BOWEN UNIVERSITY, IWO
(OF THE NIGERIAN BAPTIST CONVENTION)
COLLEGE OF MANAGEMENT AND SOCIAL SCIENCES (COMSS)
ECONOMICS PROGRAMME
B.Sc. DEGREE
2023/2024 SECOND SEMESTER EXAMINATION

Course Code: ECO 104
Course Title: Mathematics for Economists I
Course Credit: 3
Time: 2 and ½ hours
Instructions: **Answer question 1 and any other 3 questions**

Question 1

a. Given the following set of equations, find $\frac{dy}{dx}$

i. $y = x^3 - 4x$ **4 marks**

ii. $y = (5x^3 + 1)^4$ **4 marks**

iii. $y = f(u) = u^2 - 2u + 1$ and $u = g(x) = x^2 - 1$ **4 marks**

iv. $y = e^{2x+3}$ **3 marks**

1b. Find the relative extrema of the functions below and determine the nature of the points (local maximum or minimum points)

i. $Y = g(x) = 2x^3 + 6x^2 - 18x + 4$ **5 marks**

ii. $y = g(x) = x^3 - 3x^2 + 2$ **5 marks**

25 marks

Question 2

a. Find the solution to the system of equations below using any rule of your choice **10 marks**

$$7x_1 - x_2 - x_3 = 0$$
$$10x_1 - 2x_2 + x_3 = 8$$
$$6x_1 + 3x_2 - 2x_3 = 7$$

b. State any two economic applications of matrices **5 marks**

15 marks

Question 3

a. The total cost C of a firm per day is a function of its daily output Q: C = 150 + 7Q. The firm has a capacity limit of 100 units of output per day. What are the domain and range of the cost f x n? **5 marks**

b. If the domain of the function y = 5 + 3x is the set $\{x \mid 1 \leq x \leq 4\}$, find the range of the function **5 marks**

c. Given three relations R, S, T from A = {x, y, z} to B = {u, v, w} defined as:
1) R = {(x, u), (z, v)},
2) S = {(x, u), (y, v), (z, w)} and
3) T = {(x, u), (x, v), (z, w)}.
Identify which of the given relations is/are function(s) **5 marks**

15 marks

Question 4

Differentiate between **any three** of the following terms
a. mathematical and non-mathematical economic **5 marks**
b. Mathematics and Econometrics **5 marks**
c. Rational and irrational numbers **5 marks**
d. Relations and functions **5 marks**

Question 5

Using diagrammatic representation and an equation explain **any three** of the following

a. Constant function

b. linear function

c. quadratic function

d. third-degree polynomial function

e. non-algebraic function

Question 6

a. Solve the polynomial

i. $\frac{x^{1/2} \times x^{1/3}}{x^{2/3}}$ **4 marks**

ii. $\frac{x^3}{x^{-3}}$ **4 marks**

b. if $A = \begin{pmatrix} 5 & 2 \\ 0 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 7 & 6 \\ 0 & 3 \end{pmatrix}$

Find

i. AB **3 marks**
ii. Inverse of A **4 marks**

15 marks