Faculty of Computers & Artificial Intelligence
2ˢᵗ Term (2019-2020) Final Exam
class: 1ˢᵗ (General) year
Course Code:
Course name: Discrete Mathematics

Benha University
Final Date: 7 / 6 /2020
Total Marks: Pass / Fail
Examiner(s): Dr. Metwally Rashad

Research submission: From 31 May to 7 June 2020

a) <u>**Write a research project in ONE of the following topics:**</u>

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

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

Topic No. 6

Tc6. "Modeling Computation in Discrete Mathematics"

- **This topic must contain that: -**
  1. Languages and Grammars
  2. Finite-State Machines with Output
  3. Finite-State Machines with No Output
  4. Language Recognition
  5. Turing Machines

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)   **Head of Departement**