



**NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
2024 1 EXAMINATION**

COURSE TITLE: ADVANCED MATHEMATICAL ECONOMICS
COURSE CODE: ECO 718
CREDIT UNITS: 2 UNITS
TIME ALLOWED: 2 HOURS
INSTRUCTION: ANSWER QUESTION ONE AND ANY OTHER TWO (2) QUESTIONS

QUESTION ONE

- 1a. Briefly describe the concept of exponential function and give example of its expression (10 marks)
- 1b. Using an illustration, differentiate between a square matrix and a diagonal matrix (10 marks)
- 1c. Given a Total Revenue function $TR = 20Q^2 + 10Q + 5$, derive the Marginal Revenue (MR) and Average Revenue (AR) function (10 marks)

QUESTION TWO

- 2a. If 'A' is a square 'n by n' matrix over a field 'R' of real numbers, state any five (5) assumptions of the inversion theorem (10 marks)
- 2b. Using a graphical illustration, explain the meaning of deadweight loss of taxation (10 marks)

QUESTION THREE

- 3a. Given the demand curve is $QD = 200 - 10p$ and the supply curve is $QS = 10p$. If a quantity tax of N4 per unit is charged on the good, calculate the deadweight loss (10 marks)
- 3b. Examine the concept of zero-sum game in game theory and show its tabular illustration (10 marks)

QUESTION FOUR

- 4a. Explain the concept of an ordinary differential equation and give example of the equation (10 marks)
- 4b. Describe the graphical method of linear programming and enumerate the steps involved. (10 marks)