

MEMORANDUM

Programme	Diploma in Information Technology
Module	Information System 2A
Module Code	INS220
Module NQF Level	6
Credits	15
Test/Exam	TEST MEMO
Semester	1 st
Date Written	

Total marks	100
Duration	2 Hours
Pass mark	50%
Weighting	20%
Examiner	THABISO MATHEBULA
Moderator	FRANS RAMPAL

This question paper consists of 9 pages including the cover page.

REQUIREMENTS:

Learner Requirements: Stationery and Examination Answer booklet

Equipment Requirements: None

This paper consists of:

1.	Section A:	50 marks
2.	Section B:	30 marks
3.	Section C:	20 marks

ALL sections are **COMPULSORY**. It is in your own interest to write legibly and to present your work neatly.

PLEASE READ THE ASSESSMENT RULES AND REGULATIONS THAT FOLLOW

Learners are warned that contravening any of the examination rules or disobeying the instructions of an invigilator could result in the examination being declared invalid. Disciplinary measures will be taken which may result in the students' expulsion from Damelin.

ASSESSMENT RULES AND REGULATIONS

Please ensure that you have read and fully understand the following assessment rules and regulations prior to commencing with your assessment:

1. To be permitted access to the examination, a learner must arrive with:
 - an Identity Document or other official proof of identity (for example,
 - a student card, passport or driver's licence card with photo); and
 - the required exam stationery.
2. No learner may enter the examination room more than 30 minutes after the examination sitting has commenced and no candidate may leave the room less than one hour after the examination sitting has commenced.
3. No extra time will be allowed should a student arrive late.
4. All learners must sign the *Attendance Register* for the examination on arrival.
5. It is the responsibility of learners to familiarise themselves with the examination rules prior to sitting for the examination.
6. All examinations are to be written on the date and time officially stipulated by the College.
7. It is the responsibility of learners to ensure that they are writing the correct paper and that the question paper is complete
8. Cell phones must be switched *off* prior to entering the exam venue. Cell phones and wallets may be placed under candidates' chairs rather than at the front of the room.
9. Learners may not handle cell phones or wallets during the exam.
10. No weapon of any description may be taken into the assessment room.
11. All personal belongings are to be placed at the front of the examination room. Personal belongings brought to the examination are at the owner's risk.
12. Smoking is not permitted and learners will not be allowed to leave the examination room in order to smoke
13. Once the examination has commenced, all conversation of any form between candidates must cease until after candidates have left the room, after the examination.
14. *Only* the official College examination book, as supplied by the College, may be used.
15. Learners must ensure that their student number is written on the answer book.
16. Learners are responsible for ensuring that they follow the instructions in the examination for submitting their answers.
17. Please read the instruction appearing on the examination paper carefully
18. The number of every question must be clearly indicated at the top of every answer.
19. No pages may be torn out of the answer book. All question papers and scrap paper must be handed to the invigilator after the examination.
20. Learners finishing earlier are to leave the examination room as quietly as possible on the instruction of the invigilator and may not talk until outside the building where the examination is being written.
21. Only under exceptional circumstances will a learner be permitted to leave the examination room during the examination, and if the invigilator gives permission. An invigilator must accompany the learner. Only one learner at a time may be absent from the examination room.
22. Candidates may not act dishonestly in any respect.

SECTION A:

MULTIPLE CHOICE QUESTIONS

Select the correct answer from the options available.

In the provided answer book, write down the question number and the letter of the correct answer next to it.

For example: 1.1 D

Each question is worth one (1) marks.

QUESTION 1

(10 marks)

- 1.1 A condition in which data access is unaffected by changes in the physical data storage characteristics (1)
A. Data inconsistency
B. Data independence ✓
C. Data dependence
D. Data redundancy
- 1.2 The process that yields the description of the database structure and determines the database components (1)
A. Database design ✓
B. Database management system
C. Database system
D. Distributed database
- 1.3 A condition in which different versions of the same data yield different results (1)
A. Data inconsistency ✓
B. Data independence
C. Data dependence
D. Data redundancy
- 1.4 The collection of programs that manages the database structure and controls access to the data stored in the database (1)
A. Database design
B. Database management system ✓
C. Database system
D. Discipline-specific database
- 1.5 A logically related database that is stored in two or more physically independent sites (1)
A. Enterprise database
B. Operational database
C. Distributed database ✓
D. Transactional database

- 1.6 A data characteristic in which a change in the database schema affects data access, thus requiring changes in all access programs (1)
A. Structural dependence ✓
B. Structural independence
C. Structured data
D. Unstructured data
- 1.7 A powerful and flexible relational database language composed of commands that enable users to create database and table structures, perform various types of data manipulation and data administration, and query the database to extract useful information (1)
A. Query result set
B. XML database
C. XML Language
D. Structured Query Language ✓
- 1.8 An association between entities (1)
A. Relation
B. Relationship ✓
C. Relational diagram
D. Connectivity
- 1.9 A data characteristic in which changes in the database schema do not affect data access (1)
A. Structural dependence
B. Structured data
C. Structural independence ✓
D. Unstructured data
- 1.10 The set of commands that allows an end user to manipulate the data in the database. The commands include SELECT, INSERT, UPDATE, DELETE, COMMIT, and ROLLBACK (1)
A. Data definition language
B. Structured Query Language
C. XML Language
D. Data manipulation language ✓

TRUE / FALSE QUESTIONS

Indicate whether the statement below is True or False, give reason if it is False. Indicate your answer on the Answer book.

provided. For example: 2.1 FALSE

Each question is worth two (2) marks.

QUESTION 2

(10 marks)

- 2.1 Business rule is a brief, precise and ambiguous description of a policy, procedure or principle within a specific organization. **False, Business rule is a brief, precise and unambiguous description of a policy, procedure or principle within a specific organization** (SG, 21) ✓✓ (2)
- 2.2 Physical model operates at the highest level of abstraction, describing the way data are saved on storage media such as disk or tapes, it requires the definition of both the physical storage devices and the access methods required to reach data within those storage devices, making it software and hardware independent. **False, Physical model operates at the lowest level of abstraction, describing the way data are saved on storage media such as disk or tapes, it requires the definition of both the physical storage devices and the access methods required to reach data within those storage devices, making it both software and hardware dependent** (SG, 33) ✓✓ (2)
- 2.3 Data management is a discipline that focuses on the proper generation, storage and retrieval of data. **True** (SG, 4) ✓✓ (2)
- 2.4 DBMS can support only one type of database. **False, DBMS can support many different types of databases** (SG, 8) ✓✓ (2)
- 2.5 DBMS serves as the intermediary between the user and the database. **True** (SG, 7) ✓✓ (2)

MATCHING

Match the items in column A to corresponding descriptions in column B.

In the provided answer book, write down the question number and the letter of the correct answer next to it.

For example: 3.1 D

Each question is worth one (1) mark.

QUESTION 3

(10 Marks)

	Column A		Column B
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3.1	Query	A.	Occur when changes must be made to existing records
3.2	File system	B.	Supports multiple users at the same time
3.3	Update anomalies	C.	The number of its attributes in relation
3.4	Database	D.	Often used to store historical data
3.5	Enterprise	E.	Multi-user database that supports a large group of users or an entire organization
3.6	Workgroup	F.	Many separate and unrelated files
3.7	Data warehouse	G.	Logically related data stored in a single logical data repository
3.8	Degree	H.	Multi-user database that supports a small group of users or a single department
3.9	Insertion anomalies	I.	A question or task asked by an end user of a database in the form of SQL code.
3.10	Multi-user	J	Occur when entering new records

Answer:

3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10
I ✓	F ✓	A ✓	G ✓	E ✓	H ✓	D ✓	C ✓	J ✓	B ✓

QUESTION 4

(20 Marks)

- 4.1 Differentiate between data, knowledge and information, and what is the purpose of information. (5)

Answer:

- Data – Are raw facts ✓
- Knowledge – Implies familiarity, awareness, and understanding of information as it implies to an environment ✓
- Information – Is the result of processing raw data to reveal its meaning. ✓
✓Information can be used as the foundation of decision making. ✓✓

Outcome: Data vs Information

- 4.2 Provide five (5) advantages of DBMS. (TB, 8 - 9) (SG, 7) (5)

Answer: {any five (5) are correct}

- Improved data sharing ✓
- Better data integration ✓
- Minimized data inconsistency ✓
- Improved data access ✓
- Improved decision making ✓
- Increased End-user Productivity ✓

Outcomes: Role and Advantages of the DBMS

4.3 Outline five (5) relational database keys. (TB, 83) (SG, 46)

(5)

Answer:

- Super key ✓
- Candidate key ✓
- Primary key ✓
- Secondary key ✓
- Foreign key ✓

Outcome: Database keys

4.4 Provide five (5) properties that a relation must conform to. (TB, 73) (SG, 41)

(5)

Answer: {Any five are correct}

- A table is perceived as a two-dimensional structure composed of rows and columns. ✓
- Each table row (tuple) represents a single entity occurrence within the entity set and must be distinct. Duplicate rows are not allowed in a relation. ✓
- Each table column represents an attribute, and each column has a distinct name. ✓
- Each cell or column/row intersection in a relation should contain only an atomic value—that is a single data value. Multiple values are not allowed in cells of a relation. ✓
- All values in a column must conform to the same data format. ✓
- Each column has a specific range of values known as the attribute domain. ✓
- The order of the rows and columns is immaterial to the DBMS. ✓
- Each table must have an attribute or a combination of attributes that uniquely identifies each row. ✓

Outcome: A logical view of data

SECTION B:

QUESTION 5

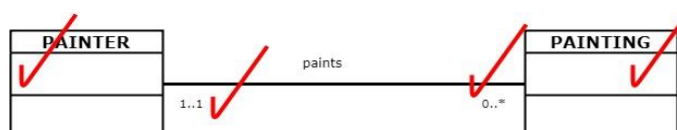
(30 Marks)

4.1 Draw the basic UML ERD of the following statements:

(15)

- a **PAINTER** can paint many **PAINTING**s; each **PAINTING** is painted by one **PAINTER**.

Answer:



- an **EMPLOYEE** can learn many **SKILL**s; each **SKILL** can be learned by many **EMPLOYEE**s.

Answer:



- an **EMPLOYEE** manages one **STORE**; each **STORE** is managed by one **EMPLOYEE**.

Answer:

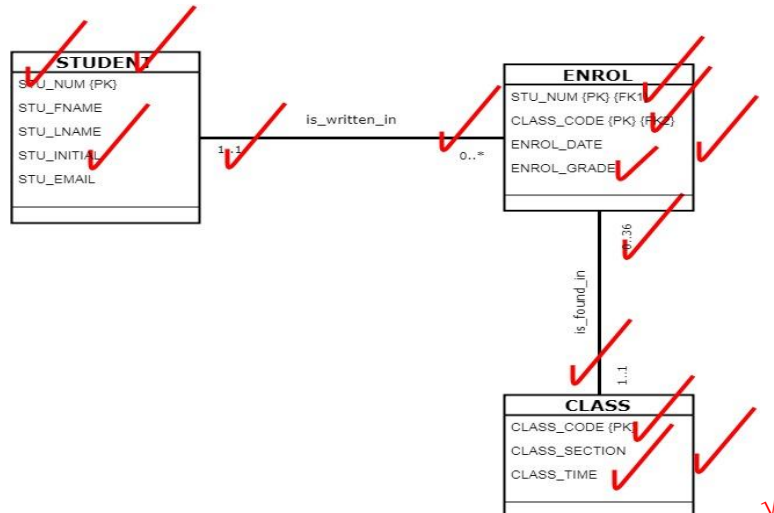


Outcome: The External Model

- 4.2 Draw the basic UML ERD of the following statements with constraints. Show attributes (15) and clearly show primary keys and foreign keys on your diagram. (TB, 197)

- A **CLASS** may **ENROL** up to 40 **STUDENTS**; and each **STUDENT** may **ENROL** up to 5 **CLASSES**.

Answer:



Outcome: The External Model

SECTION C:
QUESTION 6

(20 Marks)

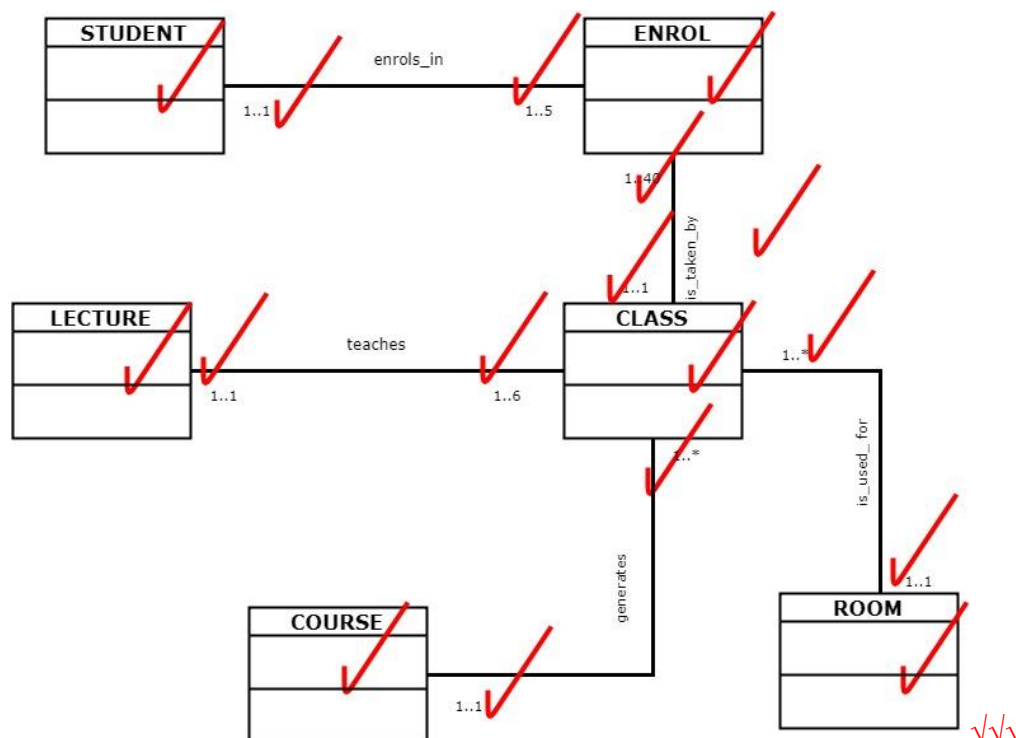
Outcome: The Conceptual Model
COLLEGE DATABASE

You want to design a database of a small college that will be used to manage data. To design this database, consider the following business rules:

- A **LECTURER** may teach up to 6 **CLASSES**; and each **CLASS** is taught by only one **LECTURER**.
- A **CLASS** may **ENROL** up to 40 **STUDENTS**; and each **STUDENT** may **ENROL** up to 5 **CLASSES**.
- Each **COURSE** may generate many **CLASSES**; but each **CLASS** reference a single **COURSE**.
- A **CLASS** require one **ROOM**; but a **ROOM** may be scheduled for many **CLASSES**.

5.1 Based on the business rules above, draw an ERD (Entity Relationship Diagram) of the college database. (20)

Answer:



∞End of Question Paper∞