAMINATION – CORPORATE SEC. & BUSI.ADMIN.

THIRD SEMESTER – APRIL 2017

MT 3209- BASIC MATHEMATICS

Date: 04-05-2017
09:00-12:00

Dept. No.

Max. : 100 Marks

Part A (Answer ALL questions)

(10 x 2 = 20)

1. Define Demand function.
2. Find the slope and the inclination of the line joining $(-4,8)$ and $(8,-4)$.
3. If $A = \begin{pmatrix} 1 & -1 \\ -1 & 1 \end{pmatrix}$ show that $A^2 = 2A$.
4. State Cayley-Hamilton theorem.
5. Define feasible solution.
6. Define Transportation problem.
7. Agnivesh scored 110 runs which includes 3 boundaries and 8 sixes. What percentage of his total score were made by running between the wickets.
8. Find the value of 45% of 750 – 25% of 480.
9. Define correlation write the types of correlation
10. Write the formula for finding the Spearman's rank correlation.

Part B (Answer any FIVE of the following)

(5 x 8 = 40)

11. a) Find the equation of the line whose intercept on the y-axis is 6 and which passes through the point $(4,-2)$.
b) Find the intercept of the equation $x + 2y = 3$.
12. Prove that $\begin{vmatrix} a & b & c \\ a-b & b-c & c-a \\ b+c & c+a & a+b \end{vmatrix} = a^3 + b^3 + c^3 - 3abc$.
13. Verify Cayley-Hamilton theorem for the matrix $A = \begin{pmatrix} 1 & 2 \\ 4 & 3 \end{pmatrix}$.
14. Find the initial basic feasible solution to the following transportation problem by Least Cost Method.

		To				Supply
From	1	2	1	4	30	
	3	3	2	1	50	
	4	2	5	9	20	
		20	40	30	10	

15. The assignment cost of assigning any one operator to any one machine is given in the following table.

		Operators			
		I	II	III	IV
Machine	A	10	5	13	15
	B	3	9	18	3
	C	10	7	3	2
	D	5	11	9	7

Determine the optimum assignment schedule and cost.

16. Find the matrix B such that $A^2 + 3A + B = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$, where $A = \begin{pmatrix} 3 & -2 \\ -1 & 4 \end{pmatrix}$.
17. 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.
18. The average weight of A,B,C is 48 kg. If the average weight of A and B be 40 kg and that of B and C is 43 kg, find the weight of B.

Part C (Answer any TWO questions)

(2 x 20 = 40)

19. (a) Find the equation to the straight line passing through the points (2,-3) and perpendicular to the line $x - 2y = 3$.
- b). Define equilibrium price. Find the equilibrium price given $Q_d = \frac{8p}{p-2}$ and $Q_s = p^2$.
- c). If $f(x) = x^2 - 2x + 5$, find $f(x + 2) - f(x + 1) + f(x - 1)$.

(5+5+10)

20. (a) Find the inverse of the matrix $A = \begin{pmatrix} 2 & -1 \\ 3 & 2 \end{pmatrix}$.

b). Solve by using Cramer's rule.

$$5x - 6y + 4z = 15, \quad 7x + 4y - 3z = 19, \quad 2x + y + 6z = 46. \quad (8 + 12)$$

21. (a) Determine the basic feasible solution to the following LPP by using North-West Corner rule.

		A	B	C	D	E	Supply
Origin	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	

(b) Two ladies were asked to rank 7 different types of lipsticks. The ranks given by them are as follows.

Lipsticks	A	B	C	D	E	F	G
Neelu	2	1	4	3	5	7	6
Neena	1	3	2	4	5	6	7

Calculate the Spearman's rank correlation.

(10 + 10)

22 a) Solve the following LPP by graphical method:

$$\text{Maximize } z = 5x_1 + 4x_2$$

Subject to the constraints :

$$1.5x_1 + 2.5x_2 \leq 80$$

$$2x_1 + 1.5x_2 \leq 70$$

$$x_1, x_2 \geq 0$$

b). A, B and C started a business by investing Rs. 1,20,000, Rs. 1,35,000 and Rs. 1,50,000 respectively. Find the share of each, out of an annual profit of Rs. 56,700.

c). A book was sold for Rs. 27.50 with a profit of 10%. If it were sold for Rs. 25.7, then what would have been the percentage of profit or loss?

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