LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.A. DEGREE EXAMINATION – ECONOMICS

FIRST SEMESTER – NOVEMBER 2007

EC 1809 - MATHS & STATISTICS FOR ECONOMISTS

AN 21

Date : 02/11/2007   Dept. No.   Max. : 100 Marks
Time : 1:00 - 4:00

PART A
(5*4=20 Marks)

Answer any five of the following, each answer not exceeding 75 words:

1. Define Matrix. What is order of a Matrix?

2. What are the properties of transpose a matrix?

3. What is meant by minimum value of a function?

4. For the utility function of two commodities $U=U(X_1, X2)=(X_1-2)^2(X_2+1)^3$, find the first-order and the second-order partial derivatives.

5. What are the assumptions of input output analysis?

6. A die is rolled thrice and a 5 or 6 is considered a success. Find the probability of (i) no success, (ii) at least two successes, (iii) at least one but not more than two successes.

7. Define Normal Distribution and mention its constants.

PART B
(4*10=40 Marks)

Answer any four of the following, each answer not exceeding 300 words:

8. Discuss the properties of Determinants.
9. Find the in inverse of
$$A= \begin{matrix} 1 & 2 & 0 \\ 3 & -1 & 4 \\ 2 & 0 & 6 \end{matrix}$$

10. Given the following demand and supply functions, for three independent commodities: $Q_{d1}=45-2P_1+3P_2-7P_3$
$Q_{d2}=16+2P_1-P_2+3P3$
$Q_{d3}=30-P_1+2P_2-8P_3$
$Q_{s1}=-5+4P_1$
$Q_{s2}=-19+5P_2$
$Q_{s3}=-6+2P_3.$

Find the equilibrium prices and quantities for this three-commodity market model.

11. A firm has a demand curve given by the function 2Q-160+3P=0. The average cost curve of the firm is given by the relationship $AC-3Q^3=63+5/Q-18Q$. Find the level of output, which minimizes total revenue.

12. Given the following production function for a firm $Q=A(\alpha L^{-\gamma}+\beta K^{-\gamma})^{-1/\gamma}$, where A, α, β, and γ are constants, find the marginal productivity of labour and marginal productivity of capital. Does the output exhibit constant returns to scale?

13. Bring out the necessary and sufficient conditions for Maxima and Minima.

14. Explain the procedure for testing hypothesis.

PART C

(2*20=40 Marks)

Answer any two the following, each answer not exceeding 900 words:

15. Solve by Cramer's Rule: X+6Y-Z=10
                                                2X+3Y+3Z=17
                                                3X-3Y-2Z=-9

16. Given the technology matrix and final demand vector

     A= | 0.123 0.333 0.250 | | 10 |
         | 0.500 0.167 0.250 | and d= | 20 |
         | 0.250 0.167 0.250 | | 30 | ,

          find out the output matrix x.

17. From the following data obtain the two regression lines:
     X: 6   2   10   4   8
     Y: 9   11   5   8   7

18 A consumer has a utility function given by:
     $U=5\log X_1+3\log X_2$

   If the budget constraint is given by $10 X_1+14X_2=124$, find out the optimum quantities of the two goods that the consumer should purchase in order to maximize utility, subject to the budget constraint.

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