Problem1:

a) frequent itemset generation: minimum support count≥3, minimum confidence: 66%

Database D

TID	Items
1	ACDE
2	CDE
3	AC
4	BE
5	ABDE
6	ABCDE

Scan D →

C_1

Itemset	Sup
{A}	4
{B}	3
{C}	4
{D}	4
{E}	5

L_1

Itemset	Sup
{A}	4
{B}	3
{C}	4
{D}	4
{E}	5

C_2

Itemset
{AB}
{AC}
{AD}
{AE}
{BC}
{BD}
{BE}
{CD}
{CE}
{DE}

Scan D →

C_2

Itemset	Sup
{AB}	2
{AC}	3
{AD}	3
{AE}	3
{BC}	1
{BD}	2
{BE}	3
{CD}	3
{CE}	3
{DE}	4

L_2

Itemset	Sup
{AC}	3
{AD}	3
{AE}	3
{BE}	3
{CD}	3
{CE}	3
{DE}	4

C_3

Itemset
{ACD}
{ADE}
{CDE}

Scan D →

C_3
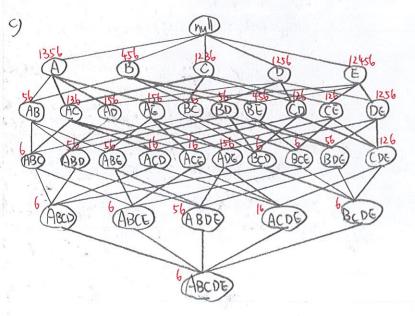
Itemset	Sup
{ACD}	2
{ADE}	3
{CDE}	3

L_3

Itemset	Sup
{ADE}	2
{CDE}	2

b) frequent itemsets: ({A}, {B}, {C}, {D}, {E}, {AC}, {AD}, {AE}, {BE}, {CD}, {CE}, {DE}, {ADE}, {CDE})

c)

d) {A} → {C}

{A} → {D}

{A} → {E}

{C} → {D}

{C} → {E}

e) association rule: {A} → {E}

	E	$\bar{E}$	
A	3	1	4
$\bar{A}$	2	0	2
	5	1	6

$P(E|A) = 0.75$

$P(\bar{E}) = 0.8333$

∴ Lift = 0.75/0.8333 = 0.9

Problem2:

a) T1 will produce the longest frequent itemset

b) T1: 2   ({ABCDE}, {FGHIJ})

T2: 1   ({ABG})

T3: 3   ({CD}, {ABC}, {HIJ})

c) T_1: 2   ({ABCDE}, {FGHIJ})

T_2: 2   ({AB}, {ABG})

T_3: 6   ({C}, {D}, {BC}, {CD}, {ABC}, {HIJ})

Problem3:

(a)

Earphone → Phone   Support 6/10 = 0.6   Confidence P(Phone|Earphone) = 0.6/0.6 = 100%

(b)

Case → Earphone   Support 2/10 = 0.2   Confidence P(Earphone|Case) = 0.2/0.5 = 40%