UNIVERSITY OF INFORMATION TECHNOLOGY

FACULTY OF SOFTWARE ENGINEERING

FINAL EXAMINATION
SECOND SEMESTER – ACADEMIC YEAR 2021-2022
ADVANCED DATABASE
Time: 65 minutes
Additional materials are not permitted

Note: Students are obliged to write a group of adjacent attributes **in alphabetical order** ABCDEFGHIJKLMNOPQRSTUVWXYZ, for example: BH^+={BHKLVZ}

Question 1. (4 points) Consider the relation R and a set of functional dependencies F as follows:

R(ABCDEG)

F={ {AB} → {CD}, A → B, B → C, C → E, {BD} → A}

a. Find the minimal cover **C** of R (2 points)
b. Find all minimal candidate keys of R where a set of functional dependencies is **C** (the result of 1a) (2 points)

Question 2. (6 points) Consider the relation Q(ABCDEFGHIJ) and a set of functional dependencies F as follows:

F={ {AB}→ C
A → {DE}
B → F
F → {GH}
D → {IJ}
}

a. Find all minimal candidate keys of Q (0.5 points)
b. Decompose Q into a set of preserving BCNF relations. Prove this decomposition is preserving (4 points).
c. Assume Q is decomposed into $\mathbf{R_1}$(ABCD), $\mathbf{R_2}$(DE), $\mathbf{R_3}$(BF), $\mathbf{R_4}$(FGH), $\mathbf{R_5}$(DIJ). Is this decomposition preserving? Explain the reason. (1.5 points)

Course Goals	
Goal	**Description**
G1	Have the ability to find out, represent and resolve the problems of database design
G2	Have the ability to understand and explain the English terms in the fields of database design
G3	Have the ability to analyze and think about practical problems
G4	Have the ability to select and assess the suitable database design with requirements

Matching Table	
Question	**Goal**
1	G1, G2
2	G1, G2, G4

Ho Chi Minh City, June 4th, 2022

Head of division

Compiler

Thái Thụy Hàn Uyển