

Q1.

a)

P	Q	R	S	T
1	1	1	1	0
1	1	1	1	1

b)

P	Q	R	S	T
0	1	0	1	1
1	1	1	1	1

c)

P	Q	R	S	T
0	1	1	1	1
1	1	1	1	1

d)

P	Q	R	S	T
1	1	1	1	1
1	1	1	2	1
1	1	1	3	1
1	1	1	4	1

Q2.

a)

$B^+ = [B D E]$

b)

$CF^+ = [A B C D E F]$

c)

$DF^+ = [A D E F]$

d)

$BC^+ = [B C D E]$

e)

$ABC^+ = [A B C D E]$

Q3.

a)

No. A is not in B^+ .

b)

Yes. E is in CF^+ .

c)

No. B is no in DF+.

d)

No. $BD^+ = B^+$, and C is not in BD^+ .

e)

Yes. $BFC^+ = CF^+$, and A is in BFC^+ .

Q4.

ATTRIBUTE	CLOSURE	FDs
A	ACDE	$A \rightarrow D$
B	ABCDE	$B \rightarrow A, B \rightarrow D$
D	ACDE	$D \rightarrow A$
AB	/	/
AD	ACDE	/
BD	/	/

The projection on ABD is

$\{A \rightarrow D, B \rightarrow A, B \rightarrow D, D \rightarrow A\}$

we can find some alternative minimal basis

$\{A \rightarrow D, B \rightarrow D, D \rightarrow A\}$

or

$\{A \rightarrow D, B \rightarrow A, D \rightarrow A\}$