

Question 1

- 1) $A \rightarrow B$? No: $y \rightarrow x$; $y \rightarrow z$
2) $A \rightarrow C$? No: $y \rightarrow z$; $y \rightarrow w$
4) $D \rightarrow C$? No: $y \rightarrow x$; $y \rightarrow y$
6) $D \rightarrow A$? No: $y \rightarrow x$; $y \rightarrow z$

Question 2

(a) CLASS (CourseID, SectionID)
3NF

(b) CLASS (CourseID, SectionID, Room)
3NF

(c) CLASS (CourseID, SectionID, Room, Capacity)
2NF

Removing transitive dependency:

ROOM (Room, Capacity)

[new table]

CLASS (CourseID, SectionID, Room)


[what's left]

3NF

(d) CLASS (CourseID, SectionID, CourseName, Room,
Capacity)
1NF

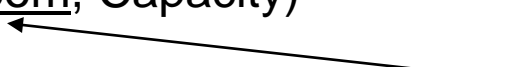
Removing partial-key dependency:

COURSE (CourseID, CourseName) [new table]
3NF
CLASS2 (CourseID, SectionID, Room, Capacity) [what's left]
2NF



Removing transitive dependency in CLASS2:

ROOM (Room, Capacity) [new table]
CLASS3 (CourseID, SectionID, Room) [what's left]
3NF



Question 3

(a) $\text{EmpID} \rightarrow \text{EmpName}, \text{DeptID}, \text{DeptName}$ (partial key dependency)

$\text{ProjectID} \rightarrow \text{ProjectTitle}$ (partial key dependency)

$\text{DeptID} \rightarrow \text{DeptName}$ (transitive dependency)

(b) Only in 1NF

(c) *Removing partial key dependency:*

EMP (EmpID, EmpName, DeptID, DeptName) [new table]

2NF

PROJECT (ProjectID, ProjectTitle) [new table]

3NF

ASSIGN (EmpID, ProjectID, ProjectHours) [what's left]

3NF

Removing transitive dependency:

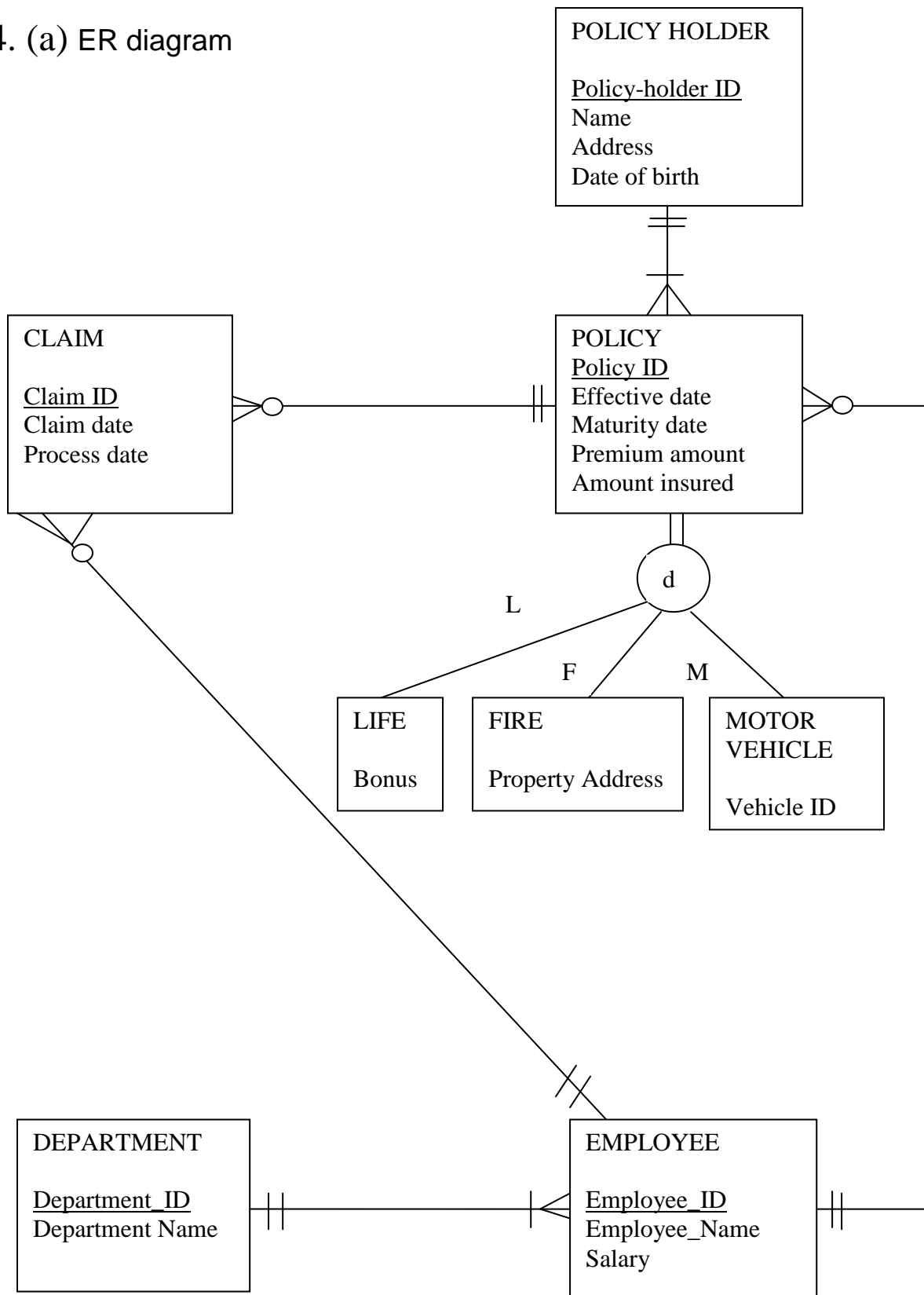
DEPT (DeptID, DeptName) [new table]

3NF

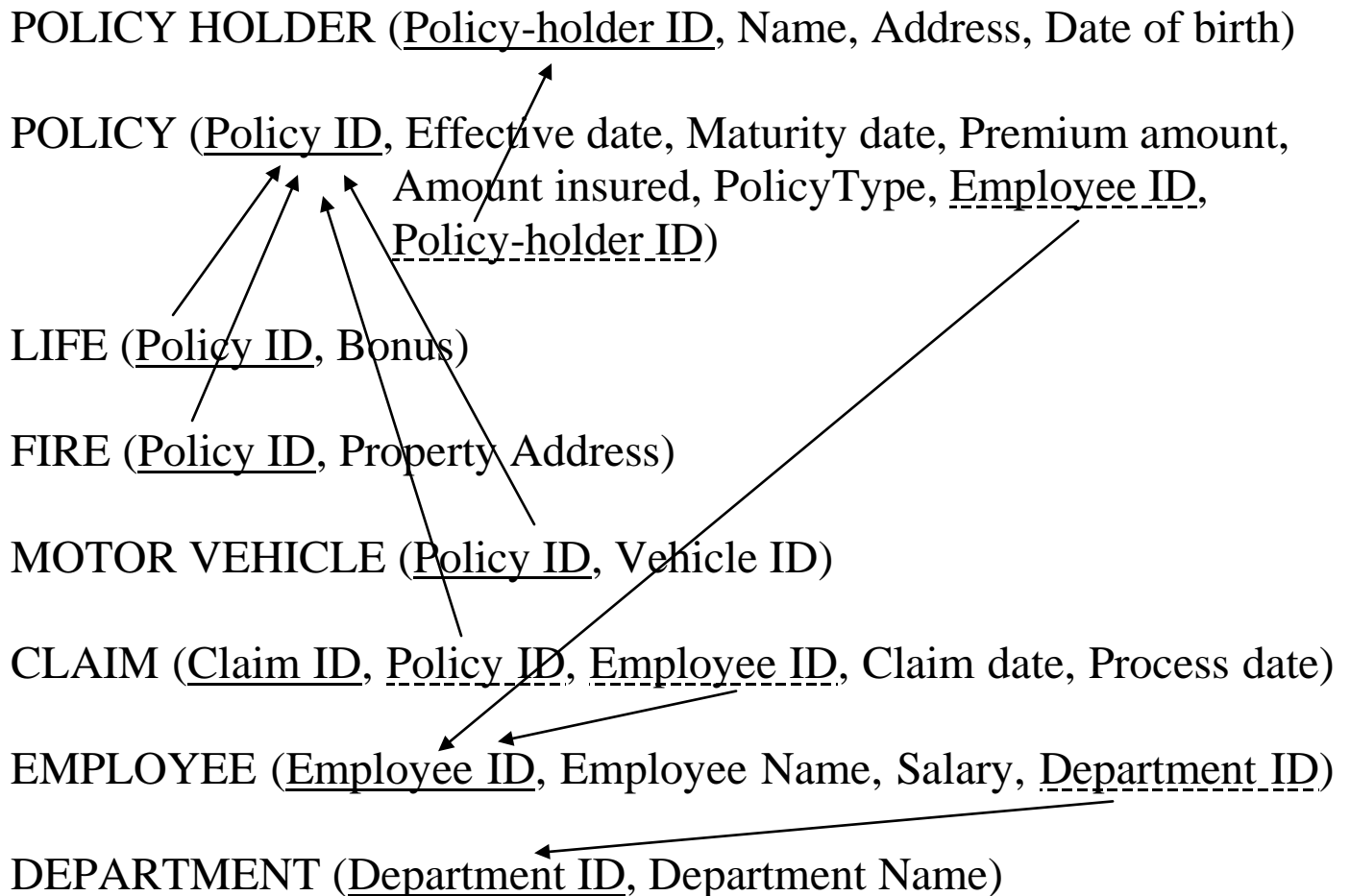
EMP (EmpID, EmpName, DeptID) [what's left]

3NF

4. (a) ER diagram



4. (b)



All in 3NF, since they are free from partial-key dependency and transitive dependency.