

Information Technology

SBA Normalisation Test

Marks: 40
Time: 45 minutes

Examiner: IT Cluster
Moderator: IT Cluster

NAME : _____

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

- This paper consists of **9** pages. Please check that your question paper is complete.
- Fill in the answers in the spaces provided on this question paper.
- It is in your interest to write legibly and to present your work neatly.

SCENARIO

The Life Orientation department at your school like to monitor Grade 12 pupil applications to the universities for 2022.

Look at the following requirements for the database:

- Students may apply for any number of courses at multiple universities
- Each university offers a number of courses

Highlight your selection of a) b) c) or d) for each of the multiple choice questions below.

1. Which of the following is NOT achieved by normalisation? (1)
 - a) Redundant data is eliminated
 - b) Duplicate data is eliminated
 - c) Data anomalies are eliminated
 - d) The structure of the data is streamlined

2. What is the term used to describe a field that can be calculated from another field. (1)
 - a) Atomic data
 - b) Duplicate data
 - c) Non-atomic data
 - d) Derived data

3. What is the term for a key that is the combination of two or more fields to form a primary key. Highlight your answer. (1)
 - a) Composite
 - b) Compound
 - c) Concatenated
 - d) Any of the above

4. Which of the following statements best describes a foreign key . Highlight your answer. (1)
 - a) A unique identifier in a database.
 - b) A primary key of one table that appears in another table.
 - c) A field that should not be in a table and needs removing.
 - d) None of the above.

5. Which of the following statements about referential integrity are true? Highlight your answer. (1)
 - a) Referential integrity refers to the accuracy and consistency of data within a relationship.
 - b) Referential integrity requires that, whenever a foreign key value is used it must reference a valid, existing primary key in the parent table.
 - c) Referential integrity will prevent users from deleting rows from a primary table if there are matching related rows.
 - d) All of the above.

6. Complete the following table by listing the rules for each of the normal forms listed. (6)

First Normal Form	Second Normal Form	Third Normal Form
1.	1.	1.
2.	2.	2.

7. Examine the data supplied on page 4.

The following field combinations for keys have been suggested.

- (StuID, University, CourseID)
- (StuID, Surname, CourseID)
- (StuID, CourseID)

7.1 Define the term **primary key**. (1)

7.2 Which of the field combinations would you select as the primary key. Provide a motivation for your choice. (2)

<u>Primary Key</u>	
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<u>Motivation</u>	
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StuID	FirstName	Surname	Choice	University	Tel	Registrar	CourseID	Course	Applicati on Status
1	Erina	Savaage	1	UCT	(0)21 650 2128	registrar@uct.ac.za	UCEA	Architecture	received
1	Erina	Savaage	2	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USSF	Food Science	accepted
1	Erina	Savaage	3	WITS	(0)11 717 1888	registrar@wits.ac.za	UWEA	Architecture	declined
2	Bernardo	Klyn	1	UP	(0)12 420 3111	registrar@up.ac.za	UPHM	Medicine	accepted
2	Bernardo	Klyn	2	UP	(0)12 420 3111	registrar@up.ac.za	UPHP	Physiotherapy	received
3	Lon	Levis	1	UCT	(0)21 650 2128	registrar@uct.ac.za	UCCB	Business Science	declined
3	Lon	Levis	2	UCT	(0)21 650 2128	registrar@uct.ac.za	UCCA	Actuarial Science	accepted
4	Brooke	Jaffrey	1	WITS	(0)11 717 1888	registrar@wits.ac.za	UWCB	Business Science	received
4	Brooke	Jaffrey	2	WITS	(0)11 717 1888	registrar@wits.ac.za	UWCA	Actuarial Science	accepted
4	Brooke	Jaffrey	3	UP	(0)12 420 3111	registrar@up.ac.za	UPCB	Business Science	received
4	Brooke	Jaffrey	4	UP	(0)12 420 3111	registrar@up.ac.za	UPCA	Actuarial Science	declined
5	Currie	Mountlow	1	WITS	(0)11 717 1888	registrar@wits.ac.za	UWHM	Medicine	received
5	Currie	Mountlow	2	UP	(0)12 420 3111	registrar@up.ac.za	UPHM	Medicine	received
5	Currie	Mountlow	3	UP	(0)12 420 3111	registrar@up.ac.za	UPHP	Physiotherapy	accepted
6	Nicolette	O'Ferris	1	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USHE	Education	accepted
6	Nicolette	O'Ferris	2	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USHP	Performing Arts	accepted
7	Simone	Code	1	WITS	(0)11 717 1888	registrar@wits.ac.za	UWEC	Civil Engineering	accepted
7	Simone	Code	2	UCT	(0)21 650 2128	registrar@uct.ac.za	UCTEC	Civil Engineering	received
8	Pall	Priestley	1	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USSF	Food Science	declined
8	Pall	Priestley	2	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USSG	Geology	received
8	Pall	Priestley	3	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USSG	Chemistry	received
9	Harmony	Corradengo	1	UP	(0)12 420 3111	registrar@up.ac.za	UPCB	Business Science	declined
9	Harmony	Corradengo	2	UP	(0)12 420 3111	registrar@up.ac.za	UPCA	Actuarial Science	accepted
10	Julienne	Vannuccinii	1	Stellenbosch	(0)21 995 2111	registrar@stell.ac.za	USSG	Geology	received

8. The LO teacher has just received a new telephone number for the University of CapeTown.

8.1 Why would this cause an update anomaly? (1)

8.2 Name and give a definition and example of **TWO** other type of anomalies. (6)

<u>Anomaly 1</u>	
<u>Definition 1</u>	
<u>Example 1</u>	

<u>Anomaly 2</u>	
<u>Definition 2</u>	
<u>Example 2</u>	

9. 9.1

The table contains **redundant data**.

data?

What is redundant
(1)

9.2
data.Name a field that contains redundant
(1)Field 1 :

10. 10.1

The table contains **duplicate data**.

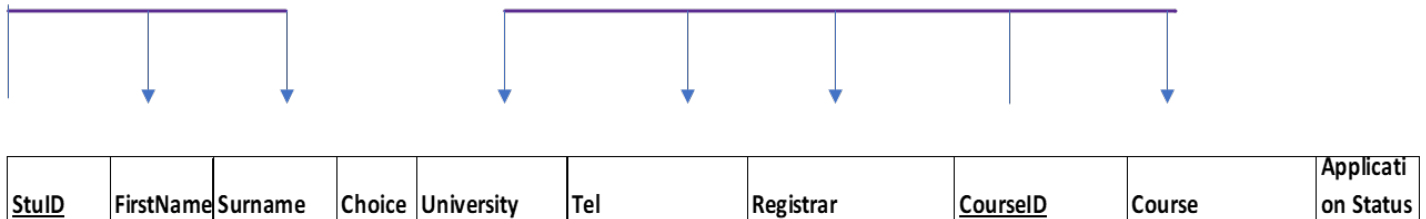
data?

What is duplicate
(1)

10.2
data.Name a field that contains duplicate
(1)Field 1 :

11. Consider the dependency diagram.

The **partial** dependencies have been identified.



11.1 Define the term **partial** dependency?

(1)

11.2 Define the term **transitive** dependency.

(1)

11.3 Draw in any other dependencies that are required to complete the normalisation to 3NF

(4)



<u>StuID</u>	<u>FirstName</u>	<u>Surname</u>	<u>Choice</u>	<u>University</u>	<u>Tel</u>	<u>Registrar</u>	<u>CourseID</u>	<u>Course</u>	<u>Applicati on Status</u>
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11.4 Write down the relation for the 3NF tables in the relational form. (9)

EXTRA SPACE – WRITE DOWN EACH QUESTION NUMBER
