**Faculty of Computers & Artificial Intelligence** | **Benha University**
**2nd Term (2019-2020) Final Exam** | **Final Date**: 7 / 6 /2020
**Networking and Mobile Technologies Program** | **Total Marks:** Pass / Fail
**Course Code:** NBS102 **Level:** 1st level | **Examiner(s):** Dr. Metwally Rashad
**Subject:** Discrete Mathematics

**Research submission: From 31 May to 7 June 2020**

**a) Write a research project in ONE of the following topics:**

## Topic No. 1

### Tc1. "The Foundations of Discrete Mathematics"

- **This topic must contain that: -**
  1. Propositional Logic and its Applications
  2. Sets and its Operations
  3. Cardinality of Sets
  4. Functions
  5. Sequences and Summations
  6. Matrices

## Topic No. 2

### Tc2. "Algorithms for solving many different types of problems in Discrete Mathematics"

- **This topic must contain that: -**
  1. The concept of algorithm.
  2. Algorithms for many problems in discrete mathematics
  3. Recursive algorithms with examples
  4. Complexity of Algorithms with some examples

## Topic No. 3

### Tc3. "Mathematical Induction in Discrete Mathematics"

- **This topic must contain that: -**
  1. The principle of mathematical induction
  2. Examples of Proofs by Mathematical Induction
  3. Examples of strong induction

**Topic No. 4**

## Tc4. "Graph structure in Discrete Mathematics"

- **This topic must contain that: -**
  1. Graphs and Graph Models
  2. Special Types of Graphs
  3. Representing Graphs and Graph Isomorphism with examples
  4. Graph Connectivity with some examples
  5. Shortest-Path Problems with graph

**Topic No. 5**

## Tc5. "Tree structure in Discrete Mathematics"

- **This topic must contain that: -**
  1. Introduction to Trees
  2. Applications of Trees
  3. Tree Traversal with examples
  4. Spanning Trees

**b) <u>Notes: please, your research must contain the following elements:</u>**

- **Explain each point with examples**
- **State the applications of each point**

**GOOD LUCK,**

| **Examiner(s)** | **Program Coordinator** |
|---|---|
| **Dr. Metwally Rashad** | **Dr. Mohamed Taha** |