

Name: \_\_\_\_\_ Index No. \_\_\_\_\_ / \_\_\_\_\_

2920/206  
**DATABASE MANAGEMENT SYSTEMS**  
 November 2015  
 Time: 3 hours

Candidate's Signature \_\_\_\_\_

Date: \_\_\_\_\_



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY**

**MODULE II**

**DATABASE MANAGEMENT SYSTEMS**

**3 hours**

**INSTRUCTIONS TO CANDIDATES:**

*Write your **name** and **index number** in the spaces provided above.*  
*Sign and write the **date of examination** in the spaces provided above.*  
*Answer any **FIVE** of the following **EIGHT** questions.*  
*Candidates should answer the questions in **English**.*

**For Official Use Only.**

Question Number	1	2	3	4	5	6	7	8	TOTAL SCORE
Candidate's Score									

**This paper consists of 16 printed pages.**

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

1. (a) (i) List **six** examples of Database Management Systems available in the market. (3 marks)

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

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

- (i) stored procedures; (2 marks)

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- (ii) tables; (2 marks)

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- (iii) triggers. (2 marks)

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

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

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

(i) based on data models; (2 marks)

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

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(iii) based on database distribution. (2 marks)

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

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

- (i) simple; (2 marks)

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- (ii) composite; (2 marks)

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- (iii) derived. (2 marks)

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- 3 (a) Outline **four** advantages of using indexes in Structured Query Language. (4 marks)

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(b) Write a Structured Query language statements equivalent for each of the following relational algebra operations:

(i) projection; (2 marks)

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(ii) difference; (2 marks)

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(iii) union. (2 marks)

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

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

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

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(b) Explain why each of the following is a threat to databases:  
(i) loss of integrity; (2 marks)

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(ii) loss of availability; (2 marks)

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(iii) loss of confidentiality.

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(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 lecturers' subject area as follows;

*Lecturer Number, Lecturer Name, Lecturer Grade, Department Code, Department Name, Subject Code, Subject Name and Subject Level*

Represent this information to 3<sup>rd</sup> Normal Form.

(11 marks)

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

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(ii) Outline **three** goals that would be achieved from using a normalized table. (3 marks)

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

(i) domain relational calculus; (2 marks)

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(ii) query optimizer; (2 marks)

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(iii) relational algebra. (2 marks)

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