LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **BUSI.ADMIN., & B.COM. CORP.**

THIRDSEMESTER – NOVEMBER 2017

MT 3209- BASIC MATHEMATICS

Date: 15-11-2017 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

Part A

(Answer ALL the questions)(2 x 10 = 20)

1. Define Total Revenue function.
2. Find the equilibrium price given

   $Q_d = \dfrac{8p}{p-2}$; $Q_S = p^2$.
3. Find the slope and the inclination of the line joining (-4,8) and (8,-4)
4. If $A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}, B = \begin{pmatrix} 1 & -1 \\ -3 & 2 \end{pmatrix}$, find AB and BA.
5. Define optimum solution.
6. What percent of 2.4 is 8 gms ?
7. Define Transportation problem.
8. What total amount would a person get at the end of three years if he invests an amount of Rs 4500 at 11% per annum for 3 years.
9. Find the value of 45% of $750 - 25\%$ of 480.
10. Write the formula of Spearman's rank correlation coefficient..

Part B

(Answer any FIVEquestions)(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 $x + 2y = 3$. **(4 + 4)**

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. Verify Cayley-Hamilton theorem for the matrix $A = \begin{pmatrix} 1 & 2 \\ 4 & 3 \end{pmatrix}$ and hence find A^{-1}.

14. Find the initial basic feasible solution to the following transportation problem by North-West Corner Rule.

		Market						Availability
		M1	M2	M3	M4	M5	M6	
Warehouse	W1	9	12	9	6	9	10	5
	W2	*7*	3	7	7	5	5	6
	W3	6	5	9	11	3	11	2
	W4	6	5	9	11	3	11	2
	W5	6	8	11	2	2	10	9
Demand		6	4	6	2	4	2	

15. 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.

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. A father is three times as old as his son. 12 years later the father becomes twice older than his son. What is the present age of the father.

18. Calculate the mean and standard deviation for the following table giving the age distribution of 542 members.

Age in Years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of members	3	61	132	153	140	51	2

Find the standard deviation , coefficient of variance and variance for the following data.

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 .Find the equilibrium price by the method of excess demand given the functions $Q_d = 50 - \frac{8p}{7}$; $Q_s = 10 + \frac{2p}{3}$.

c) If $f(x) = x^2 - 7x + 12$ find $f(x+2) - f(x+1) + f(x-1)$

(7 + 6 + 7)

20. (a) Find the inverse of the matrix $A = \begin{pmatrix} 5 & -6 & 4 \\ 7 & 4 & -3 \\ 2 & 1 & 6 \end{pmatrix}$

b). Solve by using Cramer's rule

$$2x - 3y = 3$$
$$4x - y = 11$$

(14 + 6)

21. (a) Determine the initial basic feasible solution to the following transportation problem by using Least Cost Method.

	Market				Availability
	M1	M2	M3	M4	
W1	10	20	5	7	10
W2	13	9	12	8	20
W3	4	5	7	9	30
W4	14	7	1	0	40
W5	3	12	5	19	50
Demand	60	60	20	10	

Warehouse

b) In an evaluation of answer script the following marks were awarded by the examiners

1st	88	60	94	50	89	75	65	54	63	40
2nd	90	65	85	53	85	78	69	59	61	43

Calculate the Spearman's rank correlation coefficient. **(10 + 10)**

22 a) Solve the following LPP by graphical method:

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 proft 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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