Tshwane University of Technology

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YEAR: 2016

EXAMINATION: D

May Main

SUBJECT NAME:	DEVELOPMENT SOFTWARE IIIA
SUBJECT CODE:	DSO34AT
QUALIFICATION(S):	

PAPER DESCRIPTION: Closed Book **DURATION:** 3 Hrs **PAPER:** Only

SPECIAL REQUIREMENTS

- ☐ **NONE**
- ☐ **NON-PROGRAMMABLE POCKET CALCULATOR**
- ☐ **SCIENTIFIC CALCULATOR**
- ☐ **COMPUTER ANSWER SHEET**
- ☐ **GRAPH PAPER**
- ☐ **DRAWING INSTRUMENTS**

OTHER:

INSTRUCTIONS TO CANDIDATES: Answer all questions

TOTAL NUMBER OF PAGES INCLUDING COVER PAGE: 7

TOTAL NUMBER OF ANNEXURES:

EXAMINER: Mr A Buitendag **FULL MARKS:** 100

MODERATOR: Mr N Moroaswi **TOTAL MARKS:** 100

Exam D

Faculty of Information and Communication Technology

Tshwane University of Technology
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I declare that I am familiar with, and will abide to the Examination rules of Tshwane University of Technology

Signature

COURSE NAME: Development Software IIIA

COURSE CODE: DSO34AT

June/July 2016

Examination D 180 min June/July 2016 Total 100	1st Examiner: Mr. A Buitendag 2nd Examiner: Mr. N Moroaswi

Student number

Surname	Initials	%

Question 1 **(15x1)**

Double barrel true and false statements. Study the following two statements (i and ii) and select the correct answer from the options A to D below. Only write down the correct question number and letter E.g. 1.1 D

1.1 i) The word "entity" in the ER model corresponds to a table.
ii) The Crow's Foot model is less implementation-oriented than the Chen model.

A The statement i is true, and ii is false
B The statement i is false, and ii is true
C Both of the statements i and ii are true
D Both of the statements i and ii are false

1.2 i) Cardinality expresses the minimum and maximum number of entity occurrences associated with one occurrence of the related entity.
ii) Connectivities and cardinalities are established by business rules.

A The statement i is true, and ii is false
B The statement i is false, and ii is true
C Both of the statements i and ii are true
D Both of the statements i and ii are false

1.3 i) Relational models view the data as part of a table or collection of tables in which all key values must be identified.
ii) A good relational DBMS excels at managing denormalized relations.

A The statement i is true, and ii is false
B The statement i is false, and ii is true
C Both of the statements i and ii are true
D Both of the statements i and ii are false

1.4 i) The advantage of higher processing speed must be carefully weighed against the disadvantage of data anomalies.
ii) The primary objective in database design is to create complete, denormalized, redundant, and fully integrated conceptual, logical, and physical database models.

A The statement i is true, and ii is false
B The statement i is false, and ii is true
C Both of the statements i and ii are true
D Both of the statements i and ii are false

1.5 i) The implementation phase of database design includes creating the database storage structure and loading the database, but does not provide for data management.
ii) The testing and evaluation phase occurs after applications programming.

A The statement i is true, and ii is false
B The statement i is false, and ii is true
C Both of the statements i and ii are true
D Both of the statements i and ii are false

Multiple Choice
Identify the choice that best completes the statement or answers the question. Only write down the question number and the correct letter. E.g. 1.1 A

1.6 A detailed system specification is part of the ____ phase of the SDLC.
A. planning
B. analysis
C. detailed systems design
D. implementation

1.7 Producing the required information flow is part of the ____ phase of the DBLC.
A. database initial study
B. database design
C. operation
D. testing and evaluation

1.8 The first step in developing the conceptual model using ER diagrams is to ____.
- A. normalize the entities
- B. complete the initial ER diagram
- C. identify, analyze, and refine the business rules
- D. define the attributes, primary keys, and foreign keys for each of the entities

1.9 The ____ scenario describes a fully distributed DBMS with support for multiple data processors and transaction processors at multiple sites.
- A. multiple-site processing, single-site data
- B. single-site processing, multiple-site data
- C. single-site processing, single-site data
- D. multiple-site processing, multiple-site data

1.10 ____ transparency allows a transaction to update data at several network sites.
- A. Transaction
- B. Distribution
- C. Failure
- D. Performance

Complete each statement. Only write down the number and supply the correct missing word/term.

1.11 Data _____ is a discipline that focuses on proper generation, storage and retrieval of data.

1.12 Subtypes that contain nonunique subsets of the supertype entity set are known as _____ subtypes.

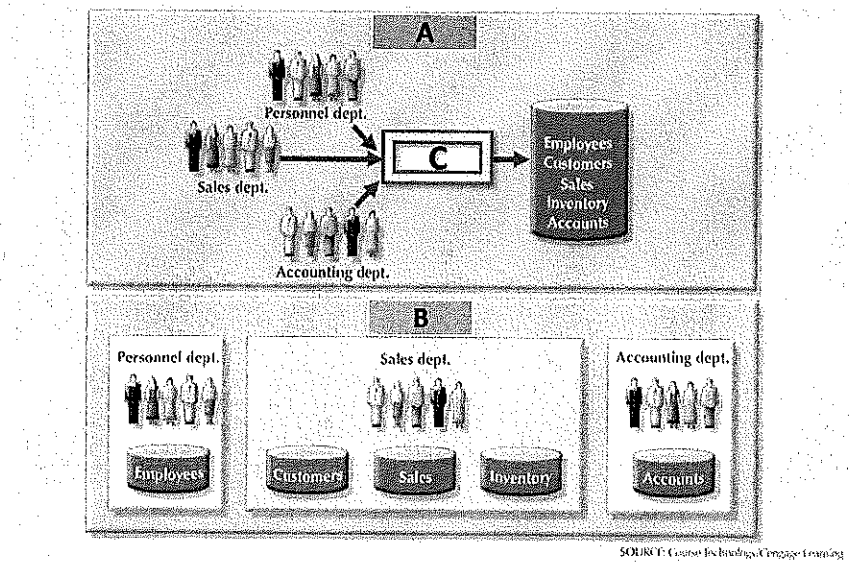
1.13 Usually, a data modeler uses a natural identifier as the _____ of the entity being modeled, assuming that the entity has a natural identifier.

1.14 One of the advantages of a DDBMS is processor _____.

1.15 _____ is data about data through which the end-user data are integrated and managed.

Question 2 (20)

Study the following diagram and answer the questions that follow.



SOURCE: Course Technology/Cengage Learning

2.1 Provide an appropriate title for the diagram. (1)

2.2 Identify the component of the system represented with A. (1)

2.3 Identify the component of the system represented with B. (1)

2.4 It is stated that: "Although the system as presented in part A of the diagram yields considerable advantages over previous data management approaches, this type of system does carry significant disadvantages."

Briefly discuss these disadvantages. (5x2)

2.5 List 7 common functions of component C as part of the diagram. (7)

Question 3 (13)

3.1 Discuss the cardinal importance and some considerations of proper database design, as part of the DBDLC and SDLC, in the development of different types of information systems. Include a short reference to the different types of databases as part of your answer. (10)

3.2 Define the term: Internal model (3)

Question 4 (11)

4.1 Discuss the difference between a Composite Key and a Composite Attribute. Also explain how each of these would be indicated as part of an ERD diagram, you may include an example as part of your answer. (3x2)

4.2 Discuss the notion of an index as part of a table. Refer to the purpose thereof as well in your answer. You may also include a small drawing to substantiate your answer. (5)

Question 5 (20)

5.1 Discuss the concept of a ***deadlock***, in a database (DB) environment, and how can it be avoided? As part of your answer also refer to the various strategies for dealing with deadlocks. You should also include a small diagram to illustrate the concept of a deadlock. (4+6+5)

5.2 Briefly, explain the main objective of query optimization. (3)

5.3 To which transparency feature are query optimization functions related? (2)

Question 6 (5)

6.1 Study the following image of tables and draw an applicable CROWS foot Entity relationship Diagram (ERD) based on the data presented. (3+2)

Table name: CUSTOMER

CUS_NUM	CUS_LNAME
1001	Smith
1002	Cordoza
1003	Bianco
1004	Jones

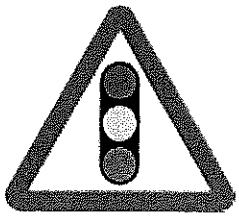
Table name: TAPE

TAPE_CODE	TAPE_COPY	TAPE_NAME	TAPE_CHARGE
M3456-1	1	Ramblin' Tulip	2.50
R2345-1	1	Once Upon a Midnight Breezy	3.99
R2345-2	2	Once Upon a Midnight Breezy	3.99
S4567-1	1	Tulips and Threelips	2.50
W1234-1	1	Bright Stars and Doodle Berries	3.00
W1234-2	2	Bright Stars and Doodle Berries	3.00
W1234-3	3	Bright Stars and Doodle Berries	3.00

Table name: RENTAL

RENT_NUM	RENT_DATE_OUT	CUS_NUM	TAPE_CODE	RENT_COPY	RENT_CHG_DAY	RENT_DATE_RETURN	RENT_CHARGE
10050	10-Jan-2010	1002	R2345-1	1	3.99	11-Jan-2010	3.99
10051	10-Jan-2010	1003	R2345-2	2	3.99	11-Jan-2010	3.99
10052	10-Jan-2010	1001	W1234-2	2	3.00	12-Jan-2010	6.00
10053	10-Jan-2010	1004	M3456-1	1	2.50	11-Jan-2010	2.50
10054	12-Jan-2010	1004	S4567-1	1	2.50	13-Jan-2010	2.50
10055	12-Jan-2010	1001	R2345-1	1	3.99	13-Jan-2010	3.99
10056	13-Jan-2010	1003	W1234-3	3	3.00	13-Jan-2010	3.00
10057	13-Jan-2010	1002	W1234-1	1	3.00	14-Jan-2010	3.00
10058	13-Jan-2010	1001	S4567-1	1	2.50	14-Jan-2010	2.50
10059	14-Jan-2010	1004	M3456-1	1	2.50	15-Jan-2010	2.50
10060	14-Jan-2010	1002	R2345-2	2	3.99	15-Jan-2010	3.99
10061	14-Jan-2010	1003	W1234-3	3	3.00	16-Jan-2010	6.00
10062	15-Jan-2010	1001	S4567-1	1	2.50		
10063	15-Jan-2010	1004	R2345-1	1	3.99	16-Jan-2010	3.99
10064	15-Jan-2010	1004	R2345-2	2	3.99		

Question 7 **(16)**



At the **Pray-As-You-Go Driving School**, a A client can either be a DriverLicenceApplicant or a LearnersLincenceClient.

In the case of the first, a LearnerLicenceNr, Code, ExpirtyDate are stored.
Such clients also have a Preferred instructor.

For every Client an applicable key field is stored as well as a name, surname, DOB and Address.
Various clients are allowed to book various lessons with various instructors.

For each Lesson a date and time is recorded as well as the duration of the lesson.
Historical data of a Client's attempts at obtaining a license should also be catered for.

Draw a Crows-Foot ERD which would present an acceptable data model for the scenario above. Include any applicable subtypes.

END ***Total [100]***