United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Final Exam, Trimester: Summer 2022

Course Code: CSE-3521 Course Title: Database Management Systems

Total Marks: 40 Duration: 2 hours

Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.

1. a. Write briefly about sparse and dense index.
   b. Construct a B+ tree from the following keys. Assume that the tree is initially empty and values are added sequentially one by one.

   (Order 4) 5, 50, 100, 25, 40, 45, 150, 80, 30, 15, 35 — 3+7

2. Consider an extendible hashing scheme where the bucket capacity is 3 and the initial local and global depth are 1. Insert the following records in the hash table **showing all the states for each insertion**. Assume that the LSB (least-significant bit) is being checked to find the directory for a record. — 10

Pointer	Key_value	Hash(key_value)
Pointer 1	7856	13 011010
Pointer 2	4256	2 000100
Pointer 3	8954	18 100100
Pointer 4	4523	25 110010
Pointer 5	1593	8 010000
Pointer 6	7524	15 01111
Pointer 7	2459	10 01010
Pointer 8	5648	5 00101
Pointer 8	9548	21 10101
Pointer 10	3694	1 00001

16 8 4 2 1

3. a) Consider the following relation R1 and set of functional dependencies F1

   R= { A, B, C, D, E, I }

   F= { A→C, AB→C, C→DI, CD→I, EC→AB, EI→C }

   i) Determine all the candidate keys for the relation R.
   ii) Find the attribute closure for (ACD) and (BCI) for the relation R.
   iii) Find the maximum normalized form (NF) of relation R

   3+ 1+ 2

b) Consider the following relation R2 and set of functional dependencies F2
R={ A, B, C, D, E, F, G, H, I, J }
F={ AB→C, AD→GH, BD→EF, A→I, H→J, I→BD }

i) Check whether A→C and I→G are valid functional dependencies or not.
ii) Check if G is a prime attribute or not.

2+2

4.

a) Write down when a schedule will be considered as view serializable with proper examples. Mention the problems of concurrent schedule handling.

b) Draw the precedence graph and show the following schedule is conflict serializable or not. If it is conflict serializable, find out the corresponding serial schedule.

3+7

T1	T2	T3	T4	T5
		read(Q)		
read(R)				
write(S)				
			read(S)	
	write(P)			
				write(R)
		read(P)		
				read(Q)
				read(L)
			read(T)	
	read(R)			
		write(T)		