Task 1. Will the conversion to BCNF be dependency preserving in any case? Proof your statement and give a reasoning for choosing BCNF design.

Conversion to BCNF will be preserving if we use lossless decomposition to obtain BCNF. In another case it may lead to inconsistency of data.

Task 2. Given table in 1NF, convert to 3NF if PK is UnitID:

Unit ID	Student ID	Date	Tutor ID	Topic	Room	Grade	Book	Tut Email
U1	St1	23.02.03	Tut1	GMT	629	4.7	Deumlich	tut1@fhbb.ch
U2	St1	18.11.02	Tut3	Gln	631	5.1	Zehnder	tut3@fhbb.ch
U1	St4	23.02.03	Tut1	GMT	629	4.3	Deumlich	tut1@fhbb.ch
U5	St2	05.05.03	Tut3	PhF	632	4.9	Dümmlers	tut3@fhbb.ch
U4	St2	04.07.03	Tut5	AVQ	621	5.0	SwissTopo	tut5@fhbb.ch

Unit ID	Date	Tutor ID	Room
U1	23.02.03	Tut1	629
U2	18.11.02	Tut3	631
U5	05.05.03	Tut3	632
U4	04.07.03	Tut5	621

Uni	Topi	Book

t ID	c	
U1	GMT	Deumlich
U2	Gln	Zehnder
U5	PhF	Dümmlers
U4	AVQ	SwissTopo

Unit ID	Student ID	Grade
U1	St1	4.7
U2	St1	5.1
U1	St4	4.3
U5	St2	4.9
U4	St2	5.0

Tutor ID	Tut Email
Tut1	tut1@fhbb.ch
Tut3	tut3@fhbb.ch
Tut5	tut5@fhbb.ch

Task 3. Given table in 1NF, convert to 2NF if PK is {ProjectName, ProjectManager}, use decomposition:

ProjectName	ProjectManager	Position	Budget	TeamSize
Project1	Manager1	CTO	1 kk $	15
Project2	Manager2	CTO2	1.5 kk $	12

ProjectName	**ProjectManager**
Project1	Manager1
Project2	Manager2

ProjectName	**Budget**	TeamSize
Project1	1 kk $	15
Project2	1.5 kk $	12

ProjectManager	Position
Manager1	CTO
Manager2	CTO2

Task 4. Given table, convert to 3NF if PK is Group, use decomposition:

Group	**Faculty**	**Speciality**
g1	**f1**	**s1**
g2	**f2**	**s2**

Group	**Faculty**
g1	**f1**
g2	**f2**

Faculty	**Speciality**
f1	**s1**
f2	**s2**

Task 5. Given table, convert to BCNF if PK is {ProjectID, Department}, use decomposition:

ProjectID	Department	Curator	TeamSize	ProjectGroupsNumber
p1	d1	e1	100	5
p2	d2	e2	120	6

ProjectID	Department
p1	d1
p2	d2

ProjectID	Curator	TeamSize	ProjectGroupsNumber
p1	e1	100	5
p2	e2	120	6

Task 6. List the three design goals for relational databases, and explain why each is desirable. Give an example of both desirable and undesirable types of decompositions

1. Reduction of redundancy and duplication of data.
2. Ensuring the correct storage of all necessary information in database tables and allows usage DML operations.
3. Possibility of obtaining data for all necessary requests fast and convenient with guaranty of consistency.

Types of decomposition: lossy and lossless.

GroupID	StudID	Stud_phone_num
1	312	8 776 787 78 89

GroupID	StudID
1	312

StudID	Stud_phone_num
312	8 776 787 78 89

ID	Name	Salary
12	Nur	123000
13	Nur	135000

ID	Name
12	Nur
13	Nur

Name	Salary
Nur	123000
Nur	135000