

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**

ORGANISATION OF ISLAMIC COOPERATION (OIC)

**Department of Computer Science and Engineering (CSE)**

SEMESTER FINAL EXAMINATION

SUMMER SEMESTER, 2021-2022

DURATION: 3 HOURS

FULL MARKS: 150

**CSE 6283: Advanced Algorithms**

**Programmable calculators are not allowed. Do not write anything on the question paper.**

Answer all **6 (six)** questions. Figures in the right margin indicate full marks of questions.

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1. Prove the three cases of master method for solving recursion. Mention the rational of the three cases. 25
  2. IoT and Blockchain are being researched together now a days for data provenance and different distributed applications. Outline one such application with its architectural details. 25
  3. a) Tensorflow and CUDA are two different frameworks for parallelism. Outline the computation and memory models of the two frameworks. 13
  - b) Write a GPU based algorithm for KMP string matching. 12
  4. DTW algorithm has been widely used time series matching and classification. The task of classification is different than matching and needs different techniques. Describe the techniques of using DTW in classification and in feature generation. 23
  5. For autonomous car, game theory is the ultimate choice for decision making in congestion and in traffic signal crossing. Can you outline game theory scenarios with their utility functions to model the decision-making choices for the autonomous car? 25
  6. Prove the correctness of RSA algorithm using Euler's Totient Function, Fermat's Little Theorem and/or Chinese reminder theory. 25