

DIPLOMA IN INFORMATION COMMUNICATION  
TECHNOLOGY MODULE II

DATABASE MANAGEMENT SYSTEMS

November 2015

Answer FIVE of the following EIGHT questions.

1. (a) (i) List six examples database management systems available in the market (3 marks)

(ii) Describe a relational database management system (2 marks)

(b) Describe each of the following components of a database

(i) stored procedures (2 marks)

(ii) tables (2 marks)

(iii) triggers (2 marks)



( c ) With the aid of a diagram , describe the three schema database architectures ( 9 marks )

2. (a) Outline three characteristics of an entity in a database (3 marks)

(b) Describe each of the following criteria for classification of database management systems

(i) based on data models (2 marks )

(ii) based on the number of users ( 2 marks )

(iii) based on database distribution (2 marks )

( c ) With the aid of an example, distinguish between integrity and domain constraints as used in databases (5 marks )

(d) With the aid of an example in each case, describe each of the following attributes as used in databases



- (i) simple (2 marks )
- (ii) composite (2 marks)
- (iv) derived (2 marks )

3. (a) outline four advantages of using indexes in structured query language (4 marks )

(b) write a structured query language statements equivalent for each of the following relational algebra operations

- (i) project (2 marks )
- (ii) difference (2 marks )
- (iii) union (2 marks )

( c) Distinguish between a data administrator and database administrator as used in databases(4 marks)



(d) Alex is in the process of designing a database . Explain three phases that he should consider during design (6 marks)

4. (a) with the aid of an example describe a hypermedia database (3 marks)

(b) Explain why each of the following is a threat to databases

(i) loss of integrity (2 marks)

(ii) loss of availability (2 marks )

(iii) loss of confidentiality (2 marks )

( c) in a college , a lecturer may teach many subjects but may not belong to more than one department. The college maintains information of its lecturer subjects area as follows



Lecturer number ,lecturer name ,lecturer grade,  
department code , department name ,subjects codes,  
subjects name , and subjects level.

Represent this information to 3rd normal form ( 11  
marks)

5. (a) (i) Describe the term repeating group as used in  
normalization (2 marks)

(ii) Outline three goals that would be achieved from using  
a normalized table

(3 marks)

(b) Describe each of the following terms as used in  
database management

(i) domain relational calculus (2 marks)

(ii) query optimizer (2 marks )

(iii) relational algebra (2 marks )



(c ) Represent each of the following structured query language statements using a Venn diagram

(i) SELECT \*

From table \_A A

FULL OUTER JOIN TABLE -B B

ON A.KEY =B.KEY

WHERE A.KEY IS NULL OR B .KEY IS NULL (3 marks)

(ii) SELECT \*

FROM TABLE -A A

RIGHT JOIN TABLE -B B

ON A.KEY =B.KEY

WHERE A.KEY IS NULL (3 marks)

(iii) SELECT \*

FROM TABLE -A A

FULL OUTER JOIN TABLE -B B

ON A. KEY =B. KEY (3 marks)



6. (a) Describe each of the following approaches used in the design of a database

(i) top down (2 marks)

(ii) bottom up (2 marks)

(b) Write a structured query language statements that would

(i) display first 3 characters of field first -name from a table named employee (2 marks)

(ii) display names that begin with letters in range of D through G from the first -name field from the employee table (3 marks)

(iii) create a table named employee data with the following properties(5 marks)



(iv) Change the email and commission field values of employees table with "not available" and 0.10 respectively for those employees whose department\_id is 150; (3 marks )

(v) Add a field named region-id after start-date to the table employeedata table (3 marks)

7. (a) Outline four types of states that a transaction may be in during processing in a database management system.(4 marks)

(b) Distinguish between direct and indirect end users as used in DBMS.(4 marks)

(c ) Aristocrafty, encountered some challenges when they introduced a distributed database management system. Explain three technical challenges that the company may have faced.(6 marks)





(d) Write equivalent relation algebra statements for each of the following structured query

language statements;

(i) SELECT ActionTitle

FROM STARS stars, Actionmovie

WHERE starName = Andrew and birthdate=1956

(ii) select a,b

From table1, table2

Where  $d > e$  and  $f = g$ ;

(iii) (select sum (salary

From employee

WHERE DEPARTMENT = "COMPUTER"

8. (a) Outline four functions of views as used in structured query language (4 marks)



(b) Under what circumstance would each of the following joins be used in relational

(i) left join(2 marks

(ii) equi join (2 marks)

(iii) cross join (2 marks)

(c ) Distinguish between data manipulation language and transaction control as language as used in structured query language(4 marks)

(d) Mwaziri intends to design an Entity relationship diagram for a proposed database system outline

six procedures guidelines that with enable him meet his objectives.(6 marks)

