St. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE-27
MID-SEMESTER TEST – AUGUST 2016
M.A. ECONOMICS – I SEMESTER
EC 7416 – MATHEMATICAL METHODS FOR ECONOMISTS

Time: 1 ½ Hour **Max marks: 35**

This question paper has 2 printed pages and 3 parts

Part A. Answer any FIVE of the following: **2x5=10**

1. Demand and supply functions of a market are given as follows: $Q_d = 51-3p$ and $Q_s = 6p-10$. Find equilibrium Q and P.
2. Consider the following matrices: $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -1 \\ 6 & 7 \end{bmatrix}$. Is AB = BA?
3. Find the inverse of the following matrix: $\begin{bmatrix} 1 & 5 & 1 \\ 0 & 3 & 9 \\ -1 & 0 & 0 \end{bmatrix}$
4. Let the production function be $Q=4K^{3/4}L^{1/4}$, Find out Marginal productivity of both labour and capital when K= 10000 and L=625
5. Given the following demand curve, find partial elasticity with respect to p_a and evaluate for the given prices:
   $q_a=50-4p_a-5p_b$ at $p_a=5$ and $p_b=5$
6. Find *dy/dx* for the function $x^2+2xy+y^2=4$

Part B: Answer any ONE of the following: **10x1=10**

7. Consider the simple national income model: $Y = C+I_0+G_0$ and $C = a+bY$ ($a>0$ and $0<b<1$). Compute the equilibrium Y and C using Cramer's rule.
8. Find own price elasticity , cross price elasticity and income elasticity of commodity X_1 for the following demand function:
   $\mathbf{X_1 = 300-0.5p_1^2+0.4p_2 + 0.05M}$, where $\mathbf{p_1}$ is own price, $\mathbf{p_2}$ is price of commodity 2 and M is the income for the following values M=200, $\mathbf{p_1}$=12, $\mathbf{p_2}$=100 . Also make suitable comments about nature of goods.

Part C: Answer any ONE of the following: **15X1=15**

9. Following is the closed economy IS-LM model:
   $Y - C+I+G$ (goods market equilibrium condition)
   $C = a +b(1-t)Y$ (consumption expenditure function)
   $I = d - er$ (investment expenditure function)
   $G = G_0$ (government expenditure)
   $M_d = M_s$ (money market equilibrium condition)
   $M_d = kY-lr$ (money demand function)
   $M_s = M_0$ (money supply function)
   Endogenous variables are Y, C, I and r (r is interest rate). Exogenous variable is G_0 and M_0. a,b,d,e and t are structural parameters. All the variables have their usual meaning.
   Using Cramer's rule derive government expenditure multiplier and money multiplier.
10. What is a homogenous function ? Check whether the following functions are homogenous and find degree of homogeneity.
   (i) $Q=aL+bK$
   (ii) $Q=L^2+LK+K^2$
   (iii) $Y=LK/(L+K)$
   (iv) $Q=L^2K\log(L/K)$