Gurudas College

Internal Examination - 2020

Economics Honours

Paper: CC-2-4

Mathematical methods in Economics

Group A (IA)

Time: 2 hrs

Answer any 5 questions

State whether the following statements are true or false

- i) A function is homothetic if it is a monotonic transformation of some homogenous function
- ii) The matrix of the second-order partial would be known as the Hessian Matrix.
- iii) Y=f(x) is an example of an implicit function.
- iv) the first-order partial derivatives are presented either in a row or in a column vector which is referred to as the gradient vector.
- v) Y=f(K,L) is an example of single variable function
- vi) For the case of perfect substitutes u(x, y)=x+y, the MRS would be 1.

Group B (Theory)

Answer any four questions

1. Use the total differential to compute the slope of the level curve of the following function

$$f(x_1, x_2) = 2x_1 + 3x_2$$

2. Use the total differential to compute the slope of the level curve of the following function

$$f(x_1, x_2) = x_1^2 x_2$$

3. Find the marginal rate of technical substitution for the production function $f(x_1, x_2) = x_1^{1/2} x_2^{1/2}$

4. Find and interpret the second order-partial derivatives of the following Cobb-Douglas production function

$$Y = f(x_1, x_2) = A x_1^{\alpha} x_2^{\beta}, \ x_1 \& x_2 > 0 \quad A > 0, \ 0 < \alpha \ \beta < 1$$

- 5. Find and arrange in Vector/Matrix notation of the first and second order partial derivatives of the following function $f(x_1, x_2) = x_1^2 x_2$
- 6. Find the gradient vector for the following function $f(x_1, x_2, x_3) = x_1^{\alpha} x_2^{\beta} x_3^{\gamma}$
- 7. Find the gradient vector for the following function

$$f(x_1, x_2) = 5 - 2x_1 + 3x_2$$