

UGANDA BUSINESS AND TECHNICAL EXAMINATIONS BOARD

PAPER CODE TDIT 123	PROGRAMME NATIONAL DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY YEAR I SEMESTER II	DATE THURSDAY, 11 TH AUGUST 2022
SERIES JULY/AUGUST 2022	PAPER NAME DATABASE PLANNING, DESIGN AND MANAGEMENT I	TIME ALLOWED 3 HOURS
YOU SHOULD HAVE THE FOLLOWING FOR THIS EXAMINATION Answer Booklet		

INSTRUCTIONS TO CANDIDATES

1. This paper consists of **eight** questions.
2. Answer **only five** questions.
3. All questions carry equal marks.
4. All answers to each question should begin on a fresh page.
5. **Do not** write anywhere on this question paper.
6. All rough work should be done in the official answer booklet provided.
7. Read other instructions on the answer booklet.

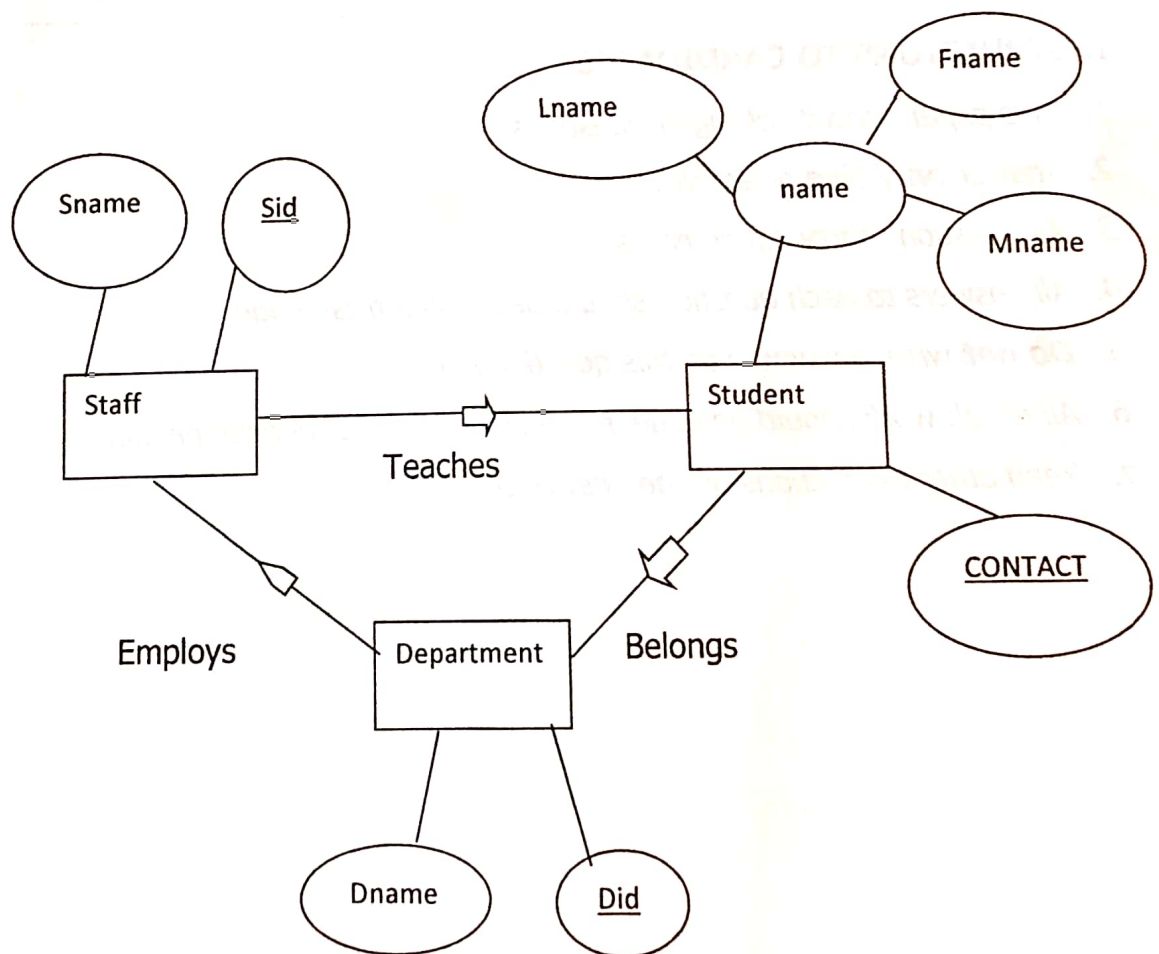
Question One

A College Information system currently uses three sets of files for its student records, staff records and finance records and each is run separately. The systems manager is keen to introduce a **Database Management System** (DBMS) claiming that this will have major benefits for the College.

- (a) Explain **five** advantages of a system to be introduced as compared to use of independent files. (10 marks)
- (b) During the design of the system, a decision is made to restrict the access of different users in different ways. Describe **five** different restrictions that may be imposed upon different users. (10 marks)

Question Two

- (a) Distinguish between **domain constraints** and **entity integrity constraints** as used in Database Management Systems. (04 marks)
- (b) The ERD below shows the relationships between different entities in a University Database



- (i) List down the **three** entities from the ERD above. (03 marks)
- (ii) Map the identities in 2(b)(i) into relations. (07 marks)
- (iii) Using the ERD above, explain the difference between a **single-valued attribute** and a **multi-valued attribute**. Give an example of each. (06 marks)

Question Three

- (a) Define the term **user view** as used in Database Management Systems. (02 marks)
- (b) Explain **three** importance of using views in a database. (06 marks)
- (c) A library uses an interactive computer database system for details and answers customer enquiries regarding the availability of books. An enquiry for a particular book shows that there should be a single copy remaining in stock. After searching the shelves and stock room, the book cannot be found.
 - (i) State **four** possible reasons for this discrepancy. (04 marks)
 - (ii) Describe **four** different strategies the library can apply to avoid the discrepancies when a search operation is done. (08 marks)

Question Four

- (a) Distinguish between **normalization** and **generalization**. (04 marks)
- (b) Explain **four** reasons why normalization is important. (08 marks)
- (c) Using examples, explain the following database concepts.
 - (i) First normal form (02 marks)
 - (ii) Second normal form (03 marks)
 - (iii) Third normal form (03 marks)

Question Five

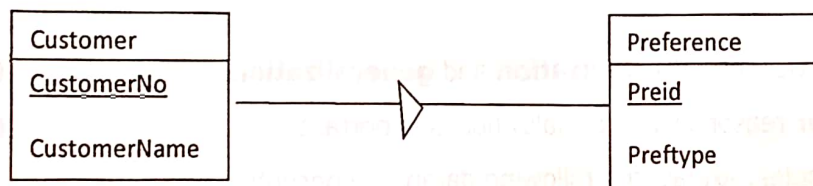
- (a) Distinguish between **decision tree** and **CASE tools** as used in database design. (04 marks)
- (b) Explain **three** types of CASE tools used in database planning, design and maintenance. (06 marks)
- (c) Describe the Database Development Life Cycle. (10 marks)

Question Six

- (a) Define the following terms as used in databases. (02 marks)
- (i) Insertion anomaly (02 marks)
 - (ii) Deletion anomaly (02 marks)
 - (iii) Modification anomaly (02 marks)
- (b) Explain the disadvantage of each of the anomalies in 6(a). (06 marks)
- (c) Given that **A** and **B** are attributes of relation **R** and that **B** is functionally dependent on **A**;
- (i) Use a diagram to illustrate this relationship. (04 marks)
 - (ii) Describe the circumstance under which an attribute **A** is considered to be functionally dependent on **B**. (04 marks)

Question Seven

- (a) Distinguish between a **weak entity** and **strong entity** as used in database management systems. (04 marks)
- (b) The diagram below represents a relationship between two entities.



- (i) Identify the strong and weak entities from the above relationship. (02 marks)
 - (ii) State the reason to support your answer in 7(b)(i). (02 marks)
- (c) Under what circumstances are entities **X** and **Y** considered to have;
- (i) One-to-one relationship. (02 marks)
 - (ii) One-to-many relationships. (02 marks)
 - (iii) Many-to-many relationships. (02 marks)
- (a) With illustrations, explain **two** problems associated with ER diagrams. (06 marks)

Question Eight

- (a) Define the term data independence in database management system. (02)
- (b) Explain **two** types of data independence. (04)
- (c) Describe the levels of the ANSI SPARC database architecture. (06)
- (d) Discuss **four** checks that can be performed on a data item to ensure integrity. (08)

END