



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
91, Cadastral Zone, Nnamdi Azikiwe Express Way, Jabi-Abuja  
**FACULTY OF MANAGEMENT SCIENCES**  
**2025\_1 EXAMINATION**

**Course Code: Business Mathematics**

**Course Title: BUS729**

**Credit Unit: 2**

- Instructions:**
1. Indicate your Matriculation Number clearly
  2. Attempt Question 1 and any other two (2) questions
  3. Question 1 is compulsory and carries 30 marks while the other 2 questions carry 20marks each
  4. Present all your points in coherent and orderly manner

**Time Allowed: 2 Hours**

1a. Write notes with examples on the followings

- i. Equality of Sets
  - ii. Sub-Sets
  - iii. Disjoint Sets
  - iv. Universal Set
  - v. Null Set
- 5marks**

1b. Let  $A = \{4,5,6,7\}$ ,  $B = \{1,3,5,7\}$  and  $C = \{3,4,5,6\}$ . Find

- (a)  $A \cup B$ , (b)  $A \cup C$ , (c)  $B \cap C$ , (d)  $B \cup B$  **8marks**

1ci. If we are receiving #1500 every year for the next 5 years and invested each payment at 5%. Calculate the future value of ordinary annuity. **4marks**

1cii. If we make payment of #2000 every years and invested in a bank for Using the above example, calculate the present value of ordinary annuity **4marks**

1d. Explain the various types of Annuities **4marks**

1e. explain and give examples of the following functions

- i. Constant function
- ii. Identity function
- iii. Product function
- iv. Onto (Subjective) function

- v. One-One (Injective) function **5marks**
- 2ai. Explain what you understand as Bounded and Unbounded Sets. **3marks**
- 2ii. Explain the various sources of finance shown in the cash flow. **5marks**
- 2b. Fineman LTD. has sales of #29,550, cost of #12450, depreciation expense of #2,800, and interest expense of #1920. If the tax rate is 25 percent, what is the operating cash flow? **4marks**
- 2c. Define sinking fund and explain various types of sinking fund. **4marks**
- 2d. A company wishes to spend #45000 for new equipment and decides to set up a sinking fund to accumulate this money over a 5 –year period. If payments are to be made to the fund quarterly, with interest compounded quarterly at an annual rate of 5%, how large should the payments be? **4marks**
- 3a. Suppose you invest #5000 at an annual interest rate of 8%. Find your balance at the end of 1 year if interest is compounded;
- a) yearly b) semiannually c) quarterly d) monthly **8marks**
- 3bi. What is Debt Instrument? **2marks**
- 3bii. Explain the properties of a Bond as form of debt instrument **5marks**
- 3c. A publishing company finds that the cost of publishing each copy of a magazine is N0.38. The revenue from dealers of the magazine is N0.35 per copy. The advertising revenue is 10% of the revenue received from dealers for all copies sold beyond 10,000 units. What is the least number of copies which must be sold so as to have a positive profit? **5marks**
- 4ai. Explain what is meant by linear programming? **2marks**
- 4aii. what are the conditions that must be present for the linear programming to be used for optimization problems. **3marks**
- 4b. Explain the various areas of application of linear programming. **5marks**
- 4c. A company has two grades of inspectors, I and II to undertake quality control inspection. At least 1,500 pieces must be inspected in an 8-hour day. Grade I inspector can check 20 pieces in an hour with an accuracy of 96%. Grade II inspector checks 14 pieces an hour with an accuracy of 92%. Wages of grade I inspector are #5 per hour while those of grade II inspector are #4 per hour. Any error made by an inspector costs #3 to the company. If there are, in all, 10 grade I inspectors and 15 grade II inspectors in the company find the optimal assignment of inspectors that minimizes the daily inspection cost. **5marks**
- 4d. Explain the various limitations of linear programming. **5marks**