



Machakos University

University Examinations for 2022/23 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST TERM EXAMINATION FOR

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

2920/206: DATABASE MANAGEMENT SYSTEMS

DATE: 23/3/2023

TIME: 8:30 – 11:30 AM

Instructions: Answer any five questions

QUESTION ONE (20 MARKS)

- a) Differentiate between sequential file access method and direct file access method. (4 marks)
- b) Explain each of the following concepts in the context of the relational data model.
 - i. relation (1 mark)
 - ii. tuple (1 mark)
- c) Identify two notations used to show relationship between entities in an E-R diagram. (2 marks)
- d) Identify two limitations of traditional file systems and state how such limitations have been addressed by the database approach. (4 marks)
- e) Janet, a database administrator is supposed to protect the database from various threats. Advise her on two methods she can use to perform this task. (4 marks)
- f) Differentiate between primary key and foreign key. (4 marks)

QUESTION TWO (20 MARKS)

- a) Explain each of the following concepts in the context of the relational data model.
 - i. tuple (2 marks)
 - ii. relational database. (2 marks)
- b) With aid of a well-labelled diagram, illustrate an E-R model. (4 marks)
- c) Explain two advantages and two disadvantages of DBMSs. (8 marks)
- d) Explain the important role played by users in the process of database design. (4 marks)

QUESTION THREE (20 MARKS)

- a) Outline four main tasks carried out by the Database Administrator (DBA). (4 marks)
- b) Identify two threats that could affect a database system. (2 marks)
- c) Explain two advantages of database management systems. (4 marks)
- d) Describe what relationships represent in an ER model and provide examples of unary, binary, and ternary relationships. (10 marks)

QUESTION FOUR (20 MARKS)

- a) Define the following terms in the context of database management systems.
 - i. Attribute (2 marks)
 - ii. Data dictionary (2 marks)
 - iii. Distributed database (2 marks)
- b) Explain the following in terms of providing security for a database.
 - i. authorization (2 marks)
 - ii. backup (2 marks)
 - iii. encryption (2 marks)
- c) Describe four components of a database system. (8 marks)

QUESTION FIVE (20 MARKS)

- a) Explain the relational data model. (4 marks)
- b) Using a suitable example, explain two entity relationships. (4 marks)
- c) Janet has been employed as a database administrator by Bentam (K) Ltd. She is mandated to develop a database system for the company.
 - i. Outline the process she could follow to achieve this mandate. (6 marks)
 - ii. Explain two benefits the system could bring to the company. (4 marks)
 - iii. Identify two security measures she could incorporate into the system to protect the company data. (2 marks)

QUESTION SIX (20 MARKS)

- a) Describe the stages of the database system development lifecycle. (6 marks)
- b) Describe two components of the DBMS environment. (6 marks)
- c) Distinguish a data warehouse from a data mart. (4 marks)
- d) Explain two responsibilities of a database administrator. (4 marks)

QUESTION SEVEN (20 MARKS)

- a) Citing an example in each case, explain two types of attributes in a relational database system. (6 marks)
- b) Describe what attributes represent in an ER model and provide examples of simple, composite, multi-value, and derived attributes. (10 marks)
- c) Explain the purpose of Entity Relationship Diagrams in the data modelling activity for database systems. (4 marks)