COURSE CODE: BUS729   CREDIT UNIT: 2
COURSE TITLE: BUSINESS MATHEMATICS
TIME ALLOWED: 2HRS
INSTRUCTIONS:
1. Attempt Question One (1) and any other two (2) questions
2. Question 1 carries 30 marks, while the other questions carry 20 marks each.
3. Present all points in coherent and orderly manner

1a. A manufacturer of calculators has an East Coast and a West Coast plant, each of which produces Business Calculators and Standard Calculators. The manufacturing time requirements (in hours per calculator) and the assembly and packaging costs (in naira per hour) are given by the following matrices: **15Marks**

Hours per Unit

Assembly   Packaging

$$T = \begin{bmatrix} 0.2 & 0.1 \\ 0.3 & 0.1 \end{bmatrix} \begin{matrix} \text{Business Calculators} \\ \text{Standard Calculators} \end{matrix}$$

Naira per Hour

East Coast   West Coast

$$C = \begin{bmatrix} 5 & 6 \\ 4 & 5 \end{bmatrix} \begin{matrix} \text{Assembly} \\ \text{Packaging} \end{matrix}$$

a) What is the total cost of manufacturing a business calculator on the East Coast?

b) Calculate the manufacturer's total cost of producing the calculators in the two plant locations.

1b. Briefly discuss areas of linear programming application.   **15Marks**

2a. A firm has tendered for two independent contracts. It estimates that it has probability 0.4 of obtaining contract A and probability 0.1 of obtaining contract B. Find the probability that the firm:

(i) obtains both contracts   **4Marks**

(ii) obtains neither of the contracts   **4Marks**

(iii) obtains exactly one contract   **2Marks**

2b. What do we mean by the terms mutually exclusive events and independent events? **10Marks**

3a. What is the integral of $\int \sin^2 (x) . \cos^2 (x) \, dx$?   **10Marks**

3b. Differentiate between the "maxima" and "minima" principles with examples. **10Marks**

4a. Describe any five (5) Characteristics and properties of bonds. **2Marks each = 10Marks**

4b. The present ratio of any business organisation is the ratio of its current assets to its current liabilities. The Managing Director of Bua has decided to obtain a short-term loan to build up inventory. The company has current assets of N450, 000 and current liabilities of N90, 000. How much can the Managing Director borrow if the company's current ratio must be not less than 2.5?

Note that funds received are considered current assets and loans are considered current liability. **10Marks**

5a. Find the periodic payment of an accumulated value of #1,600,000, payable annually for 3 years at 9% compounded annually.   **10Marks**

5b. Write short notes on the following   **2Marks each = 10Marks**

i. Annuity-Immediate

ii. Annuity-Due

iii. Deferred Annuities

iv. Fixed Annuities

v. Variable Annuities