



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) $A \cap C$, (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**