

Question 1

1) No.

2) Possible candidate keys: CDG, ADG or DEG.

3) 1-NF.

R is not in 2 NF because functional dependency $H \rightarrow J$ violates the constraint that non non-prime attribute should be functionally dependent on a part of the primary key.

4) One of the possible solutions:

$Fm = \{A \rightarrow B, A \rightarrow C, CD \rightarrow A, CD \rightarrow E, E \rightarrow C, E \rightarrow H, E \rightarrow I, H \rightarrow J\}$

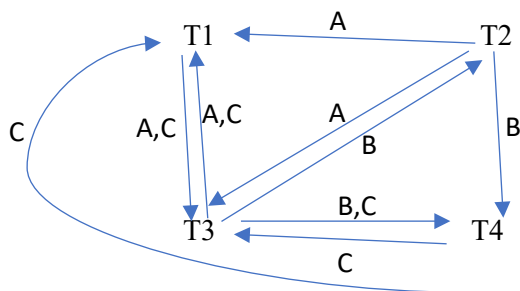
5) One of the possible solutions:

AB, EHI, HJ, ACDEG

This decomposition is dependency preserving and lossless join.

Question 2

1) No. The precedence graph is as below. There are cycles in the graph.



2) One of the possible solutions:

Time	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}	t_{11}	t_{12}	t_{13}	t_{14}	t_{15}	t_{16}	t_{17}	t_{18}
T_1	R(A)	R(C)	W(A)	W(C)														
T_2					R(A)	W(A)	R(B)	W(B)										
T_3									R(B)	R(C)	R(A)	W(C)	W(B)	W(A)				
T_4															R(C)	W(C)	R(B)	W(B)

3)

T1	T2
	WriteLock(A)
	R(A)
	W(A)
	Unlock(A)
WriteLock(A)	
R(A)	
WriteLock(C)	
R(C)	
W(A)	
Unlock(A)	
	WriteLock(B)
	R(B)
W(C)	W(B)
Unlock(C)	Unlock(B)