International Islamic University Chittagong

Department of Economics & Banking

Midterm Examination;Spring-2023 | Program: BSS (Honors) in Economics & Banking

Course Code: MATH-2302 | Course Title: Mathematical Economics

Time: 1 hours 30 minutes | Full Marks: 30

35

Answer the following questions. Figures in the right margin indicate full marks.

QN	Description of Questions	Marks	CLOs & PLOs	Cognitive learning
1(a)	Define the following concepts with example: i) Identity Matrix ii) Singularity of a Matrix iii) Inverse matrix	03		Remember
1(b)	Determine the rank of the following matrix: $A=\begin{bmatrix}1 & 0 & 0\\ 0 & 0 & 1\\ 0 & 1 & 0\end{bmatrix}$	01	CLO- 1 & PLO-3	Evaluate
1(c)	Use Cramer's rule to solve the following equation system: $7x_1 - x_2 - x_3 = 0$ $10x_1 - 2x_2 + x_3 = 8$ $6x_1 + 3x_2 - 2x_3 = 7$	06		Apply
2(a)	Given A$=\begin{bmatrix}2 & 8\\ 3 & 0\\ 5 & 1\end{bmatrix}$, $B=\begin{bmatrix}2 & 0\\ 3 & 8\end{bmatrix}$ Is AB defined? Calculate AB. Can you calculate BA?	03	CLO-1 & PLO-2	Evaluate
2(b)	What are the conditions of the existence of inverse of a matrix? Determine the inverse of the following matrix, $\begin{bmatrix}4 & -2 & 1\\ 7 & 3 & 3\\ 2 & 0 & 1\end{bmatrix}$	07		Remember & Evaluate
3(a)	What kind of returns to scale is reflected in the production function: $Q = 125K^{0.8}L^{0.4}$?	02		Remember
3(b)	Given Production function $Q = AK^{\alpha}L^{1-\alpha}$ i) Find marginal products of both factors. ii) Show that the expansion path generated from this production is linear and passes through the origin. iii) Compute the share of each factor in total production.	08	CLO- 2 & PLO-1	Remember Apply
	Or			
3(a)	Consider the production function: $Q = 125K^{0.7}L^{0.3}$ Show that the production function is homogenous of degree one.	02		Remember
3(b)	Given Production function: $Q = 96K^{0.3}L^{0.7}$ i) Find marginal products of both factors. ii) Show that the function is convex to the origin. iii) Compute the share of each factor in total production	08		Remember Apply